SPRING 2015

SMALL FARM QUARTERLY

Good Living and Good Farming – Connecting People, Land, and Communities

Feature Articles

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Supplement to Country Folks

YOUTH PAGE

Edible Schoolyard NYC: "Thank You Gardeners, Thank You Cooks!"

by Annette Slonim

Established in 2010, Edible Schoolyard NYC is a nonprofit organization committed to bringing the vision of Alice Waters, acclaimed restaurateur and organic food pioneer, to New York City public schools as an effective solution to our childhood obesity crisis. When Alice Waters created the first Edible Schoolyard in Berkeley, CA in 1995, she knew that the best way to teach children the connections between food, health and the environment was by integrating an edible education program into our schools' everyday curriculum.

6th grade students, Lizbeth and Jessica, harvesting radishes in the garden.

Photographer unknown

As the first official Edible Schoolyard affiliate in the Northeast, Edible Schoolyard NYC not only provides professional development training to teachers citywide, but has also developed two demonstration sites at schools; the first with PS 216 in Gravesend, Brooklyn, and the second with PS/MS 7/Global Tech in East Harlem. At these schools, we provide a hands-on, standards-based, seed-to-table education that students enjoy and share for their entire lifetime. To this end, we envision a future in which our children are educated and empowered to make healthy food choices for themselves and their communities.

School gardens in New York City take on many forms, from a few raised beds or small container garden to window farms, hydroponic or aquaponic growing systems, to in-ground gardens or larger urban farms. In Brooklyn, our demonstration school has the available land and space to accommodate a half acre in-ground garden, including a small orchard and greenhouse. In the concrete jungle known as Manhattan, our garden is one example of what can be done to make the most of a schoolyard in a dense urban setting.

Standing in front of PS 7 in East Harlem, you would never guess what lies beyond the front doors of the school and through to the center courtyard. Up until a year ago, the courtyard and playground were typical of any New York City school, paved over with concrete and decorated with sidewalk chalk and basketball court lines. While the basketball court remains, the central courtyard is now home to a teaching garden full of brightly colored recycled containers, a compost system, tool shed, and circle of bright orange benches where garden classes take place. The garden has also become a relaxing and welcoming space for students and staff to enjoy during lunch and recess in the warmer months.

Pre-K student squeezing lime juice for the salsa.

Twice a month during the growing season in spring and fall, students visit the garden to participate in every step of growing their own food. Pre-Kindergarten through 8th grade students learn seed starting, watering techniques, how to make compost and build healthy soil, and when to harvest their crops. During the colder fall and winter months, students take time to reflect and observe in the garden, learn through crafts, and plan their crops for the spring. The majority of the produce grown in the garden is used in the kitchen classroom and for garden tastings. At the end of every garden class, students are offered a tasting of fruits, vegetables or herbs as an opportunity to sample new foods growing in the garden. One of the most popular garden tastings is sorrel; students love the tart lemon flavor!

Our kitchen classroom occupies a sunny corner of the second floor of PS 7, looking out over the courtyard-turned-edible-schoolyard. The view from the kitchen to the garden and vice versa reflects the cycle of seed to table education. As one first grade student has said, "I know why we garden. So we can grow the food and cook it in kitchen class." Making connections between what they are growing in the garden to what they are cooking in the kitchen is one way students learn about seasonality in local food systems.

Ms. Liz, Kitchen Teacher, showing a scallion from the garden to Pre-K students who are making salsa.

Photos by Nancy Borowick

Every month, all of our 600 students come to kitchen class where they make a seasonal recipe and develop their culinary knowledge and skills. For example, in September, students learn to make Salsa with tomatoes and scallions from the garden and in December, they learn to make "Greens Two Ways" with kale and chard freshly harvested from the garden. While every class from Pre-Kindergarten through 8th grade prepares the same recipes, our kitchen teachers adapt the lessons with age-appropriate techniques for students to make the recipes.

During kitchen lessons, students practice teamwork and good communication skills to prepare the recipes with their classmates. When they have finished cooking, students set their tables and prepare to taste. An important part of the Edible Schoolyard NYC program is acknowledging where our food comes from, how it was grown, who grew it, how it was prepared and by whom. When the students sit down to eat together, before tasting they acknowledge themselves and their peers who were involved in all of these steps by saying together "Thank you gardeners, thank you cooks!"

The garden at PS 7 in East Harlem.

Photographer unknown

Through the garden to kitchen connections, which include composting all of their kitchen scraps, students are developing their environmental knowledge and awareness of the differences between food they grow themselves and much of the food they find at the corner store or on supermarket shelves. In our garden and kitchen classes, we have seen an increase in student's knowledge and enjoyment of healthy eating. As one of our kindergarten students has said, "I like planting seeds because then they grow into fruits and vegetables and they make us healthy and strong."

Ultimately, we envision a future in which our children are empowered to make healthy food choices for themselves and their community. Through our model of integrated seed-to-table education, we are working to transform the hearts, minds and eating habits of young New Yorkers, and we are inspired every day by the excitement and joy of learning we experience in Harlem and Brooklyn.

For more information and to sign up for the Edible Schoolyard NYC newsletter, please visit www.edibleschoolyardnyc.org.

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Pre-K student making salsa with fresh garden ingredients.

Cornell Small Farms Program Update

Message from the (Outgoing) Managing Editor

As we turn the corner from a record cold winter into a more benign Spring, I have some transitional news of my own to share. Starting with this Spring edition, I have transitioned the role of Managing Editor over to new Small Farms Program staff Steve Gabriel. I have reduced my work hours since our son, Julian, was born 1.5 years ago, and along with that change, I've needed to simplify my work plan. It has been such a pleasure these past 5 years to get to know the writers and readers of Small Farm Quarterly and hear about the wonderful farms and agriculture projects happening around the Northeast. Steve is a very talented writer, educator and farmer and I am looking forward to seeing the magazine continue to grow under his leadership.

Small Farms Program welcomes new Northeast Beginning Farmer Project Coordinator

We are pleased to announce that we have hired Matthew Weiss to fill the role of Northeast Beginning Farmer Project Coordinator. Matt is an Ithaca, NY, native who has returned to the Finger Lakes region after spending seven years living in Philadelphia, PA. Matt has a B.S. in Communications from Cornell University and an M.S. in Community and Regional Planning from Temple University, where he focused on environmental planning and the collaborative planning process. Most recently, Matt spent three and a half years working with small farms in Southeastern Pennsylvania and New Jersey on direct-to-consumer sales and marketing through farmers' markets, CSAs, and buying clubs. His work in Philadelphia involved coordinating partnerships across a diverse group of stakeholders including farmers, small business owners, non-profits, and government agencies. He is very excited to be returning to his roots in Central New York while continuing to work with small farms to help them grow and thrive.

New Support for Veterans and Advanced Beginning Farmers

The Cornell Small Farms Program is excited to announce that we have been awarded a 3-year grant from the USDA's Beginning Farmers and Ranchers Development Program that will enable us to provide new support services for military veterans seeking to farm, and for "advanced beginning" farmers who have 3-9 years of experience. With this grant and matching funds from our collaborators at the NY Farm Viability Institute and the Local Economies Project, we will create training programs and farmer-to-farmer networks to aid these veterans and farmers. For more information, visit http://nebeginningfarmers.org/projects

Sparking a Wholesale Revolution

We are excited to announce the launch of a new 3 year train-the-trainer project, "Sparking a Wholesale Revolution: Connecting Small and Mid-sized Farmers to Larger Markets" sponsored by Northeast SARE and the Cornell Small Farms Program. The goal of the project is to equip NY agricultural educators with the knowledge and skills to identify and communicate with wholesale entrepreneurs in their regions and assess the benefits and challenges of these new wholesale markets to ensure sound marketing decisions. We are also aiming to help farmers assess changes needed in production, storage, packaging and handling to satisfy larger markets. If you're an educator or farmer in New York interested in participating in the project, please sign up at the project website: http://smallfarms.cornell.edu/projects/wholesale/

Message from the Editor

It's with great pleasure that I take the reigns of the Quarterly, a paper I have enjoyed reading over the years as my wife and I have explored and started our own small farm. I've also always enjoyed writing, having first been passionate about short stories and creative writing in high school and college, switching to non-fiction and advocacy writing as I got deeper into environmental, farm, and community issues.

One of my favorite elements of the Quarterly is the dedicated and thoughtful writers who submit articles for each issue, not for any personal or financial gain, but for the benefit of us all learning from one another. My farming path has been graciously mentored by so many others that I feel compelled to share my experience with words, and in doing so give back at least a small portion of what's been given to me. I think that many of our writers feel the same way.

Anyone with a story, experience, or issue of importance that feels called to write should submit an article to the quarterly. Check out the writer guidelines and feel free to contact me with any questions. I look forward to serving the readers as the next generation of farm knowledge is passed around the circle.

Steve Gabriel
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LIVESTOCK AND POULTRY

Small Ruminant Grazing: The Trouble With Worms

by Sam Anderson

Rotational grazing can be a very important strategy for reducing parasite pressure, so long as fields get plenty of rest or are hayed before being re-grazed.

If you have raised sheep or goats on pasture for at least a couple of years, or have been to a few sheep or goat workshops, or have read very much at all about pasture-based sheep or goat farming, you probably know a bit about the problem of internal parasites, aka "worms." You may already know that pasture-borne parasites such as the dreaded *Haemonchus contortus*, aka "barberpole worm," co-evolved with sheep and goats, as evidenced by their life cycle: The adult worms reproduce in a sheep or goat's gut, depositing thousands of eggs onto the pasture in the animal's feces, where the larvae hatch and migrate a few inches up the blades of grass to wait for another sheep or goat to come along and ingest them, starting the cycle anew. While most animals can shrug off a small infestation of *Haemonchus*, a large parasite load causes anemia, loss of body condition, and eventually death, especially in young lambs and kids.

While barberpole worm and the other most important pasture-borne parasites can be controlled with chemical dewormers, misuse (e.g. treating too frequently or treating all animals regardless of need) leads to dewormer-resistant parasites. When one type of dewormer loses its effectiveness due to parasite resistance, the farmer can still move on to one of the other types of dewormer - but if this is not done carefully, you can end up with a parasite population resistant to multiple dewormers, until eventually chemical dewormers are simply no longer an option.

This has been a serious problem for years in the southeastern U.S., where shorter winters mean a longer parasite season, but it is an increasingly important issue on northern sheep and goat farms, too. A 2010 study out of Delaware State University examined parasites' level of resistance to the four types of commercially available dewormers on 33 sheep and goat farms in the mid-Atlantic region, with some pretty eye-opening results:

- Benzimidazoles ("white" drenches, e.g. Safeguard® or Valbazen®) were ineffective on 97% of farms tested;
- Ivermectin (Ivomec®) was ineffective on 79% of farms;
- Moxidectin (Cydectin®), essentially a more potent relative of ivermectin, was ineffective on 48% of farms;
- Levamisole (Prohibit TM), the last line of defense, was already ineffective on 27% of farms.

Young kids and lambs are especially susceptible to internal parasites.

But my animals haven't had any worms. What does all of this have to do with me?

If you've never had to deal with a worm problem in your own herd, this might all sound a bit overblown. In fact I've heard this sentiment quite a bit, especially from those who haven't been raising sheep or goats for very long, those who only have a few animals, and those whose animals don't spend much time on pasture. And my response might be: Fair enough. If you have a small enough number of animals and plenty of space for them, or if you mostly raise them in a barn or a dirt lot, worms might never be much of a

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Cover: Lions Mane (*Hericium spp.*) is a newly developed mushroom crop that can be grow in forests on Beech and Sugar Maple logs. Photo by Steve Gabriel

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.

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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.

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GRAZING

Vital Signs: Split-Second Animal Performance Monitoring for Cows

by Meg Grzeskiewicz

Before I launch into my first SFQ article, I'd like to introduce myself. I am the owner of Rhinestone Cattle Co., a grassfed beef and grazing consulting operation in Western New York. After I graduated from West Virginia University in 2012, I worked as an intern for expert grazier Greg Judy in Missouri. My specialty is beef cattle and mob grazing, but the concepts I explain below apply to all types of cattle and all management programs.

Here are three easy observations you can make every day to see how your animals are performing. Use them to constantly adjust your management, instead of "flying blind" until sale day or weighing. They can help you optimize your grazing plan or change a total mixed ration (TMR) composition. These three indicators are valuable no matter what kind of cattle you raise, or how big a role grazing plays in their diet.

A chlorine floater for water tanks. The bottle on the left floats on the water surface, and suspends the other bottle in the middle of the tank. The bottle on the right has holes drilled in it, and contains the chlorine tablet and small rocks for weight. They are tied together with non-degradable nylon string.

Photo by Meg Grzeskiewicz

1. Check rumen fill

Stand facing a cow's left side (with her head to your left and tail to your right). You need to be on the left side, because that's where the rumen is. Look for a triangular indentation behind her ribcage and before her hook (hip) bone, high on her side, just beneath her loin muscle. If you can't see any depression, her rumen is full. Her forage intake has not been limited, and she has eaten to her heart's content. However, if you can see a sunken triangle, she is hungry. You need to provide her with more feed mass. If you're high-density grazing, allocate larger paddocks. In a low-density rotation, it's time to move to the next pasture. If moving your herd faster or using up more pasture isn't feasible, put out some hay. You can do this with any age of bovine, from calf to adult.

2. Read manure pile consistency

Every manure pile is a gold mine of not just fertilizer, but animal performance information too. You can tell so much about how a cow's digestive tract is processing ingested nutrients, just by looking down.

The ideal manure pile is one to two inches tall. It has circular ripples like a target, and a small pond-like depression in the middle. Spread it open with your boot. It should have the consistency of "pumpkin pie", as my mentor Greg Judy always said. The animal that left this gift has a well-functioning digestive tract, and is utilizing all available nutrients in the grass it eats. It is gaining, growing or milking to its maximum ability.

