Feature Articles

No-Till Organic Relay Cropping in Kentucky ...............................................................Page 8
Pawpaw - A “Tropical” Fruit for Temperate Climates .................................................Page 10
Low-Cost Fence Designs to Limit Deer Impacts in Woodlands and Sugarbushes....Page 16
Vermont food system businesses are building a values-based supply chain to succeed in the local, regional, and national marketplace.

by Jake Claro, Farm to Plate Director, Vermont Sustainable Jobs Fund

When you ask people their definition of the Vermont food economy, they’ll often talk about farms, farmers’ markets, or CSAs. What’s often missing from the conversation are the supply chain of local businesses such as distributors, food processors and manufacturers, and seed, feed, and equipment dealers.

Vermont’s local food economy not only extends well beyond the farm, it’s also an important part of our state’s economic engine. Sales from food and beverage manufacturing and wholesale distribution in 2012 totaled $9.1 billion. In terms of employment across the food system—spanning farm inputs (seed, feed, fertilizer), production, processing, distribution, and retail—64,000 Vermonters are employed in the food economy.

In Vermont, local food is considered to be anything produced or processed in Vermont plus 30 miles.

Essential to Vermont’s food economy, food manufacturing and processing involves a series of mechanical (chopping, mincing, mixing ingredients) or chemical (fermentation, pickling, curing) operations to preserve or change raw food into other forms, such as cheese, beer, maple syrup, meats, and sauces.

Food and beverage manufacturing has boomed since 2010 as one of the few growing manufacturing sectors in Vermont. Employment increased 47 percent from 2009 to 2015, up from 4,628 jobs to 6,810. Processing and food manufacturing facilities in Vermont represent a diversity of products and scales, from large commercial facilities like Cabot Creamery Cooperative and King Arthur Flour, to smaller operations like Green Pasture Meats, Baird Farm Maple Syrup, 14th Star Brewing, and Mad River Food Hub.

The growth in food manufacturing is even more impressive when you contrast growth with non-food manufacturing in Vermont. From 2004 to 2013, total value-added, non-food manufacturing in Vermont decreased 37 percent (-$2.3 billion). But in the food economy, it’s an entirely different story. Net value-added food manufacturing (when raw products are processed into something else, like beer, salsa, or ice cream) increased 58 percent ($359 million).

A Values-Based Supply Chain

Traditional supply chain businesses view relationships as transactional, competitive, and benefits unevenly distributed—the average U.S. farmer, for example, only receives approximately 17 cents of each dollar spent on food, while the remainder goes to food service, processing, and retail.

Vermont’s food economy emphasizes the relationships between supply chain businesses and their shared commitments to being financially profitable, as well as providing positive benefits to the community and environment.

In Vermont’s values-based supply chain, businesses work together to boost the entire local economy and contribute to our self-sufficiency as a state.

For Example:

• Butternut Mountain Farm, one of the largest maple processors and distributors in Vermont, has created lasting connections over the past 40 years by purchasing and distributing maple syrup from approximately 350 small producers who manage over 100,000 acres of land, helping get their products into consumers’ homes.

• The Mad River Food Hub in Waitsfield is an incubator for business development, providing processing space and distribution to clients, as well as marketing opportunities through the new Mad River Taste Place.

• Pete’s Greens established The Vermont Farm Fund, which was inspired by the outpouring of support the farm received after a fire destroyed the barn that was the heart of its operation. The fund was started to help other farms get back on their feet and has evolved to include a Business Builder Loan Program that’s designed to help other food businesses innovate and grow. Since 2011, the Fund has lent $764,000.

These are just a few examples of numerous Vermont food system businesses that are going beyond the traditional supply chain model to succeed in the local, regional, and national marketplace.

Local food is truly a bright spot in Vermont’s local economy. Increasing consumer purchases of local food keeps more money here in Vermont—and in turn creates jobs, supports businesses committed to their communities, protects family farms, and helps more local food be accessible for more Vermonters.

Learn more about the work taking place to implement Vermont’s Farm to Plate food system plan at www.vtfarmtoplate.com.
How can I get Small Farm Quarterly?

**Country Folks subscribers** automatically receive SFQ four times a year at no extra cost. Country Folks is delivered weekly for $50 per year.

**SFQ-only subscribers** receive just the 4 issues of Country Folks that contain the SFQ insert for only $5 a year.

Cooperative Extension Associations and other organizations can offer their members a subscription to SFQ as a member benefit! Your organization collects the names, forwards them to Country Folks Subscriptions, and pays Country Folks just $2.50 for each subscriber. Country Folks mails out the copies.

**Bulk orders:** You can order multiple copies of any issue for just 10c a copy! Minimum order is 50. Orders must be placed at least 4 weeks before the publication date.

To find out more, contact:

Tracy Johnson  
Country Folks Subscriptions  
P.O. Box 121, Palatine Bridge, NY 13428  
1-888-596-5329  
email: subscriptions@leepub.com

---

Baskets to Pallets training offered in NNY

Are you looking to diversify sales beyond the farmers market, CSA and farm stand? Food hubs, grocery stores and cooperatives are looking for your products to meet growing consumer demand for local and sustainably-grown food. Yet, doing so can be challenging. Hear Janaki Fisher-Merritt from the Food Farm (Wrenshall, MN) discuss how they have worked to incorporate cover crops in a diverse rotation with cover crop fallows, interseeding, and cut-and-carry mulching. Ryan Maher, from the Cornell SFP, will share research results from the latest trials on strip tillage in winter hardy cover crops and adaptations for organic cropping systems. Come to think through the approaches and tools that will work to reduce inputs and improve productivity on your farm.

**Winter conferences**

- **NOFA-NY Winter Conference (Jan. 19 in Saratoga Springs, NY)** to learn how you can get more from the latest trials on strip tillage in winter hardy cover crops and adaptations for organic cropping systems. Come to think through the approaches and tools that will work to reduce inputs and improve productivity on your farm.

From the Editor:

For those of us that work each day until sunset, Winter brings a forced break as the sun drops and darkness falls earlier in the day. Things tend to slow down, and rest feels more affordable. There is time to repair broken tools and equipment, clean up that fallen pile of debris, and even sleep in a little later than we might allow ourselves to during the rush of the growing season.

Still, animals need to be fed and milked, and extra care taken to make sure water doesn’t freeze and materials don’t get lost under the snow. The work isn’t always easier, just different. I happily welcome the change from moving sheep fence to hauling buckets of water, a task I will happily trade back once more, come spring.

Whatever the case may be, may you find time to give thanks for the season, put your feet up and rest for at least a few minutes, and enjoy celebrating with family and friends!

- Steve Gabriel

---

Cornell Small Farms Program Update

**Winter workshops on novel cover cropping and strip tillage practices for vegetables**

Attend the 2018 Empire State Producers Expo (Jan. 18 in Syracuse, NY) or the NOFA-NY Winter Conference (Jan. 19 in Saratoga Springs, NY) to learn how you can incorporate cover cropping and reduced tillage practices while overcoming the residue and weed management challenges. Hear Janaki Fisher-Merritt from the Food Farm (Wrenshall, MN) discuss how they have worked to incorporate cover crops in a diverse rotation with cover crop fallows, interseeding, and cut-and-carry mulching. Ryan Maher, from the Cornell SFP, will share research results from the latest trials on strip tillage in winter hardy cover crops and adaptations for organic cropping systems. Come to think through the approaches and tools that will work to reduce inputs and improve productivity on your farm.

---

Log-Grown Shiitake: Economics and Management for a Profitable Crop

The Cornell Small Farms Program is offering a one-day workshop this winter in eight locations around New York State about the marketing and business aspects of growing and selling log-grown shiitake mushrooms.

The conference, hosted by the Cornell Small Farms Program and the Farmer Veteran Coalition, showcased some of the many resources that are available to veterans in agriculture. Be on the lookout for educational workshops from FarmOps partners at CCE of Jefferson County, CCE of Allegany County, CCE of Broome County, Heroic Foods, and Equicenter. Other initiatives include On the Job Training opportunities, a veterans in agriculture Livestock and networking activities. Resources and information about these efforts are available on the FarmOps website, http://smallfarms.cornell.edu/projects/farmops/.

Funding for these initiatives is provided through support from the New York State Department of Agriculture and Markets, by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2015-70017-22882, and by the Local Economies Project of the New World Foundation.

---

Upcoming Online Courses

The Cornell Small Farms Program offers over 20 online courses each year on a wide range of topics. You can learn more about each course at: http://smallfarms.cornell.edu/online-courses/
TABLE OF CONTENTS

Cornell Small Farms Program Update..............................Page 3

EXTENSION NEWS
Extension and NY Farmers Share Harvest with Hurricane Victims
by R.J. Anderson..........................................................Page 20
Extension Helps NY Brewers, Growers Raise a Pint
by R.J. Anderson..........................................................Page 19
Extension Summer Interns Recount Helping NYS Businesses and Communities
by R.J. Anderson..........................................................Page 7

FARM SAFETY
Personal Protective Equipment: Chainsaw Safety, Part 2
by Rich Taber...............................................................Page 5

FOREST, FIELD & WOODLOT
Black Locust: A Tree with Many Uses
by Steve Gabriel.........................................................Page 12
Low-Cost Fence Designs to Limit Deer Impacts in Woodlands and Sugarbushes
by Peter Smallidge........................................................Page 16

FRUITS & VEGETABLES
Pawpaw - A "Tropical" Fruit for Temperate Climates
by Guy K. Ames...........................................................Page 10
Using Whole Farm Revenue Protection to Manage Ups and Downs in the Berry Patch
by Dan Welch...............................................................Page 15

LIVESTOCK AND POULTRY
Improved Meat Marketing for Small Scale and Direct Marketing Farms in the Northeast
by Matthew LeRoux......................................................Page 6

LOCAL FOOD & MARKETS
Local Food Economic Impacts in Vermont
by Jake Claro...............................................................Page 2

RESOURCE SPOTLIGHT
Book Review: Mycorrhizal Plant by Michael Phillips
by Steve Gabriel...........................................................Page 17
Supporting Haudenosaunee Seed Stewardship in New York
by Ken Greene.............................................................Page 12
Young Farmer Survey Gives a Glimpse of the Next Generation..............................................Page 9

SEED STORIES
New Heirloom Vegetables for the Finger Lakes
by Petra Page-Mann......................................................Page 18

SOIL HEALTH
No-Till Organic Relay Cropping in Kentucky
by Brian Caldwell and Ryan Maher..................................Page 8

STEWARDSHIP & NATURE
Gimme Free Ice Cream!
by Jason Detzel............................................................Page 14

VETERANS IN AG
Veterans and Their Families Learn About Local Agriculture Straight from the Farmer’s Mouth
Alyssa Couse...............................................................Page 14

Cover photo: Paw Paws entered in the tasting competition at the Ohio Paw Paw Festival, held each September in Athens, OH.

SMALL FARM QUARTERLY

Good Farming and Good Living
Connecting People, Land, and Communities
Small Farm Quarterly is for farmers and farm families — including spouses and children — who value the quality of life that smaller farms provide.

OUR GOALS ARE TO:

• Celebrate the Northeast region’s smaller farms;
• Inspire and inform farm families and their supporters;
• Help farmers share expertise and opinions with each other;
• Increase awareness of the benefits that small farms contribute to society and the environment;
• Share important research, extension, and other resources.

Small Farm Quarterly is produced by Lee Newspapers, Inc, and is distributed four times a year as a special section of Country Folks. Publication dates: January 8th, April 2nd, July 2nd and October 1st, 2018.

EDITORS & CONTRIBUTORS:

• Steve Gabriel, Cornell Small Farms Program Managing Editor sfg53@cornell.edu
• Anu Rangarajan, Cornell Small Farms Program Editor-in-Chief ar47@cornell.edu
• Tara Hammonds, Cornell Small Farms Program Student Intern tih25@cornell.edu
• Ryan Maher, Cornell Small Farms Program Vegetables ryan.maher@cornell.edu
• Rich Taber, CCE Chenango County Farm Tech/Farm Woodlot rtab44@cornell.edu
• Ulf Kintzel, White Clover Sheep Farm Sheep ulf@whitecloversheepfarm.com
• Petra Page-Mann, Fruition Seeds Seed Stories petra@fruitionseeds.com
• John Thurgood, USDA Natural Resources Stewardship and Nature john.thurgood@vt.usda.gov
• Jason Foscolo, The Food Law Firm Farm Law info@foodlawfirm.com
• Reuben Douvrie, Ruhi Insurance Farm Insurance ruhiinsurance@gmail.com
• Elizabeth Henderson Labor elizabeth.henderson13@gmail.com
• R.J. Anderson Extension Communications rj.anderson@cornell.edu

FOR SUBSCRIPTION INFORMATION CONTACT
Tracy Johnson, Lee Newspapers, Inc., PO Box 121, Palatine Bridge, NY 13428 888-596-5329, ext. 146 • subscriptions@leepub.com

FOR ADVERTISING INFORMATION CONTACT:
Tina Krieger, Lee Newspapers, Inc., 518-673-0108 or 800-218-5586, ext. 108 or tkrieger@leepub.com

SEND YOUR LETTERS AND STORIES TO:
Cornell Small Farms Program
15A Plant Science Building, Cornell University, Ithaca, NY, 14853
607-255-2142 • sfg53@cornell.edu

Small Farm Quarterly is compiled by the Cornell Small Farms Program, based at Cornell University in Ithaca, NY. The Cornell Small Farms Program fosters the sustainability of diverse, thriving small farms that contribute to food security, healthy rural communities, and the environment. We do this by encouraging small farms-focused research and extension programs.

Anyone is welcome to submit articles for consideration. See our guidelines at smallfarms.cornell.edu/quarterly/writers/ and contact Steve Gabriel with inquiries. Articles should be 1,000 - 1,600 words in length with 2 - 3 high-resolution pictures.

Topics should be appropriate for a farmer audience, and not promote a single organization or business. We focus on articles with relevant information that helps to improve the practice of farming and agriculture in New York and the Northeast.

About copyright: The material published in Small Farm Quarterly is not copyrighted unless otherwise noted. However, we ask that you please be sure to credit both the author and Small Farm Quarterly.

SUPPORTING ORGANIZATIONS:

CONSErVATION: The USDA Natural Resources Conservation Service:
United States Department of Agriculture
Natural Resources Conservation Service
www.nrcs.usda.gov
832-665-7065
http://www.mjt.org/
802-318-5527

VERMONT SUSTAINABLE JOBS FUND
http://www.vsjf.org/ 802-655-7895

ABOUT OUR ADS...
All advertisements in Small Farm Quarterly are managed by Lee Newspaper. Cornell’s Small Farms Program, Cornell Cooperative Extension, and other Small Farm Quarterly sponsors and contributors do not endorse advertisers, their products or services. We receive no revenues from advertisers.

To find out how your business or organization can advertise in Small Farm Quarterly, contact: Tina Krieger, Lee Newspapers, 518-673-0108 or 800-218-5586, ext. 108, tkrieger@leepub.com
Personal Protective Equipment: Chainsaw Safety, Part 2
by Rich Taber, CCE Chenango

This second part article on chainsaw safety is part of our CCE Chenango grant project done in collaboration with the New York Farm Viability Institute, "Increased Farm Profitability and Diversity through Value-Added Forest Products Initiative". We have been encouraging farmers and woodland owners to develop forest-based enterprises, many of which at one time or another require the safe use of chainsaws. In the Fall 2017 edition of SFQ I began with part I, "Chainsaw Safety, an Absolute Necessity", in which I listed the general requirements for Personal Protective Equipment, or "PPE".

To reiterate: head, hearing, eye and face, leg, foot, and hand protection needs to be present in order to safely and efficiently operate a chainsaw. The rest of this Part II article will deal with the specifics needed for each category of protection. Some good information on this topic can be found in the book "To Fell a Tree: A Complete Guide to Successful Tree Felling and Woodcutting Methods", by Jeff Jepson, and the "Chainsaw Operator’s Manual: Chainsaw Safety, Maintenance and Cross Cutting Techniques", published by Forest-Works; both books are available from online vendors.

Head, eye, ear, and face protection can all be accomplished by wearing a good quality helmet specifically designed for chainsaw use. OSHA, (Occupational Safety and Health Administration) requires it, and it would still be imperative to wear one even if it were not required by law. The helmet style that is becoming the standard among tree cutting professionals is the “helmet system”. The helmet incorporates a face shield for eye and face protection, earmuffs to reduce ear noise to a safe decibel level, and of course the helmet face shield for eye and face protection.

Head protection is the “helmet system”. The helmet incorporates a face shield for eye and face protection, earmuffs to reduce ear noise to a safe decibel level, and of course the helmet face shield for eye and face protection. Inspect your helmet daily for cracks, frayed straps, or other signs of damage to the shell, suspension, or helmet components. Repair of the helmet is NOT an option, and should be replaced every two or three years.

An industry approved helmet providing eye, ear, face, and head protection.

Hand protection can be provided for by using gloves; such as traditional leather, latex covered “gripper gloves”, and styles that are chainsaw resistant. Gloves protect your hands from injuries such as cuts, scratches, splinters, and burns and provide a firm grip on the things you handle daily while working: limbs, logs, chainsaws, rope, and other work related tools.

Leg protection is another necessity when working with chainsaws. The majority of chainsaw injuries occur on the legs and knees. It is important to wear protective pants, chaps, or bibs designed specifically for chainsaw use. Cheaply constructed pants are no bargain; typically no leg protectors are cut-proof, instead, the fabric of leg protection is designed to slow or jam the cutters of the chainsaw when contact is made, thus reducing the severity of the injury.

Foot protection can be provided with a good work boot. Many woods workers use steel-toed boots, which can protect feet from being crushed by logs rolling onto the user’s feet.

There are many excellent places to acquire the required safety equipment. I suggest going to vendors who cater to the logging industry, rather than “big box” type stores. The personnel in the logging oriented businesses tend to be quite knowledgeable and helpful. The clerk in the big box store may not possess any firsthand knowledge for you to seek advice from.

The New York State Woodsmen’s Field Days that are held each year in Boonville, in August, are another excellent showcase for all kinds of forest industry equipment. Many of the vendors in attendance offer good discounts on merchandise during this three-day event. Again, one of my main motivations for writing this series on chainsaw safety has been the awful, unsafe, and unprofessional use of chainsaws that I sometimes see on television and that I have observed in person. People are depicted “drop starting chainsaws”, running saws with loose chains, using saws with only one hand, and operating the saw with no personal protective equipment at all. Don’t be like those people!

Rich Taber, M.S., M.S.F., is Grazing, Forestry, and Ag Economic Development Specialist with CCE Chenango. He lives with his chainsaws on a farm that has a 100-acre woodlot in Madison County. He can be reached at phone: 607-334-5841 ext. 21 or email: rbt44@cornell.edu.
For small-scale farms, the need for marketing skills has increased as the local food marketplace has become crowded with more competition. Perhaps 15 years ago the supply of local meat was smaller than the demand, allowing farms to simply “show up and sell out” in their markets. However, here in the Northeast we have seen many farms, both old and new, respond to market demand for local meat and enter the marketplace. In addition, national corporations responded to consumer demands for non-commodity meat, putting many “look alike” products on to grocery store shelves, where they are easy for consumers to grab during their regular food shopping. These pressures of supply and demand require the savvy farm marketer to step-up their game.

The good news is that, even in an increasingly competitive market, applying a few standard marketing techniques will show results. One such technique is to choose a target market and focus your marketing resources on it. Some thoughtful discussion among your farm’s team, paired with basic market research, should reveal the best target market for your business. Some questions that can help you determine a viable target market are:

- What is the quintessential customer of my farm now?
- How would I describe an exaggerated caricature of my stereotypical customer?

It is tempting to think, “I sell meat to everybody, everybody has to eat” but with target markets, specificity counts. In fact, the more specifically you can describe your target customer, the easier marketing to them will become. A specific description of your customer should reveal details about their needs, preferences, and the reasons they are more likely to purchase your product. Each target customer has characteristics that you should explore and discuss with your farm’s marketing team (your team may simply be your family, employees and/or friends). The more you can understand about the customer, the better you can communicate to and serve them.

A handy method for working out a description of the target customer is to write a strategy sentence. The strategy sentence describes the customer, their characteristics, and your product. A very specific sentence provides guidance for your marketing efforts, which improves the payoff for each marketing investment you make, whether it is a paid ad, a special offer, or the use of your time. An example of a strategy sentence is:

*Our farm sells pasture-raised pork by-the-cut to busy working moms with young children who don’t have time to slow-cook something for dinner.*

If this sentence sounds very specific and a little bit amusing, that’s a good sign! When you have created such a sentence, you work to understand the customer as best as possible and answer questions to guide your marketing.

Given the sample sentence, think of how the farm might answer these marketing questions:

- What cuts make sense for this customer? Should we get our pork shoulders ground into sausage?
- How many pounds should each package weigh?
- Is our customer more likely to buy for one meal at-a-time or a large supply?
- Should we sell it fresh or frozen?
- What flavors of sausage would be most popular with young kids? Should sausage be in patties or bulk?
- Where is the best place for this customer to get the product?
- Should we offer home delivery? Should we talk to a local grocer in an effort to get into their meat case?
- When advertising, where can we best reach this customer?
- What should the message be in our ad?
- What attributes of our farm and product should we highlight when your brand and product identity are clear it has the effect of attracting lots of different customers to you, not alienating them.

A well-written strategy sentence will provide guidance in every marketing decision right down to the most basic. The specificity of your strategy will resonate with your target customer and pay off better than a broad-casting attempt to reach all consumers. Some folks worry that targeting one specific group of consumers might mean that you lose all the ones that don’t fit that description. A valid concern, however, when your brand and product identity are clear it has the effect of attracting lots of different customers to you, not alienating them.

By the way, that strategy sentence, it’s not for your brochures or Facebook page! It is a sentence for the farm to use to guide marketing decisions and not made for the public. A well-developed sentence with specific details enables the farm to understand their customers’ needs, preferences, and buying habits. This understanding allows the farm to better serve the customer, building a positive and distinct image for the farm.

A strategy sentence can be written for any target customer, including wholesale customers. If you typically sell feeders or breeding stock, you can tailor your sentence to your buyers. The sentence helps you define what the buyer prefers and thus, how to serve them better. Marketing strategy benefits your customers in this way and improves the payoff of every investment you make in marketing!