The lumpy manure pile looks more like horse poop. It is tall with well-defined shapes. When spread with your boot it is thick, more like cement than pumpkin pie. If your herd's manure piles look like this, they are eating too much fiber (cellulose) and not enough energy and protein. This translates to a loss of productivity. Piles like this often occur when cattle are eating dry drought forage or hay. The easiest way to fix it is to provide lick tubs to supplement energy and protein. If weather and season allow, move cattle to green, actively-growing pasture. There are more expensive ways to add protein and energy to your herd's diet, but I'm not particularly experienced or interested in them.

The runny manure pile indicates just as serious a production problem as a lumpy pile. It is common to see cattle on lush spring or fall pastures passing runny, greenish manure. These deposits are more like puddles than pies, and are too watery to hold any ripples. Many farmers accept it as normal for the season, but in reality, these cattle are not reaching their performance potential. Do you feel good when you have diarrhea? Of course not! Often, you lose a few pounds while you're sick. Growing stock with uncorrected runny manure may fall short of maximum gain by a half-pound or more per day!

The problem stems from the high protein content in fast-growing spring grasses. Not only can excess protein stifle gain, but it can cause a bunch of other health problems. Oxygen uptake in the lungs may become impaired, rumen chemistry is disrupted, and in extreme cases, females will not conceive. If you see runny manure in puddles on the ground or soiling the tails of your cattle, you need to change your grazing management to limit their protein intake. Give your cattle a larger paddock so they don't eat as far down on each grass plant. Energy is concentrated in the tips of the grass plants, and protein is concentrated farther down (according to nutrition expert Mark Bader). Energy balances out excess protein.

Another easy fix is providing a small amount of hay or straw (in square bales) to pastured cattle. When I worked for Greg in 2012, his herd had this runny manure problem briefly. We threw out three square bales of straw each day for 200 head during the fall period of rapid grass growth. Within a week the manure had firmed up and become ideal piles again. The hay or straw does not need to have any nutritional quality. It simply acts as dry matter to counteract the nutrient-dense but protein-heavy pasture.

The first time I visited Greg's farm, I thought he was crazy when he purposely stuck his boot in a manure pile and raved about its resemblance to pumpkin pie. In reality, it's producers like him who succeed because of their attention to detail. They analyze every clue their cattle give about how well they're producing. I'm sure glad Greg shared this one with me!

3. Observe drinking behavior

Clean water is absolutely imperative to the health of your herd. It can affect stocker gains by a half-pound or more per day. This is another thing I learned from Mark Bader: watch your animals drink. They should put their noses right in the water and drink without hesitation. If they sniff or lick at the water, play with it or hesitate, you have a water quality problem. If you wouldn't drink it, don't make your livestock!

If your cattle drink from a pond, put up a single-strand electric fence (hi-tensile on fiberglass posts or temporary polywire on plastic posts) two to three feet out into the pond. This gives the animals the perimeter of the pond from which to drink, but keeps them from standing in the middle. The water will become less muddy and won't be contaminated with urine and manure. Installing a pond circulator does wonders for water quality too, by aerating the water. Solar, wind and electric models are available. But don't install a circulator unless you've put up the electric wire to keep you animals away from it! Circulators also help keep ice off in winter, but again, put up that electric wire to keep your animals from walking out onto the ice!

If your herd drinks from tanks, adding a chlorine tablet will keep algae and bacteria at bay. This is especially important if your tanks are filled from ponds or wells. Punch holes in a plastic Gatorade bottle, and place a few stones in it for weight to keep it underwater. Add a small piece of a swimming pool hypochlorite tablet, which you can get at a hardware or pool store. Check the bottle every few days and add more chlorine when it's gone. I did this with a tank so full of algae I couldn't even see the float, and after three days the water was clear. The chlorine doesn't bother the cattle; they actually drink more because of the improvement in water quality. This translates to better gains.

Meg Grzeskiewicz is owner of Rhinestone Cattle Co., LLC, in Colden, NY. She can be reached at 716-517-6415. Her website is www.rhinestonecattleco.com.

FOREST AND WOODLOT

Lions Mane: A new candidate for profitable forest mushroom cultivation

by Ken Mudge

Forest cultivation of shiitake mushrooms has become one of the most important non-timber forest crops in the Northeast. Well-established methods of cultivation, along with strong market demand for log cultivated shiitake, have made it a fairly reliable crop for experienced as well as beginning forest farmers. Yet, Shiitake is only one of a number of specialty forest mushrooms with potential for small-scale commercial cultivation. One that I've been working with for several years at Cornell is an exciting and exotic addition to any woodlot; the Lion's Mane mushroom (*Hericium erinaceus, H. americanum*).

Forest farming is an agroforestry practice in which high value non-timber forest crops are cultivated in the unique microclimate created by an existing forest canopy (*Farming the Woods*, Mudge and Gabriel 2014). Forest farming is not only a way to produce mushrooms and other forest products in an ecologically sustainable way, it also brings economic diversity and additional incomes to rural areas, as well as encouraging responsible forest management.

According to the USDA National Agricultural Statistical Service, in 2012-2013 specialty mushroom growers produced over 8.9 million kg of mushrooms in the United States (indoor and outdoor). Although there are good opportunities for forest cultivation, most commercial cultivation of specialty mushrooms is indoors, which is energy and resource intensive, involving processed substrates (sawdust, chopped straw, etc.) and climate-controlled growing facilities.

On the other hand, forest farming of specialty mushrooms involves less intensive outdoor cultivation on unprocessed logs. While there is a significant amount of log-based forest production of shiitake (Gold et al. 2008), outdoor production of other specialty mushrooms including lion's mane is extremely limited, but are an attractive opportunity for future development. This has been a focus of research at Cornell's Arnot forest over the past 7 years.

Lion's mane (*Hericium species*) are common saprophytic (decomposing) fungi found on decaying trees throughout the Northern United States and Canada. There are three species of Hericium that are found in Eastern North America. They are *Hericum erinaceus, H. americanum, and H. coralloides*. All members of the genus produce more or less globoid white fruiting bodies (atypical mushrooms) covered in downward cascading spines. In addition to being edible these mushrooms have been shown to have medicinal properties (Abdulla et al. 2008) making them a prime candidate for the specialty mushroom market. The taste of lions mane is highly desired by chefs and is said to resemble lobster and seafood. There is currently a limited commercial market for *H. erinaceus* (pom pom mushroom) produced indoors on sawdust substrate, but practically no forest (log) production.

Hericium americanum fruiting on sugar maple.

Hericium erinacous fruiting on beech totems at Cornell Research Sites.
Photo by Steve Gabriel

Just as increasing consumer interest in specialty mushrooms has motivated the development of improved shiitake strains (clones) that are better adapted to consumer preference, seasonal constraints, and other quality and production considerations it is reasonable to expect that strain selection and improvement will result in improvements in lion's mane cultivation. Currently there are very few strains of lion's mane commercially available. The long term goal of research was to evaluate the totem log production system for growing lion's mane and to assess the possible usefulness of lion's mane as a non-timber forest crop capable of income generation for small scale forest farms, either as a complement or an alternative to shiitake mushrooms.

In 2008, Jeanne Grace initiated this experiment as part of her Master's degree research and the original totems inoculated in 2008 have been monitored for mushroom production each year until 2013. Her experiment was designed to compare the performance of four different strains of Hericium sp. using a totem production system. Fungal strains are clones, analogous to plant varieties. Each strain is initiated from a single mushroom propagated vegetatively on a substrate like sawdust. A strain can be repeatedly propagated for many generations.

In addition to the question of strain selection (different genotypes) on yield of lion's mane mushrooms, which has obvious commercial implications, several other considerations were also addressed by this research including the post inoculation delay (years) before mushroom production begins, the proportion (percent) of inoculated totems that actually fruit, the duration (years) of mushroom production from a totem, and the seasonality (within year) of mushroom production.

This study compared 4 different strains - one *Hericium erinaceus* from a commercial source designated FFP3, and 3 strains of *H. americanum* (He 3, He 4, and He 5) collected locally (upstate NY) and isolated in a our laboratory. The process of strain selection from a wild mushroom, involves isolation on a petri plate followed by spawn production on sawdust, and finally inoculation and eventual fruiting is shown in Figure 3.

About 30 totem stacks of American beech for each strain were inoculated with sawdust spawn. and mushroom production was monitored for 5 years. Not all stacks produced mushrooms (fruited) during each of the 5 growing seasons. The percentage of stacks that fruited for each strain was noted for each year.

All three of the strains except FFP3 fruited at least once over 5 years. Seven stacks of FFP3 did not fruit at all over the course of the experiment. Interestingly, a stack that did not fruit was not necessarily "dead" since most of the non-fruiting stacks during any given year, fruited during some or all of the subsequent years.

This finding, that totems from different strains do not have an equal probability of fruiting, has implication for any future commercial production because of the considerable time and labor involved in cutting down trees, transporting logs to the laying yard, and construction and inoculating the totems. The lower the probability of fruiting of totems inoculated with a given strain the more trees must be cut and transported, and more time and effort must go into totem construction.

For example, the time and effort required to achieve that same level of production for the FFP3 strain (60% fruiting) would be considerable greater than for He 4 (80% fruiting), even though the two did not differ significantly with respect to yield of mushrooms (Figure 1). In contrast, well-managed shiitake logs typically have approximately 95% fruiting (Mudge et al, 2013). Figure 1 shows the harvested yield (pounds) for each strain for each year.

The apparent differences yield among the strains was not enough to be considered statistically significant (i.e. the variation among strains could be accounted for by chance alone). On the other hand, year-to-year differences among strains was highly significant. During the first two years (2008-2009) mushroom production was low, but fruited in earnest during the third and fourth years. Production declined significantly during the last two years.

These differences in mushroom yield among strains and the number of years after inoculation are important considerations for anyone hoping to grow lion's mane in order to make a profit. Since there are no economic or marketing data available for forest cultivation of Hericium, and since shiitake is currently the only economically viable forest cultivated mushroom, a limited comparison between the two is warranted.

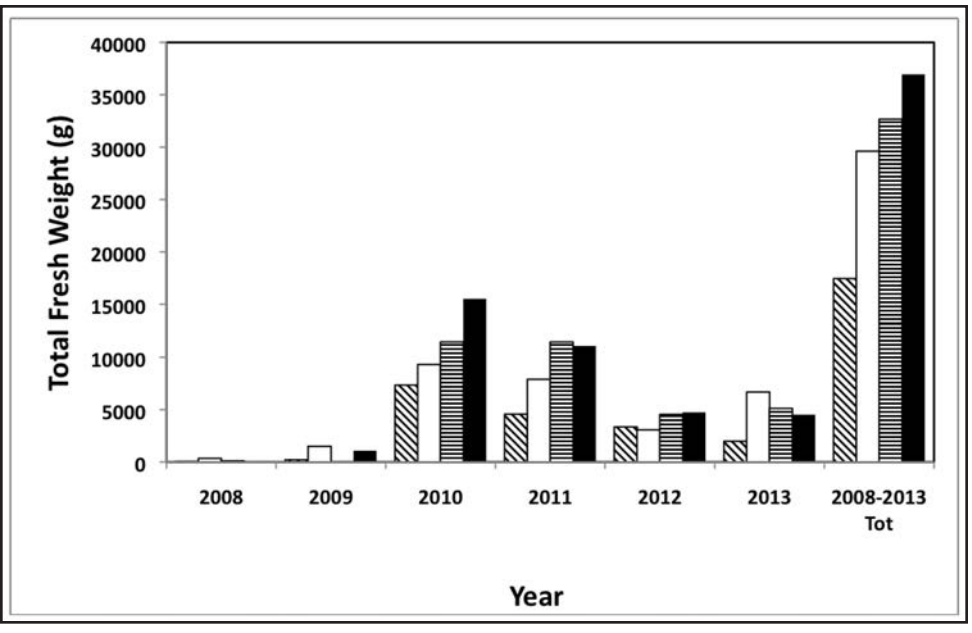

Figure 1. Total mushroom production (fresh weight) by each Hericium strain each year from 2008-2013, and the accumulated (sum of 6 years) production throughout the entire experiment. For each production year and total, from left to right the strains are FFP3, He 3, He 4 andHe 5 .

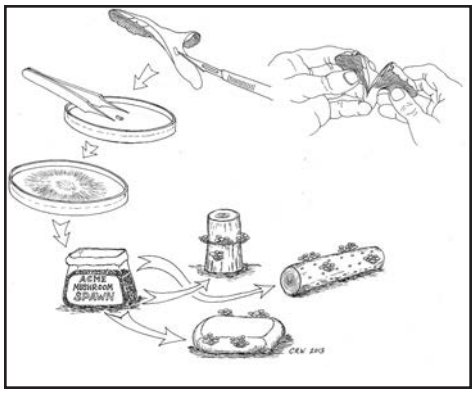

Figure 3. Isolation of a mushroom from the wild for cultivation.
Credit: Carl Whittaker

To begin with, the grower will have to wait for two years after inoculation before fruiting commences, rather than just one year in the case of shiitake. Our results suggest that yield during any given year may not differ very much among strains, although this tentative conclusion is based on only 4 strains. Yield of lion's mane is another key consideration. How does yield of lion's mane compare to that of shiitake? Shiitake yield varies from grower to grower, and there is very little published information about this.

As we reported earlier in the SFQ (Winter 2015), researchers from Cornell, University

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LIVESTOCK AND POULTRY

Copper Poisoning and Copper Deficiency in Sheep

by Ulf Kintzel

Articles warning of copper poisoning in sheep appear frequently in various publications. This leads people often to believe that sheep should have no copper in their diet. However, copper is essential for a sheep to even exist. So how likely is copper poisoning?

Let's examine why sheep are more likely to get copper poisoning than other species that are more tolerant of this element such as goats. Simply stated, sheep have a greater difficulty disposing of excess copper than other species of animals. If there is an excess of copper in a sheep's diet, it is stored in the liver. It is then only slowly disposed by the sheep's liver. Over time excess copper will accumulate. When the animal is stressed, the copper is released all at ones into the blood stream. This is called chronic copper poisoning and is more common than acute copper poisoning. Death is certain when a sheep shows symptoms. Treatment options exist theoretically speaking but are not practical or feasible in real life. However, chronic copper poisoning does not occur as a widespread outbreak. Only one or at the most a few individual animals will die at any one time.