In essence, strategy is a technique to improve the rate of gross sales per hour of labor spent on marketing. A second technique is to set specific and measurable marketing objectives. Objectives aid the farm in planning, decision making, and execution of marketing activities.

Accomplishing an unmeasurable objective is a difficult task. Consider this example: “I need to start saving more money.”

How do you know when you’ve accomplish this? When you deposit $20 into a savings account, are you done? The more detail you can add to an objective, the EASIER it becomes to plan, execute, and ultimately succeed. Objectives transform marketing from a never ending, undefined job to a manageable task with specific outcomes which begin and end.

Consider this version of the saving money example: “I’ll put $20 from the second paycheck of the month into a savings account, starting in September.”

With this improved statement, we know when to begin and if we are on-track. If September ends and we only saved $10, we know we need to deposit another $10 or adjust our objective. A well-constructed marketing objective will contain a measurable goal, a timeline, a budget, and a target audience for the objective.

A measurable goal is usually a sales quantity but can also include other marketing goals such as, number of restaurant or online orders you’ve contacted or Facebook likes. The goal should be quantified, and then, when measured against your timeline it creates a rate to measure your success against. In the example below, the farm must sell 8 quarters/month or 2 quarters/week.

*We plan to sell 32 beef quarters (8 head) between Sept. 1 and Dec. 31.*

Adding a target audience helps make the task easier. Ideally, the farm will use the target audience from their strategy sentence (see our previous article). The target audience allows you to develop a plan to reach consumers with a product and message that appeals to their specific interests.

*We plan to sell 32 beef quarters to homeschool families in a 3-county area between Sept. 1 and Dec. 31.*

Finally, adding a budget to get this objective accomplished sets you free to come up with innovative, creative ideas to accomplish your objective. Come up with a percent of gross sales you are willing to spend, or whatever amount seems reasonable to you. Once you know how much you have to spend and your timeline, you can get really creative.

Consider our example: If the average beef quarter brings $600 to the farm, they stand to earn $19,200. The timeline is 4 months or 16 weeks. We can also look at the budget per beef quarter sold.

The chosen budget informs the farm’s plan. Here are some creative possibilities:

**Idea 1**: Hold 2-3 open farm days, invite homeschool groups by email, Facebook, and fliers. Advertise in local media and places that homeschool families are likely to see it. Offer a farm tour and pass out fliers explaining the value of purchasing a beef quarter. Include a coupon or offer a discount to anyone putting a deposit down for a quarter during that period.

**Idea 2**: Hold two open farm days and hand out free burgers (your own product). Announce a special raffle for a FREE...
Projects from winery establishment and expansion in New York’s North Country to enhancing children’s play and parents’ knowledge in Suffolk County, Long Island.

by R.J. Anderson

Stepping up to the podium at the 2017 Cornell Cooperative Extension (CCE) internship reception Oct. 11, at Cornell Biotech, 26 students shared their experiences of working at CCE county association offices across the state this summer. One theme emerged from each presenter: an enhanced appreciation for purpose-driven research through hands-on community engagement.

Working on projects ranging from winery establishment and expansion in New York’s north country to enhancing children’s play and parents’ knowledge in Suffolk County, Long Island, the interns learned how applied research from Cornell, the state’s land-grant institution, benefits citizens across New York state. Sixteen of the students are in the College of Agriculture and Life Sciences (CALS) and 10 are from the College of Human Ecology (CHE).

“This program is a wonderful representation of the powerful and effective collaboration between CCE, CALS, CHE and the Office of Engagement Initiatives,” CCE director Chris Watkins said. “Our internships are unique in that students work on projects proposed by faculty and staff from CALS and CHE and are hosted by extension educators at local extension offices in counties and boroughs all over New York State.”

CALS Dean Kathryn J. Boor Dean said: “Pairing the university’s research expertise with CCE’s statewide presence through this program facilitates significant and far-reaching impact in areas as diverse as production agriculture, nutrition and health, youth and families, economic and community development, and sustainable natural resources. The internships also have a tremendous and life-changing impact on our students.”

Ryan Graff, a CALS food science major, spent his summer in Plattsburgh, New York, working in the CCE Clinton County office to provide cost-benefit analysis for prospective winery and vineyard owners in northern New York’s burgeoning cold-hardy grape industry.

“I wanted to create an interactive spreadsheet that would help develop effective strategies for establishing future wineries as well as expand the existing ones in that area,” says Graff. His project was overseen by Miguel Gómez, associate professor at the Dyson School of Applied Economics and Management, and supervised in the field by Lindsey Pushaw, ag business development and marketing specialist for CCE’s Harvest New York economic development team. “So not only did I have an opportunity to explore my own interests, I was also creating something that hopefully will benefit the community I was working in,” Graff said.

Cornell Vice Provost Judy Appleton, who leads the university’s public-engagement mission, said projects like Graff’s demonstrate the impact that can only be achieved with reciprocity. “The CCE educators share their knowledge from the field with students and faculty, to our benefit,” Appleton said. “Meanwhile, students share their learning with communities in ways that are beneficial to them.”

In interviewing 20 or so winery and vineyard owners to collect data for his economic tool, Graff said the conversations with people with diverse needs and perspectives made his internship experience unique. “Learning how to connect and relate at that level isn’t something you get in a classroom setting and it helped me realize what I’m capable of communication-wise,” he said. “It also reaffirmed that what I’m learning through CALS is applicable in the real world and prompted me to re-evaluate the types of classes I’ll take going forward.”

Said Alan Mathios, Dean of CHE: “As both an administrator and a faculty member, I can attest to the value and uniqueness of the CCE intern program. The program builds on two key strengths we have here at Cornell – our amazing undergraduates, and our mission as a land grant institution – bringing the two together to enhance not only the student experience, but also the impact Cornell is able to make across New York State.”

R.J. Anderson is a writer/communications specialist with Cornell Cooperative Extension.
No-Till Organic Relay Cropping in Kentucky

Salamander Springs Farm uses powerful cover crop sequences to produce crops, forage and seed.

Reduced tillage practices take many forms. This story is part of a series featuring organic vegetable growers that have adopted reduced tillage practices on the way to greater farm sustainability. Experienced growers at diverse scales are tackling weeds, managing rotations, and integrating cover crops while minimizing soil disturbance. Look for past and future SFQ issues to learn the practices that are helping these growers build better soils. Visit http://smallfarms.comell.edu/projects/reduced-tillage/ or contact Ryan Maher of the Cornell SFP for more information on this project.

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-October; before frost kill)

Salamander Springs Farm uses powerful cover crop sequences to produce crops, forage and seed.

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-

SOS made it in exemplary fashion:

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-

Salamander Springs Farm uses powerful cover crop sequences to produce crops, forage and seed.

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-

Salamander Springs Farm uses powerful cover crop sequences to produce crops, forage and seed.

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-

Salamander Springs Farm uses powerful cover crop sequences to produce crops, forage and seed.

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-

Salamander Springs Farm uses powerful cover crop sequences to produce crops, forage and seed.

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-

Salamander Springs Farm uses powerful cover crop sequences to produce crops, forage and seed.

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-

Salamander Springs Farm uses powerful cover crop sequences to produce crops, forage and seed.

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-

Salamander Springs Farm uses powerful cover crop sequences to produce crops, forage and seed.

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-

Salamander Springs Farm uses powerful cover crop sequences to produce crops, forage and seed.

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-

Salamander Springs Farm uses powerful cover crop sequences to produce crops, forage and seed.

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-

Salamander Springs Farm uses powerful cover crop sequences to produce crops, forage and seed.

by Brian Caldwell and Ryan Maher

Susana Lein is ahead of the curve. She has put together so many practices at Salamander Springs Farm near Berea, Kentucky that we can only scratch the surface in this article. Permaculture principles are at work in all aspects of the farm, from off-grid energy and contour swales, to no-till production of staple grains, beans, eggs, vegetables, fruits, nuts, and herbs. Please see her photo site, https://www.flickr.com/photos/salamanderspringsfarm/sets for a full breadth of the farm.

Susana follows many of the concepts of Japanese farmer and philosopher Masanobu Fukuoka, adapted to her mid-
Young Farmer Survey Gives a Glimpse of the Next Generation

The results of a survey titled “Building a Future With Farmers II” from the National Young Farmers Coalition offers important insights to policy, education, and justice efforts needed to keep farming strong across the U.S. The survey, which solicited 3,517 respondents with the help of 94 partner organizations, offers a number of specific challenges young farmers face, most notably access to land and the burden of student loan debt.

The survey also highlighted the changing demographics of farmers. Young farmers (under 40 in this case) are more likely to be women (60% of respondents), NOT from farm families (75%), and highly educated with one or more degrees beyond high school (69%). The proportion of young farmers who are people of color or indigenous is also roughly double that of the 2012 USDA Census of Agriculture.

Another big finding was the overwhelming focus of young farmers on environmental stewardship, with 75% describing their practices as “sustainable,” and 63 percent describing their farming as “organic,” though only 17% are actually certified. Even this low number is great compared to the 1% of current farms in organic certification programs.

The report ends with several excellent and specific recommendations, from ways to improve land access and support housing and business training, to ways to support the vital participation of immigrant farmers and to reduce barriers to entry for those who have been historically underserved by federal programs.

See the whole report at: http://www.youngfarmers.org/spread-the-word-new-report-on-young-farmers

No-Till from page 8

Diverse Education Program striving to present new topics with speakers from across the country

SRC Center at Onondaga Community College
585 West Seneca Turnpike, Syracuse, NY 13215
Just 6 miles from downtown Syracuse

Enhanced schedule allows time to attend seminars and experience the full trade show

No Downtown Traffic! Ample Free Parking! Free Shuttle to Host Hotel!
Newer, Brighter, More Comfortable Facility!
Pawpaw – A “Tropical” Fruit for Temperate Climates

by Guy K. Ames

Introduction

The pawpaw (Asimina triloba) has great potential for commercial development. It has always been a delicious and nutritious native American fruit, but history, cultural prejudices, and difficulty in storing and shipping have relegated it to the obscure backwoods of American cuisine. However, several factors seem to be coming together to bring the pawpaw to the attention of the American public—at least, to the “foodie” segment of the public. These include recent improvements in available cultivars (with even better flavor and fewer seeds), production research at Kentucky State University, breeding programs both private and public, international interest, a renewed interest in America’s food system and diet, and a nascent effort by growers and aficionados to publicize the virtues of the pawpaw.

Though the pawpaw’s only near relatives are tropical, and pawpaws look like mangos and taste like bananas, they are not tropical but are native to most of the eastern United States and even parts of Canada. The pawpaw grows best in areas with hot summers and cold winters (USDA Plant Hardiness Zones 5 to 8). It is hardy and relatively pest-free, and its tolerance to shade makes it suitable for intercropping with certain other trees. In addition, the pawpaw has genetic variability that can be used to improve the plant.