Copper is an essential element for proper development of sheep.

Because of the sensitivity to copper, feed stuff and minerals for sheep have no copper added, which is often confused with not containing any copper. Most feed stuff, be it forage or be it grains, does contain copper. In fact, sheep need copper for very important biological functions. For instance, the development of the central nervous system requires copper. That means there is also the real possibility of copper deficiency. This article makes the attempt of putting both copper poisoning and copper deficiency in perspective.

About twenty years ago, I used to feed minerals designed for cattle that had copper added. I did so because minerals designed for sheep were unavailable to me at that time or at least not obtainable at a reasonable price. I did that for a few years without any negative impact to my flock of Texel sheep, which I ran at that time. Finally, I got a hold of a representative of a feed supply company and was now able to receive minerals for sheep. The same year, I pastured my sheep most of the winter on residue on heavily limed hayfields. Lambing came around in late winter and I had an unusual number of still born lambs. Many of the lambs that were born alive had a retarded suckling reflex and died despite of all the help shortly after birth. I had epidemic-like losses. The diagnosis was copper deficiency. The limed fields had aided the problem since lime reduces the amount of available copper in plants.

I read up on the subject of copper deficiency and ever since then I feed free-choice minerals with added copper right around the time when my ewes are 100 days into gestation. That is when the central nervous system of the un-born lambs develop and copper is essential for it. Let's also remember that copper sulfate used to be used as a dewormer for sheep and indeed I use it from time to time as a dewormer still by throwing once in a while a small handful into the water trough.

Over the years following the incident of copper deficiency, I had gotten lax about added copper in minerals or salt with added trace minerals (which includes copper) and used it indiscriminately. It caught up with me. One year I lost one sheep in the fall and the following winter another due to chronic copper poisoning. Since I didn't want to risk the health of my expensive new rams I discontinued the liberal use of minerals with added copper for a while. Instead, I deliberately use minerals or salt with added copper at certain time intervals, especially at the time when my ewes are right around the 100 day mark during pregnancy.

A word of caution: my experience is limited to minerals and salt with added copper. I don't know what the effect would be if one were to feed a grain mixture with added copper. I don't feed any grain since I have been grass-fed for many years. I would suspect that the effect would be much more pronounced simply because of the greater amount of grain consumed compared to minerals and therefore also a far greater amount of consumed copper. Any grains that are being fed already contain copper, which makes in my view copper deficiency in grain-fed sheep highly unlikely.

Over the years, I came to this conclusion: Many articles have been written about copper poisoning in sheep that warn time and time again against feeding feed and minerals with added copper. They are warranted given a sheep's higher sensitivity to copper when compared to other animals like goats or cattle. Very little is being said about copper deficiency. Copper deficiency is a real possibility in grass-fed sheep, especially when limed fields or moorland pastures are grazed, which are often low in available copper. While copper poisoning often only claimed a sheep or two when it occurred at my farm, copper deficiency was devastating when it happened. I have adjusted my schedule of feeding minerals with added copper to avoid such devastating loss due to copper deficiency.

Ulf owns and operates White Clover Sheep Farm and breeds and raises grass-fed White Dorper Sheep without any grain feeding and offers breeding stock suitable for grazing. He is a native of Germany and has lived in the U.S. since 1995. He farms in the Finger Lakes area in upstate New York. His website is www.whitecloversheepfarm.com. He can be reached by e-mail at ulf@whitecloversheepfarm.com or by phone at 585-554-3313.

Lions Mane from page 6

of Vermont, and Chatham University undertook a 3-year SARE project Mudge et al. (2013). They worked with 13 beginner shiitake farmers and monitored production expenses and incomes for 100 newly inoculated logs. They found that after two years the average yield of shiitake mushrooms necessary to economically "breakeven" (income = expenses), was about 0.4lbs per log. By comparison, the yield of Hericium mushrooms, (as shown in Figure 1) for peak production years 2010 and 2011 was in most cases substantially greater than or equal to the 0.4 pounds per log per year threshold for established for shiitake.

Although there was no significant difference among the four lion's mane strains with respect to the yield of mushroom per log, yield varied significantly depending on the number of years after inoculation, with peak production during the third and fourth years. Peak production levels were similar to the commercial yield of forest cultivated shiitake mushrooms. The successful forest production of Hericium mushrooms on totem stacks, and the yield potential demonstrated here suggest that this non-timber forest crop may be suitable for commercial production.

What we currently recommend to growers looking for commercial viability is to build a business and markets based on shiitake, which can be fruited more reliably. Then, additional gourmet mushrooms such as lions mane will be easily sold to pre-existing outlets, a form of "icing on the cake" for the aspiring forest farmer.

Visit www.cornellmushrooms.org to learn how to inoculate a wide range of mushrooms in your woodlot.

Ken Mudge is emeritus professor of Horticulture who devoted many years of his career to research and development of forest grown mushrooms, bringing their status from a hobby crop to one that has commercial viability. He recently co-authored a book, Farming the Woods with SFQ editor and colleague Steve Gabriel.

LOCAL FOODS AND MARKETING

Perfecting the Package: The Importance of Labeling Farm Products

by Miriah Reynolds

Often it's the label that sells a product the first time; it's the product that sells it the second. Font, color, and specific words might be enough to strike the customer's attention. Whether its cheese, soap, eggs, milk, or just handing out a business card, labeling plays an important role in small farm success. With my experience marketing our farm's goat milk products and years of working in retail, I would like to share some techniques to creating the perfect packaging.

The cinnamon goat milk soap is one of the bestselling soaps. It is very soothing to irritated skin and moisturizing.

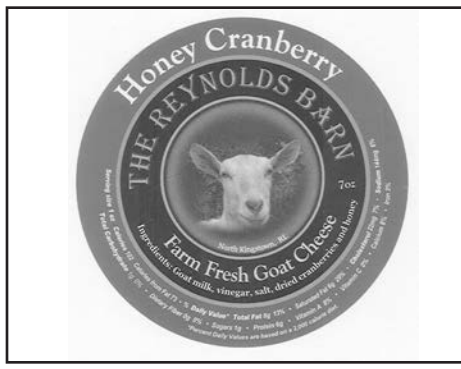
On our dairy goat farm in Rhode Island, our family makes delicious goat milk cheeses, beautiful soaps, and other beauty products. Each product is made with high quality ingredients and lots of love. We put so much effort into each piece that customers line up at farmers markets to purchase the goodness. For years we struggled with packaging. Often wondering if the labels were giving our product justice it deserved. Primarily, up until that point, we sold our products by sampling.

Our cheese labels consisted of handwritten sharpie on the plastic lids. When my brothers and I were little, there was always spelling errors that needed to be relabeled, costing money and time. As the years went by and the business grew, hand writing hundreds of containers of cheese became tedious and looked sloppy. It was time for an upgrade, so we could venture into the retail corporate world we later realized we did not want to be in.

The hardest part in labeling a product is deciding who the customer base is going to be. Do the products target a specific group of people? Do most of the customers have preferences in the products and food that they purchase? Knowing the target market is very important. Add appropriate labels such as organic, GMO free, natural, local, homemade, or locally grown are important features. (Be sure to label in accordance with state laws) Most importantly make sure the farm name is clear and easily identifiable.

Sometimes people do not remember a name, but look for a certain logo. For us, it is our bright white Saanen goat that sits front and center on our cheese label. The farm logo should be consistent in color throughout all the labels, that way customers can recognize it easily. Try and make labels appear professional but not commercial. Nothing fancy but not boring. "A photo says a thousand words" is true here. The bright white goat in the center of our label shows the animals are clean, her alertness shows good health and her caring eyes prove she is loved. On a local level, which that is our goal to keep food local, our customers know her name from the articles written and farmer market meet and greet our goat days.

To keep costs down it's wise to use standard sizes for jars, labels, boxes, or other packaging. That way labels can be printed on a home printer if necessary. Packaging should offer advertising as well as protection from handling. Retail stores and shipping products is simpler if the packaging allows stacking. When labeling out goat milk soap we have gone through dozens of changes. We have our goat milk products in retail stores as well as selling them at the farmers markets. Keep in mind that the packaging should enhance the product and 'show off' its farm fresh benefits. Limit the amount of attachments such as ribbon or anything hanging from the product as it will be torn off during transportation.



The honey cranberry goat cheese has a sweet taste and smooth texture. It tastes great on bagels or sliced apples. The label has our first Saanen goat named Angel.

Creating the perfect packaging and labels for local farm products is actually exciting when you accomplish it. Incorporate the love and dedication that your products have into the packaging and the results will be amazing. Wrap it up and sell it!!

Miriah Reynolds is a member of the Reynolds Barn Family. She grew up on her families dairy goat farm and now attends Montana State University seeking a degree in Agricultural Business. Miriah is also a contributing writer of Dairy Goat Journal. She can be reached at inimthegoatbarn@gmail.com and thereynoldsbarn.com.

Worms *from page 3*

problem for you. But if you want to raise enough sheep or goats to call it a business, you want to raise them on pasture, and you plan to make the best use of your pasture resources - and especially if you plan to have a spring or summer lambing or kidding-then chances are very good that you're eventually going to have to deal with a worm problem.

In case that sounds like an overstatement: In a recent survey of 165 sheep and goat farmers from across New England, 72% listed internal parasites as the most costly management issue on their operation. For comparison, mastitis came in second at 6%. And of those who didn't list internal parasites as their most costly problem, nearly all listed it as their second costliest.

So how do you explain the farmer who swears she has never had to spend a penny on dewormer in all her years raising goats? It could certainly be thanks to her skilled management, especially if she is actively using integrated pest management (IPM) strategies. But there are some other possibilities too. Maybe she has unwittingly been applying IPM strategies that limit the parasite population, such as well-timed rotational grazing or starting out with animals that carry a strong genetic resistance to internal parasites. If she has loads of pasture and only a handful of goats at any given time, the pastures may have a low enough concentration of parasites that it may never be much of an issue. Or if she has only had her goats for four or five years, the parasite population may have just not built up enough to cause noticeable problems … yet.

Here's the point: Just because I haven't noticed internal parasites causing problems in my sheep doesn't mean I can really say "we don't have worms." In fact, even though I haven't lost any lambs or seen any bottlejaw, internal parasites might already be costing me money. By the time you are losing animals to worms, they have probably been affecting your bottom line more subtly for some time, forcing your lambs to redirect energy from adding body condition toward instead having to fight off a parasite infestation.

What can you do about all of this? You can head off internal parasites by implementing IPM strategies before you have a problem. There are lots of resources that can help you understand how to strategically manage your grazing, your flock's genetics, and your deworming regimen to keep internal parasites under control and deal with dewormer resistance. But first you have to take the matter seriously. Especially considering how

They may look pretty different, but your sheep share parasites with your guard llama. (Alpacas, too.)

quickly dewormers can become ineffective, any sheep or goat farmer who has had to deal with a serious internal parasite problem will tell you the same thing: Prevention is the best medicine.

Sam Anderson is Program Coordinator at New Entry Sustainable Farming Project.

NEW AND BEGINNING FARMERS

USDA's Youth Loan Program Attracts Young Women to Farming

by Devon Kenny

Five Roses Farm is not your average farming operation. Leading the charge on this charming homestead are five girls who give everything they have, and a little more, to keep the operation running smoothly. At this scenic farm in Madison County in New York, the Cranwells are dad Clyde, mom Kristi, and daughters: Amanda (15), Emily (14), Megan (13), Haley (10) and Kaycee (7).

The farm is perched on a hill directly across from SUNY Morrisville College. Clyde teaches at the school and has been involved in agriculture most of his life, along with his wife Kristi, who works for the Oneida County Cooperative Extension. Originally from Kansas, the Cranwells have always been interested in farming and the oldest three girls were given the opportunity to make their own way through the USDA Farm Service Agency's (FSA) Youth Loan Program administered by the Marcy FSA farm loan office. This program allows for young adults aged 10 to 21 to apply for a loan (up to $5,000) to finance income-producing agricultural projects such as buying livestock and equipment or paying operating expenses. The applicants are given the opportunity to develop and implement these projects with guidance from a project advisor (4H leader, FFA teacher, etc.). The loans are put on a repayment schedule that teaches the youths how to coordinate finances, operational planning and animal management. Haley, who turned 10 in November, is looking forward to getting her first FSA youth loan in 2015.

Hog training

The Cranwell girls are two years into the FSA youth loan program. With the loan funds they have purchased several animals including beef cattle and swine. The program has taught them the importance of not only animal husbandry but money management. Their cows are so well cared for that they have won cash prizes in various shows across the region. With their winnings the girls reinvest in the project by paying entry fees into other shows and buying needed supplies.

They have participated in shows this past spring and summer including the New York State Fair and even the occasional out of state show. Their beef cattle were purchased as 6-month old calves in early fall and are kept through the winter, then ready for the show season in the summer of the following year. The animals put on an astounding 4 pounds per day being fed a ration of grain and forage. Once the animals are about 18 months old, the cattle are sold to a local restaurant called The Copper Turret. The restaurant sources many locally grown products and Five Roses Farm is featured on its menu. The girls keep the income from the sale of the beef as a means of paying back

Cranwell sisters showing off their hard work

their FSA loans - but usually don't frequent the restaurant too soon after their prize animals get sent.

At Five Roses Farm, the steers sit on sturdy legs and have massive bulk and a sweet disposition. These animals finish at between 1,300 and are 1,400 pounds and are bigger than many of their show competitors. The Cranwell girls treat their animals with respect and care. Kristi praises her girls and is happy they have the opportunity to learn how to raise their own animals and get to know their way around a checkbook as well. The girls make all the decisions on their animals and when it comes time to pay the grain bill, they write the checks themselves. The FSA youth loan program allows young people to gain practical experience by having them keep accurate records of income and expenses in regards to the loan funds.