A major research effort centered at Kentucky State University involves a few other universities (including Cornell, Clemson, Purdue, Ohio State, Iowa State, and Oregon State) should contribute significantly to the commercial development of this crop (Pomper et al., 1999). These universities have established identical plots of pawpaw, which they hope will identify the best cultivars and best management techniques. They are breeding for the following desirable traits: yellow to orange flesh; fruit size 10 ounces or larger; seeds small and few; fruit of uniform shape and free of external blemishes; and mild, sweet flesh with no unpleasant aftertaste.

The KSU program has delivered results. In 2016, KSU-Benton™ joined Kentucky State’s 2010 release, KSU-Atwood™, from their pawpaw breeding program. With a flavor combining those of banana, pineapple, and mango, KSU-Atwood shows promise as a commercially available cultivar (Pomper et al., 2011).

Culture

The pawpaw is native to most of the humid eastern United States. It is hardy to USDA Zone 5. Pawpaws thrive in moist, fertile, well-drained soils having a pH of 5.5 to 7.0. Although pawpaw tolerates shade, it produces best in full sunlight, fertile, well-drained soils having a pH of 5.5 to 7.0. Although pawpaw flowers in the spring, they bloom after apple (an indica variability in the pawpaw that commercial-scale growers

Propagation

Separate the seeds from the fruit and store the seeds in a plastic bag with moist (not wet) peat moss or some similar medium. Never allow the seed to dry out or freeze, as either will kill the seed. The bagged seed should be held under refrigeration for three to four months to satisfy the seed’s need for a cold period. Sow the following spring into pots or field over an inch deep. Most pawpaw nurseries employ deep pots to allow for important tap root development.

Compared to apples and pears, “trueness to seed parent” is high for pawpaw; that is, seedling plants are somewhat likely to resemble their female parent. In other words, seed from high-quality fruit has a moderate chance (around 50%) of producing plants that also produce high-quality (but not necessarily identical) fruit. Nevertheless, only vegetative propagation will produce trees that can be relied upon to produce the highest-quality fruit.

Vegetative propagation for pawpaw is a matter of budding or grafting. Micropropagation by tissue culture to produce hundreds or thousands of clones at a time remains a desired, but stubbornly elusive, goal for pawpaw researchers, though progress is being made (Stanica, 2016). Budding (chip only; “T” budding has proven ineffective) or grafting should be done using dormant scionwood and actively growing seedling rootstock. Dormant scionwood should be collected in mid- to late winter and held in plastic bags under refrigeration until the seedling rootstocks are showing growth and the ambient temperatures are consistently warm. Kentucky State University recommends early June for budding and grafting, the important variable here probably being temperature: it should be consistently warm to allow for adequate callus growth and subsequent knitting together of tissues from the rootstock and the scionbud.

Pollination

The slightly foul-smelling pawpaw flowers are fly and beetle-pollinated, and that may be one of the reasons that fruit set is so inconsistent in the wild. An old recommendation to hang road kill in your trees to attract fly pollinators (Black, 2009) might actually be helpful if you have only a few trees, but Sheri Crabtree at Kentucky State University says that hand pollination is probably more effective... and less objectionable. She also observed that at Kentucky State’s relatively large research orchards, pollination has not been a major issue, probably because the presence of so many trees is simply that much more attractive to pollinators (2016). More detail about hand pollination of pawpaw is available at a Virginia Cooperative Extension Web page (Bratsch, 2009).

Pests and Diseases

Pawpaws have very few pest problems. There are a few lepidopteran pests (caterpillars), the principal one being the pawpaw peduncle borer. The peduncle borer (Taelpina plummeriana) burrows into the pawpaw flower and causes it to drop. Usually, however, so little damage is done that this is not considered a serious problem.

The asimina weebworm, Omphaloceara munroei, is a moth of the Pyralidae family. Larvae weev, roll, and fold leaves as they feed. Feeding also can extend to twigs and stems, and occasionally rows of leaves have been fried from the plants. This pest can be found throughout the range of the pawpaw but seems to be a nuisance only sporadically, according to Sheri Crabtree of Kentucky State. Some growers in Arkansas, Kentucky, and Maryland have reported problems with the asimina weebworm (Crabtree, 2016). The author has a consistent year-to-year problem with the weebworm in her Arkansas planting, requiring manual removal of the webs and larvae and/or sprays of Bacillus thuringiensis or spinosad-containing pesticides.

Other reported pests include earwigs, slugs, San Jose scale, and tent caterpillars. To discourage earwigs and slugs, Ray Jones, a California pawpaw grower, ties a three-inch band of aluminum foil around each trunk and paints the middle two inches of the foil with Tanglefoot® (Pyle, 1992). San Jose scale can be controlled with dormant oils. Tent caterpillars can be physically removed from the tree by cutting out the “tent” or the branches holding the tent.

Phyllosticta and flyspeck or greasy blotch (Zygophila ja- maicensis) can be problems of pawpaw. This occurs only during periods of high humidity and frequent rainfall. Dense canopy and lack of proper ventilation contribute to this condition, so proper spacing and pruning can reduce it. Phyllosticta can infect the leaves and the surface of the fruit; it can also cause the fruit to crack when it expands, reducing quality and storability.

There appears to be some variation in susceptibility among varieties, but nothing comprehensive has yet been published in this regard.

Harvest and Postharvest Handling

Pawpaw ripen very quickly and bruise easily, which limits shipping time. Though the fruit of some cultivars will exhibit a slight color shift from green to yellow, Dr. Pomper’s research shows that skin color is a poor indicator of ripeness. Pomper claims that the best indicators are a slight softness when gently squeezed and the ease with which the fruit releases from its stem when gently pulled. Since one of the very best indicators of ripeness is that the fruit has fallen from the tree, and because the fruit is easily bruised, some growers have taken to piling a few feet of straw or hay under the trees to cushion the fall of those perfectly ripe fruit (Moore, 2015). Chris Chmiel of Integration Acres has planted ground ivy under his trees for the same reason (Moore, 2015).

Similarly, because of its tenderness and susceptibility to bruising, pickers will want to pick into something that will cushion and protect the fruit. Pawpaws in harvest totes or boxes should not be stacked more than two deep.

An unbiased description of most of these cultivars is available at Kentucky State University’s pawpaw website: http://www.pawpaw.kysu.edu/reports.htm. Grafted trees of these named cultivars can be relatively expensive—up to $35 for a single potted tree; wholesale quantities would presumably cost less per tree—so prospective growers might be tempted to plant ungrafted seedlings. Although seedlings are much cheaper than grafted trees, there is enough genetic variability in the pawpaw that commercial-scale growers will be taking a significant gamble if they plant ungrafted seedlings, and they will not know the outcome of their bet for around five to seven years because it can take that long for seedlings to begin bearing (grafted trees usually start bearing in three to four years).

If you live in an area where pawpaw grows wild, you might be tempted to transplant from the wild, but wild pawpaws have long taproots, which are very easily damaged. Often, pawpaw trees in wild patches are root suckers from a single original tree. With poorly developed root systems per individual shoot, these root suckers do not transplant well. Even nursery-grown pawpaw can be difficult to transplant. They have fleshy, brittle roots with very few fine root hairs, which inevitably get damaged when transplanting. Experimentation has shown that, to be successful, transplantation should be done in the spring, at the time when new growth commences or soon after. If many roots are lost, it may be desirable to prune the top to bring it into balance with the remaining roots.

The KSU program has delivered results. In 2016, KSU-Benton™ joined Kentucky State’s 2010 release, KSU-Atwood™, from their pawpaw breeding program. With a flavor combining those of banana, pineapple, and mango, KSU-Atwood shows promise as a commercially available cultivar (Pomper et al., 2011).

‘Fayetteville’ pawpaw. Photo by Robyn Metzger, NCAT

Pawpaw trees will grow from 12 to 25 feet tall and should be spaced from eight to 15 feet apart.

Although pawpaw flowers in the spring, they bloom after apples, peaches, and pears, so are less likely than those fruits to be affected by late frosts. Nevertheless, it is possible to lose a crop to frost, so commercial plantings should probably avoid low-lying areas that can become “frost pockets.”

According to Dr. Kirk Pomper of Kentucky State University, weeding and mowing in the nursery are important for growth, but is important to increase tree survival rates. Pomper notes that voles that might be attracted to these mulches do not damage pawpaw trees as they would apple trees.

Planting: Seedlings vs. Grafted Trees

There are a number of cultivars that produce superior fruit.
Fruits picked just before they are fully ripe, but after they have begun to soften, will ripen indoors at room temperature or slowly in a refrigerator. Already-ripe fruit will last only two to four days at room temperature, but refrigerated fruit will last up to three weeks. Research is being conducted to determine the effectiveness of using modified atmosphere shipping and ethylene-control sachets to extend shelf life (Galli, 2007).

Pawpaws are not suited for certain value-added products like jams and jellies. Heating pawpaws changes their flavor, so pawpaws would be best used in foods such as ice cream. Recipes using pawpaws are available from several sources, including the Kentucky State University website www.pawpaw.kysu.edu/Recipes.htm.

Iowa State scientists are researching mechanical pulp extraction and freezing techniques. Because cooking destroys important flavor components, and shelf-life of fresh pawpaws is so limited, such research could be crucial to the commercialization of the pawpaw (O’Malley, 2010).

Dennis Fullbright of Michigan State University has adapted an Italian machine for processing chestnuts to separate pawpaw seed from pulp (Moore, 2015). However, the fruit still has to be skinned by hand.

Marketing
Given the fragility and short shelf-life of the fruit, the uncertain status of processing pawpaw pulp, as well as the simple novelty of the fruit itself, the enterprising pawpaw marketer should have a good sales plan before hitting stores, restaurants, or farmers markets. Careful handling, of course, is a must because the fruit is so easily bruised. There are a few commercial-scale growers in Kentucky and Ohio leading the way, including Chris Chmiel, who successfully processes and sells thousands of pounds of frozen pulp every year (2016).

In general, the pawpaw direct-marketer would be well-advised to have some printed material (posters or hand-outs) to acquaint the consumer with the fruit and its uses. If you have a cultivar that tastes like banana or mango or custard, tout that in a very visible way because most consumers won’t have any idea what a good pawpaw tastes like. Because it is so nutritious, nutrition information might be a good sales tool and can make good poster or blackboard text, as long as you don’t overwhelm the reader with too much (shoppers are at stores or farmers markets to shop, not read; emphasize the high points: one of the highest protein contents of any fruit; high in potassium, vitamin C, riboflavin). Consult www.pawpaw.kysu.edu/pawpaw/cooking.htm for more detailed nutrition information. Lastly, recipes for the buyer to take home can be another inducement for the consumer to make that first purchase of a new food. Go to www.pawpaw.kysu.edu/Recipes.htm for recipes.

The North American Pawpaw Growers Association (www.NAPGA.com/AboutUs.html) (spun off from the Ohio Pawpaw Growers Association) has many members around the country. This organization can also help individuals in pawpaw marketing efforts.

Plant Extracts as Anti-carcinogens and Insecticides
Dr. Jerry McLaughlin of Purdue University, now retired, found that pawpaw is a source of phytochemicals called acetogenins with powerful anti-carcinogenic properties (Moore, 2015). An herbal extract made from pawpaw is on the market. For more information on pawpaw as an anticarcinogen go to www.pawpawresearch.com/.