In addition to cattle, the Cranwells also have several pigs they show and sell that the girls purchased using FSA youth loan funds. The pigs are almost as pampered as the steers and are taken for walks every evening to help train them to be calm and well-mannered in the judging arena. Surprisingly, the pigs are not tied or haltered in any way. They are guided by gentle taps from show sticks the girls use to keep them on course.

There is an assortment of other livestock on the farm including chickens, horses, rabbits, and a dog. Clyde and Kristi have said they don't know how much longer they can keep going to fairs because they always come home with more animals than they left with. Having five girls giving you the eye must make it hard to say no. We wish them luck for many seasons to come.

For more information on youth loans, contact Laura Shoemaker (Farm Loan Officer) at the Marcy USDA Farm Service Agency office at 315-736-3316, your local FSA office, or visit www.fsa.usda.gov.

Devon Kenny is a Program Technician at the Marcy USDA Farm Service Agency office. She can be reached at 315-736-3316.

Pampered cow getting blow dried

Photos by Laura Shoemaker and Devon Kenny

SEED STORIES

Habanada: The Unmasked Habanero

by Petra Page-Mann

We are surrounded by brilliant innovations, some old and some new. Electricity, weaving, combustion, language: each one began as an unthinkable notion. Each had passionate people who believed it could be done who tried, failed and tried again. The dedication of countless visionaries surrounds us.

Agriculture itself is such an innovation, one that is constantly re-imagining itself through the needs and dreams of every generation. Each new variety of vegetable is the evidence of a constantly changing, constantly adapting, constantly innovating world.

Habanada is easy to grow and thrives in low fertility, offering up to a pint of fruit per week.

Photo by Matthew Goldfarb

Habanada is a brand new pepper, the first truly heatless habanero (hence the habanada) bursting with all the bright, tropical flavor of the fruit unmasked. Many attempts have been made over the years but none have achieved the fullness of flavor with absolutely zero heat. Their crisp, thin skin has an exotic, floral flavor like no pepper I have ever tasted. From cast-away seed to a signature show-stopper variety, Michael Mazourek has brought this pepper a long way in just thirteen generations.

Michael Mazourek is one of our heros, let me count the ways: father, Cornell professor and effortlessly hilarious, Michael is also one of the top organic plant breeders in the world. Michael is also unique for being one of the few plant breeders who is publicly developing varieties with culinary quality in addition to disease-resistance and productivity. You may be familiar with some of Mazourek's varieties that have already changed the way we eat, like Honeynut Winter Squash (a super small, super sweet butternut) and Silver Slicer Cucumber (a sweet, crunchy white slicer with notable disease resistance). He is constantly playing with his food, using classical breeding (non-GMO) methods to dream more delicious, more productive and more disease resistant varieties into existence.

As a species, we've been saving seed for 10,000+ years; it is because of people like Mazourek that we have cultivated such extraordinary diversity in such little time. It all started at when the University of New Mexico discovered an off-type plants in their Habanero lines that didn't even register on the Scoville scale. (Habaneros often register 40 times hotter than Jalapenos on the Scoville scale of pepper pungency.) Mazourek, a plant breeder interested in peppers, was sent some of these seeds to study. Thus began the journey to Habanada.

Mazourek wondered, "what if there was a pepper I could share with my friends who didn't like hot peppers so they could taste what I love without the heat?" This was Mazourek's first foray into plant breeding and he was optimistic: a gene for heat, in a laboratory, is simple to identify. But in the field, he soon discovered that it wasn't so simple; some peppers were delicious, some tasted strange, and still others tasted just plain bad. Few truly tasted like a bright, floral habanero. When he realized there was more to it than an assay in the lab, Mazourek shifted his approach and back-crossed his heatless lines to full-heat habaneros. "Though I didn't know what exactly was going on, I learned as I went," Mazourek recalled. "As I was changing this pepper, this pepper was changing me." After tasting thousands of peppers in thirteen generations of rigorous selection, Mazourek has stabilized the dream of a full-flavored, heatless Habanero.

Habanada has quickly captured the imaginations of chefs, farmers and eaters all over the country and all over the world. "Habanada has such unique floral qualities," remarked Nora Antene, the chef of Portland, Oregon's renowned Le Pigeon restaurant. Antene was paired with Mazourek's Habanada at the 2014 Culinary Breeding Network Variety Showcase, an event bringing together plant breeders and chefs to create innovative, delectable dishes highlighting the importance of variety development. "Habanada was simple to showcase: it seems complete on its own," added Antene. For the event, Antene created a Habanada sherbet that electrified the event. Anticipating the coming summer and the subsequent pepper harvest, Antene is already dreaming of strawberry-Habanada shortcake and Habanada crème brulee as well as its above average contributions to classic pico de gallo.

The bright, floral flavor of Habanada inspired chef Nora Antene to create this Habanada Sherbet.

Photo by Lane Selman

Habanada is also being featured at Expo Milano 2015, a six-month celebration of concrete solutions to providing "healthy, safe and sufficient food for everyone, while respecting the Planet and its equilibrium." From its innovative development to its unique flavor Habanada truly deserves this recognition.

This season you'll find Habanadas on the menu of incredible restaurants from coast to coast and indeed all over the world. You can also grow your own, and here are a few tips to keep in mind. "Habanada will easily become a hedgerow with few fruits if they are grown with too much nitrogen," Mazourek warns, "so go easy on the compost." They love heat, full sun and even water. Each plant will produce about a pint per week once they start fruiting. Though Habanada has to have a wide window of delectable ripeness, we try to harvest when they are bright tangerine orange and two to three inches long, perfect for popping into your mouth. Indeed, the rich floral character is in the seeds as well as the flesh, so enjoy your Habanadas in their entirety!

Michael Mazourek and his Habanada: the first truly heatless Habanero is full of rich, tropical flavor.

Photo of Habanada by Matthew Goldfarb; Photo of Mazourek from Cornell's EZRA magazine

This season you can find certified organic Habanada transplants through Fruition Seeds (www.fruitionseeds.com) as three-inch pot transplants for gardeners as well as 72 plant trays for farmers. Plants are also available at Fruition Seeds' farm store every Saturday in April, May and early June in addition to their 200+ varieties of organic, regionally adapted vegetable, herb and flower seeds as well as seed potatoes and transplants of other great varieties.

Are you a chef looking for a farmer to grow Habanada for you? Are you a farmer looking for a chef to buy your Habanada? Are you interested in having Habanada available at your local farmer's market? Contact Fruition Seeds to see if there are any farmer/chef/market connections we may know to meet your need!

Petra Page-Mann is a co-founder and co-owner of Fruition Seeds, customizing organic seeds to thrive in the Northeast. You'll find 200+ certified organic, regionally adapted varieties available at www.fruitionseeds.com and contact her at petra@fruitionseeds.com.

SMALL FARM SPOTLIGHT

Kinderhook Farm: Sheep of Leisure Flock Together

by Angelique Pinet

Anna Hodson is the shepherd at Kinderhook Farm in Valatie, NY, located on over 1,000 acres of rolling pastures at the heart of the fertile Hudson Valley. When she and her husband moved to the farm in 2009, there were only about 20 Dorper ewes - now she tends to a flock of over 400. Anna spoke with Small Farm Quarterly about what she's learned since becoming a full time employee on a diversified farm; the problem-solving strategies, marketing techniques and principles that have contributed to Kinderhook's consistent growth over the years; and why you should meet her friendly sheep.

SFQ: What are the most valuable things you have learned since working on the farm?
Hodson: You can't control anything. Farming teaches you that you can do the best you can, but ultimately you can't control weather and you can't control animal health.

Managed grazing: hens, cattle and lambs

Happy sheep playing

SFQ: What are your agricultural goals?
Hodson: For me personally, it's very important that animals are raised well and with respect. I will not buy or eat meat if I'm not sure where it comes from - I do not want to support meat that hasn't been well raised. In addition to animal welfare, my goals are effective land use, sustainable practices, and producing good food that feeds the world.

SFQ: What advice would you give to people who want to get into farming?
Hodson: Farming is not an occupation. It's a lifestyle. You've got to love it, and you have to dedicate your life to it essentially. With animals, it's pretty intense and it's more than a full time occupation because you can't leave them easily through the winter. You have to be happy to get up early in the morning and work long hours.

SFQ: What is the farm's mission?
Hodson: The farm has multiple aims. Owners Steve and Renee Clearman and Lee and Georgia Ranney want a farm that is sustainable and that keeps the land open. Transparency of food producing is one thing everyone at Kinderhook holds very dear. People are very much welcome to the farm. We're excited to share what we do at the farm and are happy to talk about where the food comes from.

SFQ: What would you say the cornerstone of Kinderhook's success is?
Hodson: We are really committed to doing what we do and everyone that works here works like a dog because they really believe in what they're doing. We want to make it work and we all feel very passionate about the animals we raise.

We also learn from our customers. We used to sell our lambs a lot smaller (40-50 lbs. hanging) and our customers told us that they wanted a heavier carcass with more finish (more fat cover), so now we sell them 50-55 lbs. as a standard. We have a very good relationship with the slaughterhouse, butcher shops and restaurants. They show us what they're looking for and it informs the decisions we make as farmers. We've had butchers come look at the animals, we've chosen animals with them to send to slaughter and then went to look at them at the slaughterhouse where we compared them to when they were alive. A lot of farmers don't get to see this part of the process.

SFQ: What marketing techniques have worked best for the farm?
Hodson: Transparency and relationships are our strongest marketing strategies. Conventional things like advertising may have had some impact in the beginning, but now it's all about relationships. A lot of it has been word of mouth and by having our meat in restaurants and butcher shops. That's a major part of our marketing, but it's not something we promote.

We have a close relationship with customers at the farm store as well. When they come to the farm, we don't just serve them meat; we show them around the farm, introduce them to the animals, talk about the animals, and let them herd the sheep or do whatever we're doing. People really engage with that and it's probably one of the most effective marketing strategies we have.

Georgia is the social media guru for the farm. She takes photos of the animals, so [people] get to know them and their personalities. There's no smoke or mirrors here. These chickens are out on pasture every day and you see how they're being managed. That's very reassuring for people who are worried about animal welfare and how they're being raised.

Summer graze

Anna and her flock
Photos by Georgia Ranney

SFQ: What have been valuable resources of information for you?
Hodson: I go to the Cornell sheep and goat symposium every year, attend NOFA conferences, shepherding courses, anything interesting and relevant. One of the best ways to learn is to meet other farmers and see how they graze and work with their animals. There are a lot of people with a lot of experience.

A ewe gets a foot trim

SFQ: What are some of your strategies for improving soil and plant health?
Hodson: The managed grazing we do is a major strategy. In the winter, we roll out hay in different pastures for the cattle and keep them in different groups depending on sex, age, cow calves, type of animals and finishing groups so we can target feed needs to different animal groups. The tractor rolls the hay bail out behind it and the cattle will pick through the feed. What they don't eat will cover the ground with organic matter and reseed and rejuvenate the pasture.

Also, after the cattle have been in a winter pasture we sometimes plant annual crops. The cattle will beat the pasture down, then we deliver all that manure, then it gets a covering of hay and then we put seeds down. The hay covers the soil, prevents erosion and helps to reseed. We get high quality forage from this process.

See Kinderhook page 13

FOOD SECURITY

Growing Sub-tropic Vegetables in New York City

by Sarah Nechamen

East New York is a neighborhood in Brooklyn, NY that is home to 180,000 people yet for many years only four or five grocery stores. Many supermarket companies didn't think opening a branch in this low-income part of the city would be economically viable, and the stores that were there just didn't have the infrastructure to offer much beyond junk food.

"The grocery stores were old and didn't have a lot of healthy food options, so you would see people on the subway with bags from Whole Foods which is about an hour away," says Deborah Greig, Agricultural Director of East New York farms.

In 1998, a small group of people created East New York Farms to address this problem of food access. From the start, East New York Farms was careful not to come in with the attitude of 'this is what you need and this is how we're going to help you get it,' but rather looked at community assets and how they and the residents could work together to bring in- and even produce- more fresh fruits and vegetables.

The organization started small, with one gardener selling her extra produce on the side of the street. Today, East New York Farms has an urban farm managed by 33 paid teenagers, a large farmers market and market stand, and a variety of workshops and programs to support the many gardeners in the community.

Through all of this success, East New York Farms never forgot their intention to work in close partnership with the community members. As Deborah puts it, "most of what we do is driven by the growers we work with or the community interests." So when the organization staff saw that the Caribbean and Bangladeshi community members (which make up a large part of East New York's population) were trying to grow crops from their subtropical homelands, East New York Farms wanted to help. Their half acre urban farm, though it may not sound like much to the rural farmer's ear, has much more space for experimentation than any Brooklyn backyard gardener could ever dream of.

The Vegetable Trials

Deborah applied for and received a DEC Environmental Justice Community Impact grant to conduct trials of various Caribbean and Bangladeshi vegetables, with the hope of finding out what growing practices were needed for the crops to thrive in this much colder climate.

The vegetables that the project focused on are not crops that most Americans would think to throw onto their dinner plate, but they are used commonly in Bangladeshi and Caribbean cooking. Vegetables like dasheen, a variety of taro which the Caribbean population uses for its roots and the Bangladeshis for its leaves, and culantro, a relative of cilantro with a much stronger taste.

Some of these crops, like culantro, have already been grown successfully by home gardeners, but East New York Farms wants to try cultivating them on a larger scale to increase their availability to the community. Others, like pigeon peas, have been causing the gardeners a lot more trouble.

Post-harvest handling

So far, East New York Farms has had mixed success with the crops. "The culantro was a complete bust," admits Deborah. "We couldn't even get it to germinate." But the pigeon peas are doing quite well, even after some trouble with the tricky container-free seed starting method called soil blocking, and their second attempt at growing dasheen should produce a yield soon.

"You start dasheen kind of like a sweet potato where you let the sprout come up and then put it in the ground, and the first round just didn't work," Deborah tells me. This might be because the only place to get dasheen corms is at a corner store, and it turns out corner store corms aren't the highest quality plant stock.

Helen and Leighton securing trellis

Weather Woes

I assumed that the biggest difficulty with growing these subtropical crops would be the cold New York weather, but Deborah tells me that daylight hours actually pose the bigger problem. Day length close to the equator tends to be pretty even throughout the year, varying by an hour at most, while New York sunsets happen at 4:30 pm in December and 8:30 pm in June. So if a plant from Jamaica moves to the City that Never Sleeps, it's almost always going to be getting either too much light or not enough.

This has been an issue with pigeon peas especially, which the East New York Farm team has gotten to flower with relative ease but has yet to coax into fruiting. Once the peas get a little bigger, the staff is going to try shading the plants at different intervals so that the plants will get the amount of sun they would in the Caribbean or Bangladesh.

That's not to say that colder temperatures in New York aren't a problem; a city that gets over two feet of snow dumped on it every year is not going to be very friendly to a plant whose coldest days are usually 50°F.

"These crops are biennials or perennials in warmer climates," explains Deborah, "And here they can only be annuals. So it's hard to get them to the point of fruiting."

Even crops that will produce a yield in a single year are often

Alba and Afroza talking about beans

Photos by Deborah Greig

used to doing so much later in the year - by which time they are in danger of frost damage in this climate. In response, East New York Farms has become a group of not just farmers but breeders, saving seed from individual plants that produce a yield slightly earlier in the season in order to develop varieties that will thrive in New York's short growing season.

Beyond Brooklyn

Since the project began, East New York Farms has been sharing what they learn about growing the Caribbean and Bangladeshi crops with their Caribbean and Bangladeshi gardeners. But now they want to share their project with the rest of New York too- and even with people outside the city- by holding workshops about growing the crops at various conferences.

Deborah has submitted workshop proposals to several grower conferences hoping she can spread the word to farmers outside of New York City about opportunities to serve Caribbean or Bangladeshi markets. After all, if a farmer were to bring Caribbean or Bangladeshi vegetables to farmers markets in neighborhoods with high Caribbean and Bangladeshi populations, they would sell an incredible amount of produce-a good situation for both the farmer and the customers.

East New York Farms has also applied to hold workshops at New York City based conferences held by the organizations Just Food and Green Thumb. The target audience at these will be urban gardeners who are interested in growing these

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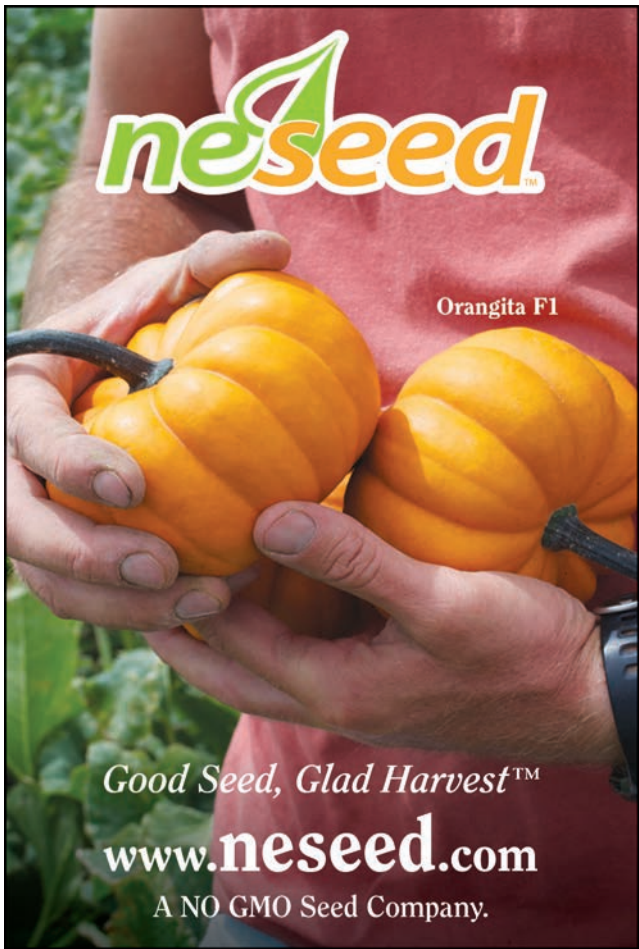

COMMUNITY AND WORLD

Feeding a Vision

Maine Could Produce More Than Enough Food to Feed Itself. But Will it?

by John Piotti

Russell Libby had a head for numbers. An economics major at Bowdoin who later served as statistician for the Maine Department of Agriculture, he could spot patterns and trends in figures not everyone saw. I witnessed this repeatedly when we reviewed agricultural census data together.

But one fall day in 1995, Libby was applying his skill with numbers differently. We were driving south on the Interstate in his pickup truck, on our way to Boston for a first-of-its-kind Northeast Food System Leadership Congress, and Libby was checking license plates to see if he knew any drivers. To my amazement, he twice predicted who we would see behind the wheel, based solely on his memory of plate numbers. This was the kind of parlor trick that could only work in a place like Maine, where people you know are likely to be driving the highway with you, but I was impressed Libby could do it at all. I took this as a sign that he was the right kind of person to tackle the seemingly impossible. Good thing, too - because for most people back in 1995, the idea of revitalizing farming in Maine seemed impossible.

Libby and I were committed to farming's future. At the time, Libby was the new executive director of the Maine Organic Farmers and Gardeners Association (MOFGA), and I had recently launched the Maine Farms Project at Coastal Enterprises Incorporated (CEI). We knew how farms in Maine had declined in the last generation; yet we firmly believed that farming here could grow. We were inspired by organic innovator Eliot Coleman, chef Sam Hayward, and other Mainers who were leaders in a national movement advancing local food. We were impressed by all the Maine farmers doing their part on the ground. And now we were off to Boston to dream and plan with peers from other states.

Fishbowl Farm, Bowdoinham, Maine
Photo by Bridget Besaw for Maine Farmland Trust

Back in the mid 1990s, only a small circle of people saw a bright future for local food. The buzzword of the day was 'globalization,' and the talk in Maine was all about call centers. Farming seemed downright anachronistic. The common view back then, the view that most people held, was that farming here was dead.

Fast-forward to today and you can see the difference. It's now commonplace for Mainers to shop at Farmer's Markets, participate in CSAs, and seek out local produce at stores and restaurants. Parents push school boards to incorporate local farm products into school lunches. State and local officials who once scoffed at the very idea of farms as viable businesses now promote farming as smart economic development. Candidates for governor talk about how Maine can be the food basket of the Northeast.

The statistics support this optimism: From 2002 to 2012, the number of farms in Maine grew by 13.5 percent. From just 2007 to 2012, the value of Maine's farm production increased by 24 percent. During that same period, the number of young farmers (under age 34) in Maine soared, up nearly 40 percent.

It's clear that good stuff is happening here, on multiple levels. But still, Maine is no Iowa. Is it realistic to think that farming in Maine - or any other part of New England - could ever be more than just a sideshow?

That's the question addressed by Brian Donahue of Brandeis University, who assembled a team of researchers (including Libby) to explore how much of the food that New England eats could be supplied locally-given population trends, dietary habits, climatic conditions, and land availability. The resulting report, A New England Food Vision, shows how the region could, by 2060, produce half to two-thirds of all its food (meat, fish, dairy, vegetables, fruit, grain, sweeteners, oils, and beverages), up from about 10 percent today. Doing so could yield significant economic, environmental, and social benefits throughout the region, but would require a major ramp-up in the amount of New England that is farmed: from 2 million acres today to 6 million acres or more by 2060. A good chunk of that land would need to come from Maine.

This vision is promising and possible, yet not supported by today's economic realities. Maine has the needed land, yet cannot cultivate another million acres (let alone another 3 million acres) without also cultivating new markets. While there is great and growing demand for food produced close to home, there is not yet sufficient demand for that much local food at prices that work for farmers. That's the nut that needs cracking.

Some people say that local food costs too much. A fairer statement may be that a lot of the food brought here 'from away' costs too little. Consider for instance, how fruits and vegetables grown in California rely on water systems - and come east via transportation systems - built and maintained with government funds. Consider, also, how the transporters pay less for fuel than its true cost. At present, some fruits and vegetables grown in Maine are cost-competitive with food from away and some are not. (It depends on the crop and time of year.) But more Maine food would become cost-competitive, if more of the true cost of producing and transporting food was incorporated into its price.

Other price distortions result directly from federal farm policies. For example, the federal government sets the price paid to any dairy farmer who sells to a conventional processor like Oakhurst or Hood, and that price is often below the farmer's cost of production. (The situation changes somewhat for organic dairy farmers and the handful of dairy farmers who sell direct retail; but even here, federal pricing constrains what's possible.) Meanwhile, federal subsidies hold down the price of commodity crops that are principally grown out West (like corn, wheat, and soy), which drives up the relative cost of products well suited to the Northeast (like grass-fed meat). Ultimately, these federal policies help neither farmers nor consumers. (Even for low-income consumers, the best approach is not to hold costs down artificially; it's far smarter to improve these consumers' buying power.)

As food costs rise - and they will - it's likely that the cost of food from away will rise more than the cost of food from Maine. If the relative cost of Maine food drops enough, consumer demand will soar. Maine could then see millions of acres of former farmland produce food once again.

We can take steps to reduce the relative cost of Maine farm products by helping smaller farms scale up. In the last decade, we've seen rapid growth in small, diversified farms that sell directly through farmers markets, farm stands, and CSAs. Some of these farms now want to expand modestly, to increase efficiency and be able to sell at least some products wholesale. That's good news if we are serious about getting more Mainers to eat locally, because the majority of consumers are going to get most of their food from supermarkets and institutions (entities that principally buy wholesale), not from direct retail venues like farmers markets. Many small farms are now exploring various ways to enter wholesale markets, including participating in 'food hubs' that pool products from multiple farms. These hubs - which come in many forms - begin to re-create the community-scale

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Another strategy is that we clean out the sheep barn once a year and put it back on the hay fields. It's a deep bed pack. We put hay in the barn for bedding, lambs spend the night in there and deposit on it, and then we put more hay on top.

SFQ: What does a typical day for a shepherd look like? What tasks are done?
Hodson: It depends on the time of year. No matter what time of day, first thing, we check the sheep. We go to wherever they are and walk through them to make sure everyone is okay and no one is sick. Then we check their water to make sure it's flowing and clean.

You have to go out every day and look at the grass and see where the animals are. Do they need to move today? Do they have to move tomorrow? Look at the grass and determine where they will be in two weeks time. Is the grass coming back sufficiently? How will we graze the sheep around the farm and with the cattle? There are a lot of moving parts.

In summer, they graze during the grass-growing months. In winter, we feed them hay and alfalfa baleage that we make on the farm. Baleage can be various types of forage crops (grass, clover, alfalfa, etc.) that are cut, and dried to about 50% moisture, then bailed and wrapped in plastic where it's then preserved in air-tight conditions. The result is a higher quality feed.

SFQ: What do you want people to know about sheep that they probably don't know?
I love my sheep! I want everybody to know how joyful sheep are. I want people to meet my friendly sheep, watch them play and interact with them. They evolved to a very specific way of living and evolved with humans. It's a codependent relationship and I want people to see that.

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crops for themselves or for their communities. If rural farmers start growing and selling these ethnic crops, and urban gardeners around the city also start growing them in their own communities, access to foods like dasheen and culantro in New York City could be vastly improved.

And that is what Deborah sees as the solution to the lack of healthy food access in urban areas in general: not urban farmers producing all their own food in backyards and balconies, or large rural farmers shipping all the food in from across the country, but a partnership between local rural farms and small urban farms. The rural farms can bring in crops for which the urban growers can't get enough volume on their small plots, like potatoes and cabbage, while the urban gardeners can grow the specialty and ethnic crops that the rural farmers haven't tried yet or are just not interested in.

"Like bitter melon!" exclaims Deborah. "For years we've said 'Please! Try to grow bitter melon, we can't grow enough!' But lack of access to resources and knowledge has prevented rural growers from attempting these unusual crops. Fortunately the urban gardeners are able to fill that niche, thanks in part to programs like East New York Farms' vegetable trials, which research the best growing methods for these unusual, subtropical, but highly valued crops.

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LOCAL FOODS AND MARKETING

Certification Programs: Labeling Farm Products for Consumer Understanding

by Elizabeth Burrichter

One of the most common questions I have been asked at market: "Is this organic?" I wonder what customers are really getting at with this question. Are they looking for produce grown without synthetic pesticides or fertilizers? Without any pesticides at all? Produce grown on a farm run by a family or beginning farmer? Or on a farm that creates habitat for wildlife? While all of these factors can play a role in a farm's sustainability, there are more nuanced and more important considerations that go beyond what the average consumer knows about soil ecology or agronomy.

Maybe some more important questions that could be asked of farmers would be, "What steps have you taken this season to minimize tillage?" or "Do you plant a cover crop between cash crops?" These are the important questions that I was never asked working major regional farmers markets in Chico, CA or Syracuse, NY, which is why industry leaders have created standards for sustainable production to address this lack of consumer knowledge. There are several different options for certification, which I will summarize in this article.

The first one I'll discuss is Certified Organic. While some consumers tend to use the word organic in a general way to describe food produced on a farm that they think is sustainable or ecological, the term organic is a very specific label that can only be used by certified operations. Following the organic standards means that the farmer is held accountable by a third party, that is, a certifier that is accredited by the USDA. There are many checks and balances, including tedious compliance and enforcement policies. And while the system isn't perfect, it is THE main system for verification developed by industry leaders in response to the growing farm and food movement.