Dr. McLaughlin also isolated a botanical insecticide, asimicin, from pawpaw twigs and bark (Anon., 1999); however, without financial backing to shepherd it through the regulatory process, it is unlikely to be on the market anytime soon (Bratsch, 2009).

This article is one among many free articles from the ATTRA Sustainable Agriculture Program. See our website for a full listing of the references mentioned in this article at http://smallfarms.cornell.edu/quarterly/.
Black Locust: A Tree with Many Uses

by Steve Gabriel

In early October this past year, a devoted group of foresters, farmers, extension educations, students, and others gathered at the USDA Plant Materials Center in Big Flats, NY to discuss a common, yet underappreciated tree that has great potential for farms across the Northeast: black locust (Robinia pseudoacacia).

This tree, which has often been given a bad name for it’s opportunistic rapid growth and robust thorns, is said to be native originally to the Appalachian Mountain range, though it has become naturalized throughout the United States, southern Canada, and even parts of Europe and Asia. The species is incredibly adaptive, growing in many elevations, microclimates, and soil types.

While some have named it an “invasive” tree given its rapid growth and willingness to spread by seed and root sucker, others see these characteristics as advantageous, if only populations are properly managed to harness these qualities. Make no mistake, locust is not a tree to plant and walk away from. It is best when incorporated into managed activities on the farm, of which there are a remarkable array of options and benefits, including:

- Because it fixes nitrogen from the atmosphere, the trees grow incredibly fast (3-4 feet in a season) and can quickly become windbreaks, shelterbelts, and shade and shelter for animals in silvopasture grazing systems.
- The nutritional value of the leaves is similar to alfalfa, making it a valuable feed for ruminant livestock. Some sources claim excessive consumption can lead to toxicity, but many farmers have found their animals naturally limit their intake. (Horses excepted)
- The tree has been used to support nutrition in other crops, from grains to other trees. Research has shown increases in nitrogen in barley grain crops interplanted with locust, and black walnuts interplanted with locust as “nurse” trees were shown to rapidly increase their growth.
- The flowers are important sources of food for honeybees. In Hungary, black locust is the basis of commercial honey production.
- The high-density wood is the most rot-resistant wood we can grow in our climate, making it an ideal material for fenceposts, hop poles, outdoor furniture, decks, and other projects that require weatherproof materials.
- It’s BTU rating is among the highest, making it an excellent firewood in both heat value and coaling ability. At our last house, we actually ruined a woodstove by burning too much locust, which gets extremely hot.

If anything, black locust is almost too good at what it does. All these attributes have resulted in an extraordinarily high demand; both sellers of locust ponders and lumber, as well as those in the nursery trade at the meeting reported not even coming close to meeting the demand for their products. There is a lot of room in the market for more farmers to grow, harvest, and sell black locust products in many parts of the region.

The challenge? Some states prohibit importing, selling, or trading black locust, including Massachusetts and it is restricted in Minnesota, Michigan, and New York. This is not necessarily a complete list - check with your state regulators before deciding how to proceed. Each state has it’s own specific regulations.

In New York, a regulated plant cannot be knowingly introduced into a location where it isn’t already present. It’s hard to say if there is such a place in New York, and likely not in any location where farming traditionally occurred, since the tree has a long history of value to both Native Americans and colonizer settlers farmers around the state. In any case, in New York the trees can be purchased, sold, propagated and transported legally. Nurseries are required to attach a disclaimer to any material they sell.

Assuming you are clear to work with black locust, it’s important to consider the genetic stock you source trees from, especially if your goal is to grow straight poles or trees that can be milled for lumber. Locust is incredibly crooked in its “natural” form, and so seed selection, and sometimes pruning, is a critical factor for success. Ironically, the Hungarians identified the awesomeness of black locust a long time ago, deciding to intentionally import seeds and engage in an intensive breeding program. As a result, some of the best stock today comes from Eastern Europe, and nearly 20% of the forests in Hungary are comprised of black locust.

Propagation of new trees is best achieved by either seed, or root cuttings. Of course, seed will express variety in the resulting genetic profile, whereas root cuttings will be clones of the parent tree. To grow from seed, the thick coat must first be broken, most often by soaking in a pot of boiling water for 12-24 hours. Root cuttings can be taken by finding a good flare in the tree, and digging up roots at least thumb thickness. Roots are cut into 2” sections and planted in a potting mix or prepared seed bed.

While the tree is suitable for a wide range of sites, avoid extremely heavy clay and soils with excessive water moisture (standing water). Soil prep can be minimal, as the trees can often compete and overtake other competitors quite easily. Protection from deer or other potential pests is critical during the early years.

RESOURCE SPOTLIGHT

Supporting Haudenosaunee Seed Stewardship in New York

by Ken Greene

For the community members of the St. Regis Mohawk/Akwesasne Tribe of northern New York, seeds are not just commodities to be planted for food, they are sacred. When their seeds disappear, so do their ceremonies, language, songs, farming practices, and connections to their ancestors.

The Native American Seed Sanctuary project is an outgrowth of an existing partnership with The Hudson Valley Farm Hub and Seedshed.org, a non-profit founded by Hudson Valley Seed Company founder, Ken Greene. In 2016, the opportunity to create a Native American Seed Sanctuary was realized with the Farm Hub’s pledge of land, equipment and staff, and made possible through Ken’s friendship with Rowan White, a renowned seed keeper, farmer, educator, and member of Mohawk Akwesasne tribal community.

Seedshed is managing the land cultivated plots and will be overseeing the harvest and seed saving of the larger corn plot in collaboration with Farm Hub team. This collaborative project forged strong bonds between the Akwesasne community, Mexican farm workers, youth from the Bronx and Kingston, staff at the Farm Hub, and many volunteers in the community.

For the first year of the collaboration, Rowan provided Seedshed with Onondaga sunflower seeds as well as Mohawk Red Bread corn, Canada Crookneck squash, Buffalo Creek Squash, and Iroquois Buckskin Brown beans for a traditional “Three Sisters” planting. There were only two ears of the sacred Mohawk corn left in existence. Rowan entrusted six pounds to Ken and to date, the project has produced almost 2000 pounds of the corn. All of the seed and food produced is rematriated to the Akwesasne community to feed people traditional foods and increase seed stock to help them work towards seed sovereignty.

There is no doubt that logistical support and seed saving know-how are key to the success of the crop. But what truly lends meaning and integrity to the project is the participation of members of the Haudenosaunee community in Akwesasne. Only with their advisement can we ensure that the sacred nature of these seeds is fully acknowledged and that the plants and seeds are cared for with the utmost respect for their Native American origins.

Learn more about the Project: https://seedshed.org/native-american-seed-sanctuary/

Some of the participants in this project appeared in the film Open Sesame: The Story of Seeds: https://www.opensesamemovie.com/

A short film is currently being produced about the project.

See Locust page 13
the establishment period, usually the first one to three years.

Black locust has just a few pests of concern, and a little observation and vigilance goes a long way. The health and vigor of the trees are important defenses against devastation, as research has shown that good growing conditions are more important than genetic resistance.

The most common pest is the Locust borer (Megacyllene robiniae) which most often attacks living, stressed trees, causing extensive damage to the quality of the wood.

Identifying and removing infected trees can go a long way. It’s critical to get to know the lifecycle of the pest. The other is main pest is the leaf miner (Odontota dorsalis), which attacks the tree in spring, turning the leaves brown by mid-summer or early fall. Overall tree growth can be impacted, but usually not seriously.

One of the most exciting conversations at the meeting was around the good economics for black locust, which can be summarized as demand far outstripping the supply. A recent blossoming of interest in natural and sustainable materials for garden and fence posts, coupled with a boom in the hoop production industry in the Northeast mean that black locust polewood (which requires only harvesting and cutting to length) can alone be a valuable product from the farm woodland. Larger, straight trees can also be milled and either sold as lumber or made into a wide range of products include outdoor furniture and offered at a premium price. Prices for these products range from $1 - $3 per board foot for whole posts, and from $1.50 - $3.50/board foot for milled lumber, which is far above the prices for most conventional hardwood lumber.

Personally, at our farm, black locust has found a nice place in our pastures, where it quickly establishes itself and is able to be integrated with our sheep grazing paddocks in under 5 years. The sheep initially prune the lower limbs for feed, and we prune thicker branches to use for tree stakes, to plant more trees! We plant very close together (3 – 4 feet apart) so that over time, we can leave some trees as the overstory, while coppicing (cutting to the ground) and pollarding (cutting above browse height) the less straight ones to provide longer-term fodder reserves for the sheep. Eventually we can harvest some posts and poles, as well.

With all its functions and uses in the farm landscape, it’s a wonder more people aren’t planting these trees, and managing ones they already have. The key take away is if you plant it, manage it. This wonderful tree has many benefits to harvest, but left along could become a problem plant on the farm.

Sources for Trees and Seeds:
Twisted Tree Farm, NY: http://twisted-tree.net/
Edible Acres, NY: http://edibleacres.com/
Sheffield’s Seeds, NY: https://sheffields.com
Cold Stream Farm, MI: https://www.cold-streamfarm.net
Lawyer Nursery, OR: http://www.lawyernursery.com

More information and slides from the workshop can be found at:

This article is available for download at Wellspring Forest Farm & School’s website:
http://media.wellspringforestfarm.com

Sources:
http://northernwoodlands.org/articles/article/planting_the_next_generation_of_waterproof_1umber
http://silvopasture.ning.com/forum/topics/gr
http://www.twisted-tree.net/black-locust/

Black Locust posts fetch a premium price and are high demand on the market.

---

**Farming in Transition**

**GET INSPIRED. CULTIVATE YOUR FUTURE.**

**27TH ANNUAL FARMING FOR THE FUTURE CONFERENCE**

**FEBRUARY 7-10, 2018**

The Penn Stater / State College, PA

---

**KEYNOTE SPEAKERS**

Lindsey Shute
National Young Farmers Coalition

Karen Washington
Rise & Root Farm

Chris Blanchard
Purple Pitchfork
Veterans and Their Families Learn about Local Agriculture Straight from the Farmer’s Mouth

Attendees toured Cross Island Farms to gain inspiration from a diverse farm operation

by Alyssa Couse, Agricultural Outreach Educator, Cornell Cooperative Extension of Jefferson County

Cornell Cooperative Extension of Jefferson County recently hosted its second farm tour for veterans, active duty military and families. The first tour was held back in May at Center Dale Farm, which is a veteran owned and run Angus beef farm. This tour was hosted by Cross Island Farms (CIF), a diverse organic operation on Wellesley Island. David Belding and Dani Baker gave attendees advice and a detailed tour, starting in one of the most unique features, the edible forest garden, or as Dani refers to it, “the Garden of Eatin”.

The group gathered at the entrance of the stone walkway as Dani described the inspiration of the garden and her hopes for it for the future. With seven layers of vegetation, from ground cover to tree branches, the edible forest garden offers herbs, fruits, hops, and several exotic species that do indeed have edible parts. This especially appealed to those interested in growing produce and hops.