A recent debate on the NPR foodie program, "The Salt," about nitrates leaking into waterways in Iowa peaked my interest; I can't help but relate the example to organic certification. The original report by Dan Charles made the mistake of simplifying the problem to one of too much fertilization. Farmers over-fertilize the fields of corn, and then nitrates leak into streams. While this is true, it's not the whole story. One listener, who works for the Practical Farmers of Iowa, emailed him to point out that the majority of nitrates that wash away form in between cash crops, between October and May when the soil is bare. The agronomic fix to this problem is to plant a cold-hardy cover crop that is tilled in before planting again in spring, but this practice is not as common as you might think. Cover cropping and crop rotation can be overlooked by farmers when time and capital are limited, but are very important for soil health and pest reduction in all agroecosytems. These practices are the foundation of successful organic management, and the certification process involving much planning, paperwork, recordkeeping, and inspections helps to hold farmers accountable to the standards, so that consumers can know what to expect for without knowing exactly what to look for. Several states offer programs to help reimburse farmers for a portion the cost of certification, for those interested in participating in the program.

Another relatively popular label is Certified Naturally Grown (CNG), the non-profit alternative to the USDA's National Organic Program (NOP) that requires an application, the signing of a contract, and an inspection performed by a volunteer, usually another CNG farmer. While their standards are based upon the NOP standards, they have more flexibility to alter requirements. For example, they have created an Aquaponics Advisory Council to work on creating standards for a potential CNG Aquaponics Certification. The NOP maintains that all crops must be grown in soil, but an increasing number of aquaponics producers are interested in testifying that they are using sustainable fertility management practices, and CNG wants to be an option for them. While this program may seem less rigorous than the USDA Certified Organic Certification process, it may be a good option for farms that do a lot of direct sales and have a chance to be transparent to their customers in person.

A good alternative to certification, whether you don't want to pay for it, or have an aversion to such labels or government

A grazing dairy cow in Central New York. Various certification programs help define agricultural practices so consumers know what they are getting.
Photo by Elizabeth Burrichter

or institutions in general, is to take NOFA-NY's Farmer's Pledge. In an effort to further assist consumers in identifying where they want to spend their food dollars, this pledge was developed to outline the agroecological management and fair labor practices used by farmers; they sign it annually and can display it for their customers. While NOFA-NY does not require professional inspection for pledged farmers, those who sign adhere to allowing any customer to visit the farm for themselves by appointment. Pledged farmers who are not certified organic cannot use the term "organic" to define their production, but the transparent principles defined by the Farmer's Pledge are well-aligned with the management practices required by the National Organic Program.

I wanted to talk about animal operations separately, because it can be such a loaded topic. While consumers may flock to organic or CNG or Farmer's Pledged produce to avoid potentially harmful chemical residues, our meat and dairy products come from an animal that lives and breathes like the rest of us, and we may place particular emphasis on buying animal products produced using humane animal husbandry practices. Consumers have many different reasons for choosing their animal products: they may prefer that livestock are not treated with hormones or antibiotics, or that they have ample space to move about outdoors, or that individual animals are called names like Betty instead of a number.

Raising an animal in the most ideal and sustainable way is a complicated task and the farmer can often face conflicting demands. For example, the organic dairy industry stemmed from consumer demand for milk from cows not treated with BST, a growth hormone, but the organic industry thrives today for reasons beyond just a lack of inputs concerning for human-health.

An article published in 2014 by the Journal of Animal Science called *Access to Pasture for Dairy Cows: Responses from an Online Engagement*, illuminates the trend that access to pasture for dairy cows is increasingly considered important to consumers when they make dairy purchases, despite the fact that the majority of milk produced in the U.S. comes from confinement dairies. For this study, over 400 people (both affiliated and unaffiliated with the dairy industry) were surveyed. The authors Schullpli, Von Keyserlingk, and Weary found that the majority of participants, including those affiliated with the dairy industry as well as those who were not, viewed cow access to the outdoors as important. The benefits they cited included: exposure to fresh air, ability to move freely, ability to live in social groups, improved health, and healthier milk products. The interesting exception to this opinion was veterinarians.

While there are many clear benefits to pasture access, veterinarians may be especially concerned with "cow comfort," which can be optimized very easily on a large scale when cows are in confinement. When a dairy cow is managed to produce as large of a volume of milk per day as she can, keeping her feet comfortable, with easy access to food and constant water, is a priority for her health. I think that this example helps to shed light to the complexity surrounding our food, even after we have agreed that animal health, human health, and environmental health are all priorities in food production.

Several participants in the study said that a hybrid system that provided cows a combination of indoor confinement and a regimented grazing program would be ideal, which is how organic dairies tend to manifest. Fresh forage and exercise getting to and from pastures provides health benefits to the cows, and a carefully planned season of rotational grazing keeps pastures and their soils sustainably productive for years to come. Another new certification has recently become available to fill the market void for omega-rich dairy products without any grain in the cows' ration: 100% Grassfed. Currently, Pennsylvania Certified Organic, American Grassfed Association, NOFA-NY, as well as emerging regional and national dairy and meat coops hold standards to which grassfed dairy and livestock farmers can officially subscribe. There are even more certifications and labels I could talk about in this article - food justice certified, animal welfare approved, kosher certified, Pride of New York, etc, but this is a market trend that deserves a book on its own.

The standards defining these various labels may not all agree on every detail, but they do have one thing in common - to protect the soil. By maintaining requirements such as biodiverse cropping plans, diligent record keeping, or animal rations including pasture, these labels and certifications aim to keep our soils healthy and productive for years to come.

Liz Burrichter is an organic inspector, writer, and beginning farmer in New York. She can be reached at elizabeth.burrichter@gmail.com.

For more information on the web, visit:
USDA Certified Organic: www.ams.usda.gov/AMSv1.0/nop
NOFA-NY Farmer's Pledge: www.nofany.org/farmers-pledge
Certified Naturally Grown: www.naturallygrown.org/
American Grassfed Association: www.americangrassfed.org/
Animal Welfare Approved: http://animalwelfareapproved.org/standards/awa-grassfed/

COMMUNITY AND WORLD

Rolling Out the Red Carpet for Soil: United Nations Declares 2015 as International Year of Soils

by Amy Overstreet, Vermont NRCS Public Affairs Officer

While we might not think about the soil underfoot every day, soil is essential to human survival. Soil grows the food we eat, the flowers and trees that surround us, and provides the foundation for the recreational activities that we enjoy. We walk on it, shovel it, sweep it away from our homes and sidewalks, but soil is a life giving resource. It's often misunderstood, but just as skin protects our bodies, soil protects the earth. Though we often take it for granted, in its absence we would quickly perish. In 2015, soil takes center stage as the world celebrates the International Year of Soils (IYS), as declared by the 68th United Nations General Assembly. The Food and Agriculture Organization (FAO) of the United Nations is heading up efforts along with the Global Soil Partnership.

Healthy soils are the foundation of agriculture. In the face of mounting challenges such as a growing global population, climate change, and extreme weather events, soil health is critical to our future. Healthy soil is essential as global demands rise for food, fuel, and fiber. Soils also play a crucial role in food security, hunger eradication, climate change adaptation, poverty reduction and sustainable development.

As part of my year-long detail to the National Soil Science Division, USDA-Natural Resources Conservation Service (NRCS), in Washington, D.C., I had the privilege of traveling to New York City on World Soil Day, Dec. 5, to attend the United Nations kickoff for the International Year of Soils. I was impressed to learn that the King of Thailand, His Majesty Bhumibol Adulyadej, was instrumental in helping declare 2015 as the International Year of Soils, along with the International Union of Soil Science (IUSS), a global union of soil scientists. The Union honored the King's efforts by declaring his birthday, Dec. 5, each year as World Soil Day. His daughter, Her Royal Highness Princess Bajrakitiyabha Mahidol, was the special guest of honor in New York, and Norachit Sinhaseni, Ambassador and Permanent Representative of Thailand to the UN, presided over the ceremony. It was amazing to witness world leaders coming together to focus attention on soil. Presentations included messages about the serious challenges that are facing agriculture and food security, particularly in light of the fact that in the next 40 years, farmers and ranchers will need to produce as much food as they have in the last 500 years to feed a rapidly growing population.

David Smith, NRCS Deputy Chief for Soil Science & Resource Assessment, Washington, D.C., and Amy Overstreet, USDA-NRCS Vermont Public Affairs Officer, traveled to New York City last December to attend the International Year of Soils kickoff at the United Nations.

2015 International Year of Soils

Many agencies are working to promote IYS and spread the word about the importance of soil resources including the USDA-Natural Resources Conservation Service (NRCS). NRCS is producing and sharing brief videos to highlight each of the monthly themes and capture people's attention so hopefully they will want to learn more. You can view these videos on the IYS-NRCS YouTube channel.

This is the year to celebrate soil and the many things that we enjoy in life which depend on this precious resource. I am confident that throughout 2015, the International Year of Soils will help raise awareness throughout the international community on the central role of soils in our everyday lives. I also hope this awareness leads to the establishment of proactive initiatives and fosters individual actions to protect this priceless resource.

For more information about soil health, contact your local USDA NRCS office or visit http://offices.sc.egov.usda.gov/locator/app

Amy Overstreet is a 21 year employee of the USDA Natural Resources Conservation Service. She recently moved from her home state of South Carolina to begin working for Vermont NRCS in Colchester, VT. She will spend the year helping USDA celebrate the International Year of Soils.

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infrastructure that once existed throughout Maine, back when small canneries, creameries, and slaughterhouses were common.

Maine farms will also become more competitive with changes to federal policy. With a new farm bill just passed, major reform is not coming soon; but reform will come, because the public will demand it. Awareness has now grown to a point where it will not be suppressed, spread as it has on so many levels, from author Michael Pollan to the local farmer who interacts with attentive customers. Beyond what may happen in Maine or Washington, D.C., we are witnessing larger forces at work in this direction. The relative cost of food from away is slowly but methodically rising, driven ever upwards by numerous factors, including increasing fuel costs, more frequent droughts and crop-damaging storms, and the alarming depletion of the Ogallala Aquifer (which supplies 30 percent of the groundwater used for irrigation in the United States).

There's no question that the economic realities in place a generation from now will bolster the competitive position of Maine farms and support the kind of robust local food system advanced by A New England Food Vision. But what happens between now and then? What happens in the interim, when the most profitable use of a 10-acre parcel with prime farm soils is to drop a new house in the middle of it, with no regard for that land's potential to feed us? What happens when current market forces do not reward farmers adequately? What happens when new farmers cannot afford to buy transitioning farmland?

If - during this critical time - we lose much more land to short-sighted development, or if we lose farming know-how because we aren't helping existing farmers remain in business or new farmers get started, then farming here will never realize its promise. For close to 20 years, I've been an unabashed supporter of farming in Maine, talking up the future whenever I can. I'm still doing that. But now - amid all the excitement about farming - I make a point of stressing that not all economic forces lead in the right direction. The future we want will only be realized if we take deliberate steps to protect more farmland and provide key services to farmers - and only if we do so now, while we still have the opportunity.

When Russell Libby passed away in late 2012, many of us lost a dear friend and colleague who we relied upon for so much. In my case, I also lost someone I could talk to about the numbers. Numbers are important: they frame what's possible. In the 1880s, Maine farmed 6.5 million acres. Today, the figure is about 700,000 acres. Of the remaining 5.8 million acres, only about a million acres have been lost to development. Much of what's left has grown up in alder and pasture pine. With the right steps, that land could transform farming in Maine.

In winter 2009, Libby and I attended a gathering of farmers and researchers at Spannocchia, a farm in Tuscany where my roommate was Brian Donahue and where I, as always, talked up Maine. At first, Donahue was skeptical that Maine had the potential to feed so much of New England, but that changed the more he spoke with Libby, who held in his head all the numbers needed to make the case. "Let's look at this closer," they said, and A New England Food Vision was conceived. Yet numbers never capture the whole story - far from it. Libby, also a poet, knew that well. In this excerpt from his poem, "At Spannocchia," he conveys both promise and urgency:

After seeing the terraces of the gardens,
level imposed on steepness below,
steps connecting each level at each end,
realizing this represents a thousand years of continuity,
of a shared understanding of what is to be done,
passed through time and changed through situation,
the most important step for any of us may simply be
to place the first stone.

Yes, Maine could once again feed itself, and more. But just because this could happen, doesn't mean that it will. The future of farming here hinges on what we do now. It's time for the people of Maine to build an expansive and enduring terrace, a foundation worthy of who we are, and then upon it, tend a bountiful garden.

John Piotti is the President and CEO of Maine Farmland Trust, a nonprofit organization that works to protect farmland, support farmers, and grow the future of farming in Maine. Since founding in 1999, MFT has protected over 37,000 acres of farmland and helped support over 400 farm families. He can be reached at jpiotti@mainefarmlandtrust.org.

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FOREST AND WOODLOT

Weighing the Pros and Cons of Producing Birch Syrup

by Michael Farrell

Although many people have heard that you can tap birch trees, very few have actually tried to produce birch syrup, and folks who have boiled down some birch sap have often had negative experiences. The sugar content of birch sap is much lower than maple sap (usually between .5-1 brix), so it takes a very long time to boil it down in to syrup, especially when it's done on a small scale without efficient processing technologies. The prolonged exposure to heat causes the glucose and fructose in the birch sap to develop a very strong and unappealing molasses-like flavor.

Since the sap is difficult and time-consuming to process and most people don't like the taste of the finished product, the obvious question is "why would anyone decide to start tapping birch trees for syrup production?" There are many valid reasons to be skeptical of birch syrup production, yet surprisingly just as many reasons that you may want to consider it, especially if you already have an existing maple sugaring operation. This article highlights the four main reasons one should consider tapping birch trees in the spring.

(1) Birch Syrup Can Taste Very Good - Especially When it is Produced with Reverse Osmosis

Although most of the birch syrup I have tasted has not been appealing, there are many people out there producing some delicious birch syrup. In fact, at the NYS Maple Conference, the folks from Millbrook Maple brought in a sample of their birch syrup and everyone in the room got to try it. Before sampling, I asked the 50 or so people in the room if they had ever tried birch syrup. About half of the people there said they had tried it and only a small handful raised their hands to say they enjoyed the taste. However, after everyone got a chance to sample the birch syrup that Millbrook Maple brought in, nearly everyone raised their hand to say they liked the flavor.