David then led the group to the first four-legged habitat. Three sows came to the edge of the fence to check out the visitors. Cross Island Farms sells USDA cuts of pork, including bacon. After a lengthy farm visit this spring, I was treated to a BLT sandwich made with CIF bacon, lettuce and tomatoes and without exaggeration, it was the best one I’ve ever had. David and Dani previously hosted a veteran volunteer, Infantry Capitan Sam Palmer (featured in the 2017 spring edition of Small Farms Quarterly), who took what he learned from the CIF practices and the Cornell Small Farms Program and applied it to his own farm in New Hampshire, where he too now raises organic pork. Check out his Sapling Forest Farm Facebook page: https://www.facebook.com/SaplingForestFarm/

Next stop was the path alongside the livestock chute where animals can be weighed and given a closer look if need be. Several beds of produce and greenhouses lined the other side of the walkway. Dani talked about the fabric coverings they use to help protect the crops while still allowing 85% of sunlight through.

Last stop was the livestock pasture. Holy goats! All 30+ group members got to visit with the goats up close and personal in their pasture. Some came right up for scratches but most kept on eating, along with the Belted Galloway beef cattle in the background. These goats are used for both milk and meat and the cattle are raised for organic grass fed beef. David and Dani shared some wisdom on soil health and pasture management, as it is the foundation of any successful farm. Attendees asked questions and walked the pasture as Dani finished preparing lunch. The meal featured hamburgers with fresh tomatoes, pasta salad, bean salad, and a beet salad, all featuring ingredients from the farm.

Given the discussions over lunch and positive feedback after the event, this was a beneficial experience for attendees and the hosts. The diversity of Cross Island Farms ensured that there was something to perk everyone’s interest. Stay tuned for the next farm tour!

This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2015-70017-22882.

Alyssa Couse is the Agricultural Outreach Educator for Cornell Cooperative Extension of Jefferson County. Part of her job is to help connect transitioning soldiers and veterans with resources and connections in the agricultural industry. She can be reached at amc557@cornell.edu or 315-788-8450

Here are links to the CCE Jefferson website and to the North East Beginning Farmers Project Farm Ops page. Any questions feel free to contact Alyssa! Amc557@cornell.edu

• http://ccejefferson.org/agriculture/farm-ops-agriculture-and-the-military
• http://smallfarms.cornell.edu/projects/farm-ops/

STEWARDSHIP & NATURE

Gimme Free Ice Cream!

One educator’s quest to address a pressing issue.

by Jason Detzel

I am a regular visitor to the Stewart’s Shops in my town, and I must admit, I was a bit ashamed to admit that their ice cream and ready-to-eat pizza constitute a significant portion of my diet when I am on the road. This morning I was in the Stewart’s bathroom. Firstly, I would like to commend them on keeping that place immaculate for that time of the day. Morning hour is a busy and cranky time for many people, but the employees were joking and carrying on with the regulars.

But while I was in the bathroom, I noticed something on the wall. There is a length of wallpaper that runs the perimeter of all Stewart’s bathrooms. It consists of a bucolic scene of a farmer tending to his land on a beautiful fall day. As I began to study the picture something caught my eye. The cattle were in the stream! Alarm bells began to ring in my head and I thought about telling the cashier, but then I considered what she would think about the crazy man commenting on the cattle on the bathroom wallpaper. So I gritted my teeth and headed into the extension office in order to write this week’s livestock update.

Livestock should not be in our streams and waterways. The water on our property is a resource to be carefully managed and cared for. It is easy to let the stock make their way to water and help themselves to a drink but this can cause all sorts of issues for you that will ultimately degrade the water quality for you and those around you.

First and foremost, the hoof action causes erosion to the stream bank, which affects the water in several ways. The degradation breaks down the bank and allows sediment to run into the stream, lowering the water quality. Not only does this affect the water when the stock are present, but also when they leave, because they have eroded the plant life around the stream, and every time it rains the water will remove more sediment from the banks, thus furthering the erosion. This constant erosion will eventually break down the banks enough that the stream will become too shallow to utilize or the banks too steep to traverse. It is even more of a problem if the bank is shaded; in the summer, animals will spend a good portion of their time loafing in the shade. This concentrates manure and urine near the stream bank, where it is washed directly into the water during the next storm.

The other major issue is the nutrient pollution that is introduced into the water. If stock are around the water for any length of time, so too are their manure and urine. These deposits can add significant pollution to the water and if multiple properties allow their animals in the water, all of this can cause health problems for animals and people alike. There is a direct link between toxic algae blooms and E. coli contamination in areas where animal manure is being washed into waterways.

See Gimme page 15
Using Whole Farm Revenue Protection to Manage Ups and Downs in the Berry Patch

by Dan Welch, Cornell University

Strawberries, raspberries, and blueberries are some of the highest value crops grown on farms in New York State on a per acre basis, but it is a challenge to consistently harvest a high yielding crop that meets your revenue expectations. Berry growers face production risks like late frosts in strawberries, bird damage in blueberries, or spotted wing drosophila in raspberries. On the marketing end, risks include lower wholesale prices, rainy wekends that depress u-pick turnout, or greater competition at the farmers market that leads to lower prices. While there are tools available to help reduce the impact of production challenges, there haven't been many tools available to growers to manage market and price risk in berries.

Whole-Farm Revenue Protection (WFRP) is a new type of crop insurance that was developed to give diversified farms an additional option for risk management. Berry growers can use WFRP to manage multiple forms of risk. Since many berry farms are diversified either by growing more than one berry crop or by growing other fruits and vegetables, WFRP may be a good option for berry farms in New York. WFRP is available in all counties in New York and can cover many crops and livestock products under a single policy. Currently there are no single crop insurance policies available for berries in New York, so WFRP makes crop insurance available to berry growers.

With Whole-Farm Revenue Protection, all farm revenue can be insured together in one policy, and actual revenue determines if there is a loss. Like most federal crop insurance programs, there is a premium subsidy paid by the USDA to the insurer to lower the cost of insurance to growers and to encourage broad participation. The subsidy for WFRP is based on diversification of the farm, so if two or more commodities are covered under the policy, the subsidy will be higher. This is an additional benefit for many berry growers in New York, because growers often grow several crops or commodities. Not only could you cover your berry crops, you could include sweet corn, pumpkins, and tomatoes. Also, if you cover more than three commodities, you are eligible for 80% and 85% coverage levels. Beginning farmers and ranchers can qualify for an additional 10% premium subsidy.

Your “coverage level” is the percentage of your total anticipated revenue covered by your policy. You can choose which coverage level to purchase. A higher coverage level would lead to a higher likelihood of payments, but will also have a higher premium. Lower coverage levels tend to have higher premium subsidies. As an example, say you were expecting $42,000 in revenue from two acres of strawberries; a higher coverage level would receive a higher premium subsidy. There are several factors that can influence what coverage level is best for a farm and those factors should be reviewed with a crop insurance agent.

Faculty and staff at the Charles H. Dyson School of Applied Economics and Management at Cornell University have a partnership with the USDA Risk Management Agency to deliver crop insurance education in New York State. Crop insurance materials and decision support tools are available at ag-analytics.org to help growers analyze their options for coverage and subsidies for several crop insurance products, including WFRP.

To obtain WFRP, you will need your Schedule F for the past five years (for the 2018 closing date, taxes from 2012-2016). These records determine your Historical Allowable Revenue. If you are a beginning farmer and have been farming in the previous year, three years of taxes qualify. WFRP has provisions for growth and expansion, so if you are in a high growth stage discuss this with a crop insurance agent to ensure you are within the policy guidelines. You will also need the expected revenue for each crop you want to insure. You would work with your agent to project your expected revenue based on your actual expected prices. These may be based, for example, on producer sales records or contractual prices with a wholesaler. Examples of producer sales records are cash register records from you-pick sales, or contemporaneous records which document market sales.

A loss is triggered under WFRP when natural causes cause a crop loss and/or there is a decline in market prices that causes farm revenue to drop below the insured revenue level. If you want to know more about how Whole Farm Revenue Protection can help you manage the specific risks in your berry patch, contact a crop insurance agent. To find a crop insurance agent in your area, go to the RMA Agent Locator: https://www.rma.usda.gov/tools/agent.html. The agent will need your historical tax records and your production plans for the insurance year. More information on Whole Farm Revenue Protection can be found at this USDA Risk Management Agency website: https://www.rma.usda.gov/policies/wfrp.html. Sales of WFRP policies for New York close on March 15th of each year.

This article is a part of the activities of the New York Crop Insurance Education and Risk Management Project, which is managed by Cornell University in partnership with the USDA Risk Management Agency to deliver crop insurance education in New York State.

Gimme from page 14

There is a simple solution to this issue: keep your animals fenced away from the water. There are any number of pumps that can fit your operation, whether you have access to power or are in a remote area. There is also the possibility of flash grazing for short periods of time near water or allowing reduced access to watering areas so animals will not loaf or wade in the water. No matter how you decide to tackle the problem, you and your animals will be better off with the clean water.

So, I decided to fire off a letter to Stewart's urging them to change their wallpaper to a more mindful scene. Maybe a herd mob grazing a small puddle clearly showing a solar powered pump filling their stock tanks and a group of local kids playing in the crystal clear stream. Who knows, maybe I'll get a free ice cream out of it.

Below is a link to a bulletin outlining how cattle can contaminate waterways.


The offending wallpaper. Photo by Jason Detzel

I ended up writing a letter to the Stewarts shop and they kindly got back to me. They mentioned that they appreciated my concern, but they are currently in the process of changing all Stewart's bathrooms to tile, and that this will eliminate the offending wallpaper. They never did offer me any free ice cream but I've still been going anyway. PS: the happy camper flavor was my favorite this year!

Jason Detzel is a Livestock Educator at the Cornell Cooperative Extension of Ulster County. He can be reached at Jbd222@cornell.edu.

Don's DAIRY SUPPLY inc.
We've got everything your farm needs but the cows...
Farmstead & Dairy Supplies
New & Used Equipment
Service & Installation
349 Roses Brook Rd,
South Kortright, NY 13842
(607) 538-9464
www.donsdairysupplyinc.com

Stand 'N Plant
SEEDER
Use for:
• Seeds
• Onions
• Garlic

Easily plant hundreds of seeds or plants per hour into plastic covered or bare ground seed beds.

PLANTER
Use for:
• Transplants
• Potatoes
• Bulbs

Stand ‘N Plant
95 Rose Road, Saltsburg, PA 15681
Phone: 724-639-3965 or visit: www.standnplant.com

Hoover Maple Supplies
Evaporators - Reverse Osmosis Machines
Tubing - Spouts - Fittings - Sap Bags - Glass Jugs

Mahlon & Emma Hoover
2555 Pulney Rd.
Branchport, NY 14418
607-522-4340

The Daily Pantry Deli
Low-Cost Fence Designs to Limit Deer Impacts in Woodlands and Sugarbushes

by Peter Smallidge

The white-tailed deer (*Odocoileus virginianus*) can significantly influence the diversity, longevity and sustainability of rural woodlands, forests and maple syrup sugarbushes. As selective browsers, deer will eat some plants more readily than they eat other plants. Many of the tree species deer prefer to consume are valued by owners as sources of timber, maple syrup, or as food-producing trees for wildlife, such as oak and maple. Deer also eat many native wildflower and understory plants.

The effects of deer browsing on woodlands and sugarbushes can have long-lasting effects (called “legacy” effects) that persist for decades after deer impacts are reduced. In areas with a history of deer overabundance, the failure to establish and grow new, young trees is having a detrimental effect on woodlands and the potential to keep these areas healthy and diverse.