This birch syrup was made by processing the sap to a high brix before boiling it for a limited time. Since over 90% of the water was removed from the sap, the time it spent under heat was reduced by over 90%. Just as the caramelization of fructose and glucose under heat causes maple syrup to darken and develop a strong flavor, the same process impacts flavor development in birch syrup. However, whereas maple sap is entirely sucrose coming out of the tree and only a small fraction gets converted to glucose and fructose by microorganisms, birch sap is primarily glucose and fructose coming right out of the tree. This is why it develops such a dark color and intense flavor when boiled for a long time.

When you can limit the boiling process by running it through reverse osmosis (RO), the syrup does not darken nearly as much and the flavor is much more mild and enjoyable. Thus, if you have an RO and enough birch trees, it's likely that you could produce some high quality birch syrup. Although it is possible to make good-flavored birch syrup without an RO, it is very difficult to do so and you will wind up spending a great deal of time and energy to produce a syrup that may wind up with an unappealing flavor. Thus, without an RO, I would not recommend trying to produce birch syrup.

(2) Birch Syrup is Not a Competitor with Maple Syrup

Because the taste of birch syrup is significantly different than the taste of maple syrup, it should not be considered a competitor or substitute for pure maple. The only thing they have in common is that they both originate from the sap of deciduous trees in North America - the flavor profile and uses for the syrup differ dramatically! In fact, rather than viewing birch syrup as a possible competitor with maple syrup, it can serve as an excellent companion product in the marketplace. When you have something different and unique for sale (such as birch syrup), it will open up new markets for your products that didn't previously exist.

It is possible that selling birch syrup could get your foot in the door at retail shops and restaurants, and if they really like your birch syrup, perhaps they will also want to try some of your pure maple products. There is a saying that "you can make a little bit of money doing what everyone else is doing, or you can make a lot of money doing what nobody else is doing". Since very few sugarmakers are currently producing birch syrup, it presents a wonderful opportunity for the latter.

(3) You Can Achieve Greater Use of Your Sugaring Equipment when Producing Birch Syrup

Whereas maple sap flow is based on stem pressure caused by fluctuations in temperature below and above freezing, sap flow in birch trees is based entirely on root pressure that occurs when the soil temperature warms to approximately 50°F. The beginning of birch sap flow tends to coincide with the end of the maple sap flow, so it is possible to use your existing infrastructure to also produce birch syrup as soon as the maple season has ended. When you can produce two crops using the same investment in infrastructure necessary to produce a single maple crop, this can greatly improve your overall bottom line for your sugaring operation. You have already spent all the money on your sugarhouse, evaporator, reverse osmosis unit, filter press, vacuum pump, extractor, holding tanks, etc. This is a huge investment to only use for 6-8 weeks a year during the maple season. If you can add 2-3 weeks of birch syrup production, your investment in sugaring equipment could be paid off much sooner.

(4) Prices for Birch Syrup are Much Higher than Maple Syrup

A few years ago I did some internet research on birch syrup and discovered that the prices for birch syrup were usually 3-4 times that of maple syrup, The main reasons for the high prices are the fact that the demand is greater than the supply AND it is usually more costly to produce in Alaska and western Canada - where the vast majority of birch syrup currently comes from.

However, the production costs for existing sugarmakers in the northeast are significantly lower since we already have all of the infrastructure in place from our maple operations. With lower costs and the same price structure based on limited supply and high demand, birch syrup production can be a very profitable enterprise. However, just because some producers are getting good prices does not mean people will be banging down your door asking to buy a 12 oz bottle of birch syrup for $25. To be able to sell birch syrup at high prices, you need to be willing to invest the time and resources in developing retail markets.

To complicate matters, most of the people you talk to will have no idea about the product or how to use it. It will take a lot of time and you will encounter your fair share of skeptical buyers and people who claim to not like the taste of it, but if you are persistent, I am confident that your sales efforts will pay off in the end.

The University of Vermont and Cornell University have active research projects on birch sap and syrup production. We are experimenting with different sap collection (vacuum tubing, gravity tubing, buckets) and processing technologies and techniques, as there is still much to be learned in this burgeoning industry. The industry is becoming more developed every year and the first ever International Conference on Birch Sap and Syrup will take place from June 12-14, 2015 at Paul Smiths College in the Adirondack Mountains of New York. The main purpose of the conference is to bring together many people who are currently producing birch sap and syrup products to network with each other, share ideas, and learn about the latest research and developments in this growing industry. It is also intended for sugarmakers who have birch trees and are considering adding birch syrup production to their existing operations. If you currently produce birch syrup or are considering doing so in the future, this is the conference for you.

The activities will kick off Friday evening with a welcome reception featuring birch-themed dishes along with a tasting competition in which everyone will get a chance to taste birch syrups from throughout the world and vote on their favorite. Saturday will feature several technical sessions and workshops along with a tour of Paul Smith's College birch and maple sugaring operations and a birch BBQ dinner. On Sunday, there will be additional workshops and a tour of the maple and birch sugaring operations at Cornell's Uihlein Forest in Lake Placid. Because the conference will be drawing people from throughout eastern Europe, Scandinavia, Alaska, and Canada, we are also scheduling an optional tour of sugaring equipment manufacturers in northern Vermont on Monday, June 15. Registration forms and additional information is available on www.paulsmiths.edu/birch

Michael Farrell is director of the Cornell Maple Program an can be reached at mlf36@cornell.edu or 518-523 9337 with any questions.

A small bottle of birch syrup produced at Cornell University's Uihlein Forest in Lake Placid. When sold for $5 in a 40 ml bottle, this equates to approximately $500/gallon on a retail basis.

Photo by Nancie Battaglia

Although many people still use buckets or bags to collect sap from individual birch tree, tubing systems that have traditionally been used in maple syrup production are now being utilized for collecting birch sap in many places.

Photo by Kevin Sargent

FARM TECH

Keeping Your Tractor Running! (Part 3)

by Rich B. Taber

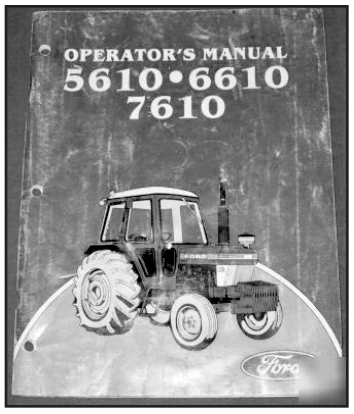
This is the third installment in a series on locating, selecting, and maintaining used tractors for the small farm. In the first installment (Fall 2014), we discussed some of the features that you would be looking for on a good used tractor for your small farm. In the second installment (Winter 2015), we described places to find and purchase a tractor. In this article, we will cover some of the maintenance activities that are needed to keep your tractor running efficiently on a daily basis, and to avoid ending up with costly repairs.

An efficiently running tractor can be critical to the successful operation of your farm. I think of my own farm during this frigid and snowy winter that we are having in Central New York State. With over 100 ewes that are going through lambing at this time and a herd of beef cattle that need to be fed, I need to move heavy round bales around the farmstead several times a week. Tractors that don't start can leave me stranded and my animals hungry. I am also constantly moving huge amounts of snow. The frigid, cold, and windy conditions that we are experiencing pose several challenges to keeping tractors running which will be addressed in this article.

One of the most important items that you need to first acquire for your tractor is the owner's or operator's manual. Oftentimes, when you purchase a used tractor, you do not get an owner's manual with it, though you can find them easily from either an equipment dealer or online. It is critical that you have one for your machine so that you know how to operate your particular tractor, when to schedule routine maintenance, and where to find the different capacities for all of the fluids which must be maintained in the tractor.

In addition to the owner's manual, you will need a simple set of common mechanics tools to accomplish many of the needed maintenance and simple repairs that normally occur with a tractor, along with a good quality grease gun.

The Operators Manual has critical information that you need to have to keep your tractor running well.



The following list highlights some of the routine items which must be frequently checked and maintained (and according to the operator's manual) on a tractor to keep it running smoothly:

Engine oil levels, and oil filters. Purchase the highest quality lubricants that you can find; don't be "penny wise and pound foolish" and try to scrimp on these items. Check dipstick levels on a daily basis!

Transmission oil levels, hydraulic oil levels, and respective filters. On some tractors the transmissions and hydraulic systems are combined, on others, they may require different types of lubricants. Again, check levels daily!

Battery fluid levels and battery terminal condition. A properly functioning alternator determines how well your battery stays charged. Additionally, a good battery charger and booster can oftentimes save the day in bitterly cold weather to get those sluggish batteries functioning.

Fuel filters (especially critical on diesel engines). Change them frequently, and before harsh weather conditions challenge all fuel systems! Fuel additives that help prevent and/or break up fuel system freeze ups can be quite useful too.

The author attempts to get his tractor used for feeding livestock running in below zero temperatures, with a block heater, and a battery booster/charger.

Correct grade of fuel for the season. In colder weather, diesel engines need to have electric block heaters installed, and the correct grade of fuel used. Winter fuel is often a mixture of diesel fuel and kerosene; check with your supplier for details. If you use summer grade fuel in your tractor, the fuel system and filters can gel up; this can be quite aggravating when your tractor quits a good distance from a building; how will you get it started in frigid cold weather now that it's marooned a long way from electricity? It is also a good idea to keep your fuel tank filled as full as possible during the winter as this can help prevent condensation from accumulating in the fuel system.

Radiator coolant strengths and levels. Coolant should be rated to -30 degrees F. Check levels often. Don't short-change this activity; if there is not enough coolant in the cooling system, you can freeze and burst your engine or result in overheating. A malfunctioning radiator thermostat can cause cooling system problems too.

Tire conditions and correct pressures. It is imperative that you have a good quality tire gauge and air compressor to keep tires at the correct pressure. Rear tires in particular are extremely expensive!

Grease fittings filled with the correct grade of lubricant. Buy good quality grease and be on a first name basis with your grease gun!

Power steering fluid levels. This level must be maintained or the machine will be very difficult to steer, even more so in cold weather.

A tractor fitted to remove the ever present winter snows we have been having and a front end loader spear to feed round bales. Regular maintenance is critical for winter operations.

Front wheel bearing grease levels. Hopefully your front tires have grease fittings that alleviate you taking apart the front wheel bearings in order to pack them with lubricant.

Air conditioning coolant levels. If the tractor cab has an A/C unit.

Air filter condition. Tremendous volumes of clean air must respire through the engine to keep it running.

Electrical and fuel gauges working. Nothing is more aggravating than having the tractor run out of fuel at the most inconvenient time. This results is having to "bleed" the fuel system to get unneeded air out of it; it seems to happen only on Sundays and holidays!

Belt conditions for generators or alternators, tightened to the correct specifications. The electrical system will not function as it should if belts are loose or frayed.

Slow Moving Vehicle (SMV) emblems. This is a matter of safety for both operators and passenger vehicle drivers. It is also required by law if traveling on public roadways.

Tractor brakes, and emergency and parking brakes working correctly. For safety and legal reasons.

Personal protective equipment (Roll Over Protective Structures or ROPS) and seat belts installed and used. For older tractors, incentive programs exist to install ROPS systems.

Lights, flashers, and turn signals all operational. Again, for legal and safety reasons.

Correct hardware for hitching implements. Includes draw pins, three point hitch hardware, and sway chains. You absolutely need to have the correct hardware, specific to whatever type of three point hitch system that you have, such as Category I, II, etc.

Correctly mounted tire chains if conditions warrant.

Checking all of these items at specified intervals will ensure that your tractor will operate safely, efficiently, and add measurably to its useful life. By keeping your tractor under cover at least during periods of cold, inclement weather, and having the right accessories as mentioned in this article you will be able to accomplish your tasks in a timely, aggravation free manner.

Rich Taber is Grazing and Ag Economic Development Specialist with Cornell Cooperative Extension of Chenango County. He also owns and operates a 165 acre farm in nearby Madison County, where he raises beef cattle, sheep, pastured poultry, and has a very productive woodlot as well. Rich Taber can be reached at 607-334-5841 ext. 21, or email rbt44@cornell.edu

STEWARDSHIP AND NATURE

Farming with Nature: The Next Agrarian Frontier

by John M. Thurgood

Imagine a world with healthy and abundant food, thriving farmers, and clean lakes and streams. Is this an unrealistic vision? It seems with our abundant resources and knowledge, it should be possible. Why isn't it? I think the root cause is the belief we need to control nature — to take the upper hand.

Our "man over nature" paradigm has driven our decision making process. In an attempt to control weeds and obtain nitrogen from a green manure crop, we plowed our soils. In short order, the health of our soil degraded and started flowing to the sea. Then, to enhance short-term yields, we adopted the use of commercial fertilizer that has choked our waters with nutrients. Nitrogen from cropland flows to the sea, resulting in algal blooms and hypoxic zones. Phosphorus flows into our streams and lakes and causes algal blooms, rendering recreational uses unattractive and the water less suitable for public drinking water systems.

I could go on at length about the negative effects of our "man over nature" paradigm, but the fact is our collective decisions have led us to where we are today. The good news is our actions can also lead us to a brighter future. So, how can we make better resource management decisions? I hope you will join me in adopting a new paradigm of "Farming with Nature."

So how do you farm with nature? I would like to be able to tell you there is a simple, easy to use formula, however, there is no one-size-fits-all answer. It starts with looking across your landscape and asking: "How can I work with the natural resources and systems I have been blessed with to produce food and fiber, while making sure I am giving something back to the net benefit of nature?"

Just where does one begin? I suggest you start at the very top of your landscape, where you can see the entire body of your resources. Imagine you are looking out from your back porch. What do you see? Trees, shrubs, grass, forbs, maybe a lake or stream, domestic and wild animals? Take a mental inventory. While you're at it, spend the whole day walking around and observing, to get a comprehensive mental list.