Under high deer impact, deer eat the plants that are used to assess if there is a problem. As deer impact increases, the evidence for deer impact decreases. To an untrained eye, a heavily-browsed woods may appear, open, park-like and picturesque rather than degraded and impoverished. In woodlands, the evidence for the over-abundance of deer include one or more of these features:

- Park-like appearance in the woods
- An understory dominated by invasive shrubs
- An understory dominated by ferns
- An understory dominated by non-palatable woody brush
- A browse line of the lower tree canopy
- Cropped or “Bonsai” tree seedlings
- Absence of, or stunted, wildflowers such as Trillium, Indian cucumber, or Jack-in-the-pulpit.

Examples of four tube types, both cylindrical and flat designs, the latter being assembled into a cylinder. All are 5 ft. tall. No presence of air-ventilation holes to reduce accumulation of hot air.

In most cases, recreational hunting is insufficient to control the impact that deer have on native vegetation. Depending on landscape pattern, deer population size, and food availability, approximately 40% to 60% of a deer herd must die or be culled each year to stabilize the population. Reducing the population requires even greater mortality. As the hunter demographic becomes older and less effective, and land is less accessible for hunting, the management impact of recreational hunting is increasingly limited. In some cases, recreational hunting may be able to help augment other deer management strategies and reduce the impacts of deer.

Protection of isolated trees is possible with wire cages or tree tubes. Tree tubes designs are used. Tree tubes should be at least 5 ft. tall and with ventilation ports to allow air circulation. Tree tubes need to be securely staked to the ground, and checked annually to ensure the tube is functional and the bottom in full contact with the soil. Tree cages made from 2” x 4” welded wire or poultry wire should be 5 ft. tall and well staked. Some nut trees and conifers may do better in larger diameter cages than in tubes. Weed management around the tube or cage is necessary to improve seedling growth, and will limit habitat for rodents that might girdle the seedling.

For larger areas, fencing is a more efficient and cost-effective option than tubes or cages. Typical fencing designs include clearing an access trail, driving posts where needed, and the use of large machinery to transport 8 ft. woven wire fence spools. Some newer designs use 8 ft. plastic mesh fence that allows for the use of small and less expensive fence posts. No fence perfectly excludes deer, and all fences require inspection and some amount of maintenance. The most expensive fences, but most effective, are made of woven wire with driven fence posts. Installation costs are typically $2.50 to almost $4 or more per running foot.

Research by Cornell Cooperative Extension and Cornell University Department of Natural Resources staff is assessing the costs and efficacy of two fencing designs to prevent or limit deer impacts. The objective is to identify low cost options that adequately exclude deer until tree seedlings grow above the reach of deer. The two methods use either plastic mesh or high tensile wire as the fencing material. These designs are being tested in 0.5 to 2 acre areas that have been managed through thinning or harvesting to increase sunlight and accelerate the establishment and growth of woodland regeneration. In some cases, herbicides were used to control interfering understory plants. The fencing designs are also being tested in sugarbushes to protect young maples and promote regeneration and sugarbush sustainability.

As described below, the designs are affordable for private woodland owners, and continued research is evaluating the long-term effectiveness of the designs at excluding deer. Fences will need to be maintained until seedlings of desirable species are at least 5 feet tall. In the early years, vegetation inside the fence will look similar to vegetation outside the fence and offer little incentive for deer to test the fence. In later years, deer may recognize that the vegetation is actually “greener on the other side of the fence” and be more likely to challenge the fence.

The fence designs shown in this fact sheet are being tested using the AVID field monitoring protocol (www.AVIDdeer.com). After one growing season, seedlings inside the exclosures were significantly taller than seedlings (www.AVIDdeer.com). After one growing season, seedlings inside the exclosures were significantly taller than seedlings outside the exclosure. If fences remain effective, then a significantly higher percentage of seedlings may grow beyond the susceptible browsing height in a shortened time frame. An appropriate number and height of seedlings is necessary to consider a woodland opening to have sufficient stocking, or seedling density. Depending on seedling height at the time of fencing, past deer pressure, soil quality, and amount of sunlight, seedlings may need 5 to 10 years of protection before they have grown beyond the typical height of deer browsing. This fact sheet will be updated as new data become available on the effectiveness of these fence designs.

The cost savings is through the use of low-value trees as living fence posts, and avoids the purchase and installation costs of fence posts. However, rather than attaching fencing directly to the tree, a batten strip made of pressure treated wood is attached to the tree with a nail and fender washer. At most one or two nails per tree are used. On fence corners the trees should be 7”-8” dbh (diameter at breast height), but trees as small as 3” dbh will suffice on straight runs of the fence. As the tree grows, it pushes against the batten strip, which pushes against the fender washer, which floats the nail. The design prevents the typical situation where the tree grows around the fence material. If after 5 to 10 years the seedlings may be at a safe height, and the fence can be removed.

See Fence page 17

---

**Low-Cost Fence Designs to Limit Deer Impacts in Woodlands and Sugarbushes**

**FOREST, FIELD & WOODLOT**

**SMALL FARM QUARTERLY January 8, 2018**

**FOREST, FIELD & WOODLOT**

**SMALL FARM QUARTERLY January 8, 2018**

**FOREST, FIELD & WOODLOT**

**SMALL FARM QUARTERLY January 8, 2018**

**FOREST, FIELD & WOODLOT**

**SMALL FARM QUARTERLY January 8, 2018**
Above all, the focus is on creating "fungal dens, fields, orchards, or forests. The text is wonderful book that helps explain the phenomenon, in terms anyone can understand.

RESOURCE SPOTLIGHT

Book Review:
Mycorrhizal Planet by Michael Phillips

by Steve Gabriel

One of the great mysteries of the soil is the mycorrhizal fungi, which live by forming beneficial relationships to plants. "Myco" means mushroom, and "rhizal" root, and these truly unique organisms are seen as one of the keys to healthy soil and plant communities.

Until now, information to better understand the ways they work and how we can support their vitality was left to obscure and complex texts littered with scientific jargon. Farmer and orchard master Michael Phillips offers a wonderful book that helps explain the phenomenon, in terms anyone can understand.

In his book, Phillips explains the science and different forms mycorrhizae can take, linking this in the process to healthy plant metabolism and ultimately crop health. He be it in good dens, fields, orchards, or forests. The text is full of practical examples that offer a way to apply newfound understanding immediately to improve many situations. Above all, the focus is on creating "fungal

High Tensile Fencing
High tensile fencing involves lower material costs but almost twice as much time and thus increased labor costs. It involves the use of standard 12 gauge high-tensile galvanized wire that is secured to trees that form the perimeter of the fenced area.

High Tensile Fencing Materials
• 12 gauge high tensile galvanized wire: Available at farm stores for approximately $100 for 4,000 feet of wire, approximately $0.03 per foot
• 8 ft. long pressure treated deck boards 1 1/2 inch thick x 5 1/2 inch wide, or pressure treated 2x4s (approximately $3.67/board)
• Wire tensioners and splicing clips (and appropriate tools)
• Electric fence plastic insulators
• Deck screws or galvanized joist hanger nails
• Rust proof (e.g., galvanized) 3" to 3.5" nails

High Tensile Fencing Installation
1. Determine your perimeter and flag low-value trees to serve as living fence posts. Try to locate a tree every 40-50 feet (avoid spans greater than 60 feet). If possible, select trees to be on the "inside" of the fence. Avoid abrupt corners on the fence. Best results occur if trees are selected before any harvesting occurs, and those trees must be protected from damage or removal during the harvest.

2. To simplify access, clear significant brush from fence line. It may be less expensive to re-position the fence than to clear the brush.

3. Attach one plastic insulator to each 10" batten strip using deck screws or joist hanger nails. Pre-drill holes for fender washers and nails to limit splitting of the board. Attach batten strips to trees so that the insulator is approximately 54 to 58 inches above ground.

4. Thread 12 gauge wire through insulators, and tighten using wire tensioner and splicing clips.

5. Unroll and position fence to suspend from fence line.

6. Use hog rings on 18 - 24" intervals to attach the plastic mesh fence to the wire.

7. Gates are created by searing the fence vertically, and attaching an apron of fence that extends approximately 4 ft. on either side of the opening.

8. If ground topography leaves gaps under fence, pile brush or slash to prevent deer from crawling under the fence. A continuous window of brush or slash on the outside of the fence, and obviate the need for baling twine in step #9.

9. Install baling twine approximately 30" offset from fence and 30" off ground. Height is important, but distance from fence can vary from 1 ft. to 4 ft. Wrap twine around saplings, around wooden stakes, or use fiberglass rods with clips.

The fence should be inspected two to three times per year, and after storms.

Total Cost: With labor estimated at $15/hour and materials the total project cost averages $0.59/running foot.

Plastic Mesh Fencing Installation
1. Determine your perimeter and flag low-value trees to serve as living fence posts. Try to locate a tree every 40-50 feet (avoid spans greater than 60 feet). If possible, select trees to be on the "inside" of the fence. Avoid abrupt corners on the fence. Best results occur if trees are selected before any harvesting occurs, and those trees must be protected from damage or removal during the harvest.

2. To simplify access, clear significant brush from fence line. It may be less expensive to re-position the fence than to clear the brush.

3. Attach one plastic insulator to each 10" batten strip using deck screws or joist hanger nails. Pre-drill holes for fender washers and nails to limit splitting of the board. Attach batten strips to trees so that the insulator is approximately 54 to 58 inches above ground.

4. Thread 12 gauge wire through insulators, and tighten using wire tensioner and splicing clips.

5. Unroll and position fence to suspend from the wire.

6. Use hog rings on 18 - 24" intervals to attach the plastic mesh fence to the wire.

7. Gates are created by searing the fence vertically, and attaching an apron of fence that extends approximately 4 ft. on either side of the opening.

8. If ground topography leaves gaps under fence, pile brush or slash to prevent deer from crawling under the fence. A continuous window of brush or slash on the outside of the fence, and obviate the need for baling twine in step #9.

9. Install baling twine approximately 30" offset from fence and 30" off ground. Height is important, but distance from fence can vary from 1 ft. to 4 ft. Wrap twine around saplings, around wooden stakes, or use fiberglass rods with clips.

The fence should be inspected two to three times per year, and after storms.

Total Cost: With labor estimated at $15/hour and materials the total project cost average was $0.51/running foot.

Plastic Mesh Fencing Installation
1. Determine your perimeter and flag low-value trees to serve as living fence posts. Try to locate a tree every 40-50 feet (avoid spans greater than 60 feet). If possible, select trees to be on the "inside" of the fence. Avoid abrupt corners on the fence. Best results occur if trees are selected before any harvesting occurs, and those trees must be protected from damage or removal during the harvest.

2. To simplify access, clear significant brush from fence line. It may be less expensive to re-position the fence than to clear the brush.

3. Attach one plastic insulator to each 10" batten strip using deck screws or joist hanger nails. Pre-drill holes for fender washers and nails to limit splitting of the board. Attach batten strips to trees so that the insulator is approximately 54 to 58 inches above ground.

4. Thread 12 gauge wire through insulators, and tighten using wire tensioner and splicing clips.

5. Unroll and position fence to suspend from the wire.

6. Use hog rings on 18 - 24" intervals to attach the plastic mesh fence to the wire.

7. Gates are created by searing the fence vertically, and attaching an apron of fence that extends approximately 4 ft. on either side of the opening.

8. If ground topography leaves gaps under fence, pile brush or slash to prevent deer from crawling under the fence. A continuous window of brush or slash on the outside of the fence, and obviate the need for baling twine in step #9.

9. Install baling twine approximately 30" offset from fence and 30" off ground. Height is important, but distance from fence can vary from 1 ft. to 4 ft. Wrap twine around saplings, around wooden stakes, or use fiberglass rods with clips.

The fence should be inspected two to three times per year, and after storms.

Total Cost: With labor estimated at $15/hour and materials the total project cost average was $0.51/running foot.

Peter Smallidge is the NYS Extension Forester and Director, and works in the Amot Teaching and Research Forest as well as at the Department of Natural Resources and the Cornell University Cooperative Extension, Ithaca, NY 14853.

For additional information on woodland management go to: www.ForestConnect.com
www.CornellForestConnect.ning.com

This article was originally published in Cornell University Agricultural Experiment Station’s and Cornell Cooperative Extension’s Supporting Sustainable Management of Private Woodlands publication.
New Heirloom Vegetables for the Finger Lakes

Visionary collaborations are creating new varieties to thrive in the Finger Lakes — which ones will become heirlooms for future generations?

by Petra Page-Mann

Although they materialize everyday before our eyes, new books are written by people who spend countless hours and often years writing them.

The plants that feed us daily also are created by people who spend countless hours, years and sometimes decades to bring them to fruition.

How is a new variety made?

When does it become an ‘heirloom’?

Each variety has a unique story.

We are fortunate, here in the Finger Lakes, to have Cornell plant breeders, an organic seed company, organic farmers, and broadly engaged eaters to inform and inspire one another, creating new varieties for all generations to enjoy.

Here are the stories of three such varieties.

August Ambrosia watermelon

Eating fresh watermelon from the garden every day in August is a lot to ask here in the Northeast, since most varieties are bred for the long, hot summers of California. Which is why Fruition Seeds, an organic seed company in the Finger Lakes, collaborated with Michael Mazourek of Cornell University to develop a new variety, ‘August Ambrosia’, adapted specifically for our short seasons. August Ambrosia’s perfectly petite 4- to 6-pound oblong fruits ripen abundantly throughout August even in short, cool summers.

With sweet flesh, thin rind & small seeds, August Ambrosia is truly a watermelon worth your time and precious garden space. Despite abundant rain, moderate temperatures and resulting impressive disease pressure in 2017, August Ambrosia was indeed delicious every day in August.

First, meet Dr. Michael Mazourek of Cornell, a public plant breeder whose vision is to serve everyone, not business as usual. (Honeynut squash and Habanada pepper are two of his extraordinary varieties that have received national attention and inspired countless chefs, growers and eaters.) We are immensely fortunate to have Michael visioning new vegetable varieties here in the Northeast.

Michael is a classical plant breeder. Think of it this way: Golden Doodle (Golden Retriever + Poodle) dogs are a great example of classical animal breeding. Nothing genetically modified in a laboratory, simply two good things cross as they could even without human management. So Michael made the initial cross of two watermelons, each with certain traits we were all hoping might combine just so.

Here’s the thing: Golden Doodles are consistent because the parent dogs are genetically uniform. Their true vegetative comparisons are F1 Hybrids (F1 stands for the ‘first filial generation’), which are similarly genetically uniform. Developing a new variety in the way Michael did creates exactly the opposite, the cross unleashing a brilliant (and often blinding) spectrum of diversity. He made, approximately, a watermelon mutt. Thousands of them.

So Michael made the initial watermelon cross and then selected two generations of watermelon ‘mutts’ (called ‘lines’ in plant breeding) before sharing 16 distinct lines of seed with Fruition Seeds. Fruition is an organic seed company in the Finger Lakes focused on flavor and regional adaptation, improving heirlooms as well as developing new ones, like August Ambrosia.

What did those 16 lines look like and taste like? Not only were not they 16 distinct lines, they were impressively diverse even within each line. Here is the tip of watermelon’s ice burg of genetic diversity:

- fruit that is red, yellow, pink, white or marbled different colors
- fruit that is crisp, crunchy
- fruit that is sweet, bland, watermelon-y, fragrant, not fragrant
- fruit that matures early, mid-season or late
- fruit that is round or oblong
- inner-rind that is thick or thin or outer-rind that is dark green, light green, black-green or silver; solid, striped, speckled or lattice coloration
- seeds that are small, large, black, brown, white, crunchy, chewy or like stones
- plants that have 1 fruit or 5

If you love watermelon and endless surprise: what fun. If you’re not care for finding needles in haystacks: what horror. For Fruition Seeds, this was a dream come true.

There are many ways to approach variety development at this stage. Fruition Seeds took the often longer but less complicated approach of simply saving seed from select fruit without making any particular crosses. Can you imagine, from all the variables in the list above, finding the plant that expresses all the characteristics you want in your watermelon?

Fruition Seeds ate a lot of watermelon.

And every season Fruition hosted a farm party to learn from the hundreds of what they like, don’t like and why. As well as to enjoy tons (literally) of watermelon with everyone.

Four seasons later, August Ambrosia is a stable expression of the petite, sweet and prolific oblong watermelon we were all dreaming of.

Brandywise & Summer Sweetheart tomato

Whether you hope to harvest 10 or 10,000 tomatoes, diseases like Late Blight, Early Blight and Septoria Leaf Spot are affecting your abundance every season here in the Northeast. Though many cultural practices can reduce spread of disease (like growing under plastic and watering soil rather than leaves), sowing seeds with natural genetic resistance to these diseases is perhaps the single greatest thing you can to increase your success, whether you are an organic or conventional grower.

Martha Mutschler-Chu develops such tomatoes at Cornell University.

In 2013 Iron Lady became the first F1 hybrid variety (think Golden Doodle) with ‘triple resistance:’ actual resistance to Late Blight, Septoria Leaf Spot and tolerance of Early Blight. Though tasting better than a standard grocery store tomato in January, the lack of richness and depth of flavor left many growers still wanting better options.

In response, Martha crossed one of her triple-resistant tomato lines with the quintessential heirloom tomato ‘Brandywine’ to see how well triple resistance and flavor would pair in the resulting F1 Hybrid.

They did.

In 2018, the world can now enjoy ‘Brandywise,’ an indeter-
Extension Helps NY Brewers, Growers Raise a Pint

Harvest NY Farm-to-Pint tours spotlight Empire State craft beer supply chain.

by R.J. Anderson

The essential ingredients of a pint of locally produced New York state craft beer are quite simple: hops, barley, yeast, and water. Much more complex, however, is how the supply chain of those elements comes together to create beverages that adhere to New York’s escalating farm brewery regulations.

It’s a recipe further challenged by the relative infancy of the farm brewery industry and its explosive growth. Since the introduction of the state’s farm brewery license in 2013, which offered tax benefits and relaxed regulations for breweries using New York-grown ingredients, there are now more than 160 active farm breweries. And while the path to startup has been made easier, there exists significant challenges for farm brewers looking to procure New York-produced ingredients. In addition to lending distinctly local flavors to their beverages, Empire State hops and barley satisfy the state’s mandate that farm-brewed beers contain at least 20 percent New York-grown ingredients—a requirement that jumps to 60 percent in 2019.

To support the craft beer production chain,因为 of that, attendees were very interested in seeing a working malt house in action and spent quite a bit of time picking the maltsters’ brains about their trade and preferences when working with growers and brewers.

Wrapping up each event was a tasting at a farm brewery where the groups networked while sampling beers featuring hops and barley from earlier tour stops.

“The attendees were very appreciative of having a forum where they could absorb new information while making those important new connections,” Thayer said. “The exchange of information and candid discussions about challenges and opportunities currently present in the supply chain was probably the most valuable takeaway for them.”

“Along with a lot of people across the state, we at CCE think the craft beer industry has the potential to cultivate emerging market opportunities for growers while simultaneously supporting good agricultural economic development initiatives,” Thayer continued. “That’s why we’re doing all we can to support its continued growth and success. But for those things to happen, the industry needs to develop a strong sense of community and understand the role of each link in the supply chain and we’ll do everything we can to help make that happen.”

R.J. Anderson is a writer/communications specialist with Cornell Cooperative Extension.
Like many Americans, Hudson Valley apple farmer Steve Penning's watched the devastation of Hurricanes Irma, Harvey, and Maria this September and wanted to do something to help. "At the same time, I looked around my orchard and saw we were having an exceptional fall — trees popping at the seams with robust fruit," Pennings said. "In talking with my wife and kids, we decided we had to find a way to share our good fortune with those in need — we just weren't sure how to do it. That's when I gave Maire a call."

For over a quarter century, Cornell Cooperative Extension vegetable specialist Maire Ullrich has worked with Orange County growers like Pennings on various agricultural issues. "When she heard my idea, Maire sprang into action and took it from there," he said. "She knew just what to do."

Ullrich, a member of CCE's Eastern New York Commercial Horticulture Team, contacted Feeding America, a nonprofit that operates more than 200 food banks in the United States and Puerto Rico, about putting together a shipment of fruits and vegetables to be trucked to Florida or Texas. "Before I even opened my mouth to commit to pursuing Steve's idea, I knew Feeding America could handle the logistics, which would be the biggest challenge," said Ullrich. "Their reply was, 'Let's do it. You line up the load — hard crops that could last a week at room temperature such as apples, potatoes, cabbage, onions, carrots and others — and we'll send a truck to pick it up.'"

Within minutes, Ullrich was back on the phone with Penning's, who was confident neighboring farms would join him in donating apples to the cause. Ullrich, in turn, said she would connect with the area's vegetable farmers to fill out the tractor-trailer load with additional produce.

About a week later, the Feeding America truck departed the Hudson Valley for central Florida with 20 pallets of fresh fruits and vegetables — more than 15 tons of food. "The truck left on a Friday, and the following Monday I heard from Feeding America that the load was already distributed," said Ullrich. "And the food bank in Florida said they were really pleased with the variety and the quality of what we sent."

Meanwhile, Ullrich was lining up more produce shipments from other fertile growing regions in the state. Two weeks after the Hudson Valley load, a shipment left Hansen Farms in the Finger Lakes packed with apples and cabbage bound for Florida. Another departed western New York in November.

In coordinating the shipments in central and western New York, Ullrich networked with her counterparts from CCE's Cornell Vegetable Program and Lake Ontario Fruit Program. "It made sense to put loads together in those areas, because like here in the Hudson Valley, those regions consist of large farms that do a lot of transportation, know all of their neighbors and are well-positioned to host shipments in their warehouses. It does take some work on their end — especially during a hectic harvest season — but it's not crazy difficult for them to manage."

Pennings said he's not surprised that it didn't take any arm twisting to get his fellow growers on board, and he said he's honored to be part of such a big-hearted network. He added: "This is also a perfect example of why we have Cornell Cooperative Extension services all around the state and people like Maire working on our behalf. She took what was a small idea and really connected the dots to make it a big success."

R.J. Anderson is a writer/communications specialist with Cornell Cooperative Extension.