Now, if left alone, where would nature move these resources? This type of movement is called succession in the world of natural science. Succession is defined as "The progressive replacement of one dominant type of species or community by another in an ecosystem until a stable climax community is established." (www.bilogy-online.org/dictionary)

The answer to this question is determined by the climate in which you live. Areas where humidity and rainfall are concentrated into short periods throughout the year tend to be brittle; an example would be the Southwestern region of the U.S. On the other hand, non-brittle areas have relatively high rates of rainfall and humidity distributed throughout the year. The Northeast U.S. is an example of a non-brittle environment. (Allan Savory)

So why is brittleness important to think about? The impact of man's actions on the land can have wide ranging consequences depending on the degree of brittleness. The impact of these actions can be predicted. In brittle environments, the presence of large herds of ranging cattle and the associated animal impact and herd effect - means that succession will tend to move toward thriving rangeland. While in non-brittle environments succession tends to move toward forests.

Now let's return to the view from your back porch. If you live in the Northeast and take no action on the land, when you compare your view from year to year you will see the bare ground, or mono-crop fields, moving toward grasses and forbs, then change to scrub and finally to forest. In succession, nature is moving to more and more diversity. If you want to stop this succession you will have to do something on the land. Keeping the land as a mono-crop takes the most work and expense. You will spend your whole life fighting myriad forbs that continue to try to get a toehold. The lack of plant diversity in a mono-crop leads to a break down in every ecosystem process.

A healthy pasture sword with a diverse set of plant species. What species do you see?

So why would you want to hold succession at the mono-crop level? Well, for one thing, it is hard to produce tomatoes in the forest. If you are a vegetable grower, you may be thinking you have to grow produce by way of a mono-crop. Let's think about this. How can you grow a mono-crop, but not as a mono-crop? One option is to grow tomatoes and follow them with a cover crop. Or maybe you can grow no-till tomatoes without inverting or stirring the soil. This will help preserve the biological community in the soil. I encourage you to think of other ways you can work with nature.

You may be thinking that holding succession at the mono-crop level seems like a lot of work, and are looking for other alternatives that are farther along the successional continuum. One option is polyculture, which means growing different plants in the same space. This diversity of plant species can help by providing different types of root systems, fibrous and tap roots and they may also have a different canopy or allelopathic capability. As you add diversity the system becomes more stable. Adding the animals to the system is another option.

Let's start with a little discussion about how animals graze in a natural setting. In the case of bovine, they would be constantly moving around to find lush grass free of urine and manure. To mimic this natural movement, many grazing farmers have adopted some form of rotational grazing. Proper grazing management eliminates the overgrazing of plants, which causes bare ground. It also promotes a diversity of grasses, including deep-rooted grasses and forbs that increase the pumping of mineral resources from deep in the soil, to the soil surface where plants need them. The roots of these forbs also serve to move carbon deep into soil and feed the biological community. All this leads to healthy soil, more productive pastures, and well-functioning ecosystem processes. Now, if you add undisturbed grazing lands or hayland during peak nesting periods, you can also have a positive impact on declining grassland bird populations. These are just a few ways that one can "graze with nature."

You may be thinking you want to let your land grow back to forest, or at least some of it. You can approach this in many ways. You can just let 'er go, but taking some action now might get you to your desired goal for a healthy forest ecosystem faster. If you have invasive species, you may want to get these under management so seedlings can outcompete them. The stage between crop or pastureland and forest is often referred to as early mid-successional habitat. This is when the land is covered by a diverse set of grasses, forbs, shrubs and trees. In many areas in the Northeast, this habitat is in short supply and has led to declining populations of bobolink, towhee and chestnut-sided warbler. By fostering this habitat you can help bring these species back. Enlisting a forester to develop a plan to meet your objectives for the regeneration and management of existing woodland can pay big dividends.

Let's go back to the porch. As you look out across the landscape, you may want to consider doing all of the things we have discussed. If so, it now comes down to deciding about placement. Ask yourself, where do I want to grow vegetables, graze animals, develop early successional habitat and forest land? Having a diversity of land uses is another good way to mimic nature.

There are trained professionals, neighboring farmers and published resources that can help you better farm with nature. Two texts I have found extremely useful in learning how to farm with nature are: 1) Holistic Management, A New Framework for Decision Making, by Allan Savory with Jody Butterfield. The concepts presented in this article are inspired by this book. 2) Permaculture: A Designers Manual, by Bill Mollison. The USDA Natural Resources Conservation Service can provide technical assistance and financial incentives for the adoption of conservation practices.

I truly believe farming with nature is our next agrarian frontier, and we have many farmers throughout the country and the world who are doing it successfully. As editor of the Stewardship and Nature section of the *Small Farm Quarterly*, I would appreciate your sharing your approach to farming with nature. If you would like to submit an article, send it directly to me at john.thurgood@vt.usda.gov. Our readers and I look forward to hearing from you.

Look across the body of your resources, what do you see?

Photos by John M Thurgood

John Thurgood is the USDA Natural Resources Conservation Service District Conservationist for the Central Zone, VT.

DAIRY AND FIELD CROPS

Hot Topic: Improving Water Quality on Dairy Farms in Vermont

by Rachel Carter

Vermont in summer; blue skies, mountain breezes, and dairy cows dappling the working landscape - a source of both heritage and economic growth for Vermonters. The hottest of Vermont summer days are the perfect excuse to skip out of life's everyday responsibilities and dunk in a stream, dip in a pond, or dive in a lake. In northeastern Vermont, the shores of the nation's sixth largest lake, Lake Champlain, resemble more of a seaside escape than a lake. Until one encounters a blue-green algae bloom.

The blooms are the result of cyanobacteria bacteria that can form into large visible colonies due to interactions with excessive nutrient loads in the lake. The blooms release toxins, which can pose serious harm to humans and animals through oral or skin exposure. In recent years, these blooms have been on the rise on the warmest days, with more beaches closing on a consistent basis, especially in the Missisquoi Bay - an area downslope of the highest concentration of Vermont's dairy farms.

Dairy farms have been at the center of the water quality discussion because they make up the largest portion of agricultural land use in Vermont. Certain types of production practices at conventional dairy farms have detrimental effects on Vermont lakes, rivers, and streams. Lake Champlain and phosphorus are the focal point because of the magnitude and importance of the lake, and because of the high number of dairy farms in Northeastern Vermont.

But phosphorus loading is not the only area of concern when discussing issues around water quality, the environment, and agriculture. Data obtained from the Vermont Agency of Agriculture, Food & Markets reveals that pesticides used on corn - the primary feed source for conventional dairy farms - make up the majority of pesticides used in Vermont. Of the pesticides used, some have negative health impacts on both the environment and humans. Pesticide use on corn has been on the increase in the past seven years, as dairy farms have gotten larger. Additionally, according to data from the EPA and Census of Agriculture, synthetic nitrogen fertilizer has been on the increase in the last decade and the amount of synthetic fertilizer has actually been applied to less land, meaning more is being applied per acre. Excess nitrogen loading is an emerging concern in the Connecticut River watershed.

Cornfield at Lucas Dairy LLC in Starksboro, VT planted using no-till equipment.

Photo courtesy of UVM Extension

Audet's Blue Spruce Farm in Bridport, VT practices nutrient management to help improve water quality and to generate electricity.

Photo courtesy of Blue Spruce Farm

It's not all bad news, however, and movement is underway in the state and on farms to create a stronger culture of stewardship. Vermont's governor, legislature, and state agencies are committed to advancing Vermont's food system and increasing coordination and communication among farm and food sector organizations, which are explicit goals of Vermont's Farm to Plate Strategic Plan, a statewide plan to strengthen the food system. The collaboration taking place in Vermont trickles down to all areas impacting the food system, including water quality. With the help of multiple funding sources, including $45 million from USDA, heightened technical assistance and stewardship practices will be expanded upon in Vermont-particularly in the areas surrounding and feeding into Lake Champlain.

The Champlain Valley Farmer Coalition is one organization working to educate farmers, the public, and legislators on water quality issues by showing how farm economic resiliency and a clean lake can work together. "Buffers could be considered wasted space, but can actually be sized to be hayed, which is one solution we work on with farmers," states Nate Severy, an agronomy outreach specialist with the University of Vermont Extension for the Champlain Valley Farmer Coalition. "Cover cropping, no till, livestock exclusion, barnyard repair, grass waterways, and crop rotation are all areas we work with farmers on so they can manage farms, livestock and crop fields in a responsible way to prevent nutrient loss to our waterways, all while contributing to a strong farm economy.

Handsomely set on the rolling slopes of the lower Champlain Valley, Audet's Blue Spruce Farm in Bridport, VT is a three generation family farm and active participant in the Coalition. As a member of the Cabot Creamery Cooperative, Blue Spruce Farm produces 3.6 million gallons of milk a year and grows crops on 3,000 acres to feed the cows. Known as Vermont's pioneering Cow Power farm, Blue Spruce Farm produces methane electricity from cow manure for Green Mountain Power, Vermont's largest electrical utility company.

"Everything is connected to soil health," shares Marie Audet of Blue Spruce Farm. "Healthy soils act like sponges to absorb nutrients and water, and promote higher quality and quantity of feed. Every investment we make insures that nutrients applied to our fields, stay on our fields, and yield positive results on both ends. For example, we use an aerator on all of our fields, whether we drag line or top apply liquid manure. We can literally walk behind the aerator within 10-30 minutes after application - the manure is in the ground, where it needs to be. One of the biggest cultural shifts on our farm in the past 50 years is our understanding of and managing nutrients. Farmers of all types and sizes can benefit from having a nutrient management plan. Additionally, we continue to increase lower till practices and cover cropping. Buffers are just common sense."

Cow Power also made sense. Growing quality feed for their cows is important to Blue Spruce Farm. The energy cows take from the crops is turned into milk. What comes out the other end is put in a covered concrete digester and then collected

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A drag line is used for aeration of liquid manure at Audet's Blue Spruce Farm in Bridport, VT.

Photo courtesy of Blue Spruce Farm

RESOURCE SPOTLIGHT

Organic Mushroom Farming & Mycoremediation

by Tradd Codder

A new book offers perspective of mushrooms as food, medicine, and healers of toxic landscapes

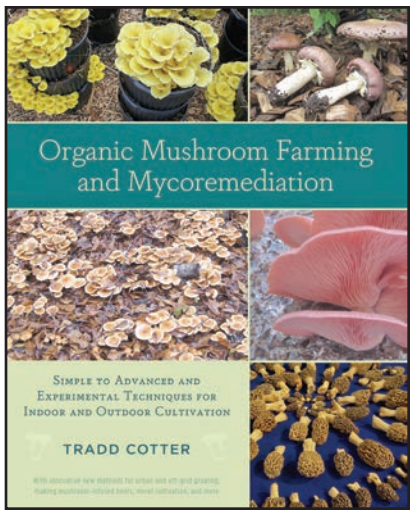
Meeting Tradd at a workshop or conference makes one thing clear; he is completely obsessed with mushrooms. Good thing for the rest of us, because over the last 20+ years Tradd has been experimenting, researching, and putting mushrooms to work solving a range of problems addressing human health and toxins in the environment. And, of course, growing mushrooms for the simple enjoyment of eating them.

The book is a long time coming, providing a great overview into the fungal kingdom and offering the skills and setup necessary to become a full-fledged spawn producer, grower, or both. The text is written in a flexible manner, which means is approachable by both beginners and experts alike. Of particular interest is the focus of the book on encouraging readers to aspire to self-sufficiency through generating and expanding spawn rather than always purchasing it. The book covers covers lab techniques, including low-cost alternatives that make use of existing infrastructure and materials.

Additionally, a host of innovative products are offers including making tinctures, powders, and mushroom-infused honey; making an antibacterial mushroom cutting board; and even growing mushrooms on old denim jeans!

Excellent writing and beautiful images make the mushroom world understandable by even the most novice producer. The book is must have for mushroom enthusiast who is merely fascinated, or who wants to put time into growing mushrooms for hobby or profit.

The book can be ordered directly from Tradd by visiting: http://mushroom-mountain.com



Hot Topic *from page 19*

as methane gas that becomes renewable power. "The sky is the limit!" Audet exclaims. "Innovation in this area will continue to evolve and be scaled to all size farms. It's one more way our family farm contributes to our community, and one more way Vermont is leading the way in connecting good business with good stewardship."

A little farther north in the small town of Starksboro at the base of the Green Mountains - a source of many mountain streams that flow into Lake Champlain - Lucas Dairy LLC milks 160 Holsteins as a member of the Cabot Creamery Cooperative. John Lucas and his family moved from New Hampshire to Vermont in 2008 to work on a dairy farm with the plan to eventually buy the herd and rent the farm. In 2012, Lucas bought the cows and began leasing the farm and farmland.

"We're farming on gravely loam soils and do a lot of no till for corn and some alfalfa. It works really well for us because we don't need to plow. Just the one task with the corn planter and then it's done," Lucas shares. "It's less fuel and less time. You do need a good planter to do it properly and a good spray program that is suitable for no till. In our three years of running the farm, the first year we did 30 acres of no till, 60 acres the next, and last year of our 180 acres, over half was no till."

Lucas Dairy also plants winter rye as cover crop and this year 100% of the corn acres are covered. "It helps hold the soil and we have better traction in the spring time because there is something green holding the soil," Lucas says. He recalls last year a non-farming neighbor expressing how nice it was to see so much green.

Water quality is a growing issue for farmers beyond Lake Champlain and throughout the nation. There are many sources of nutrient overload affecting water quality beyond farms. Many farmers fear stepping forward to tap into resources to help make changes on their farm and are daunted by the costs and other barriers to adoption.

Lucas encourages farmers to take a different approach. Instead of fearing fines, he invited resources, like UVM Extension, to visit the farm and help him problem solve what steps he can take on a timeline that can work for him and explore solutions that positively impact farm viability.

"We want things to work on our farmstead. There is a lot to do and it can be daunting. The barns and runoff around the dairy facilities are what we have to plan for next. We want to get gutters and divert water away from open barnyards, we'd like to have larger manure storage and not have to pile manure in fields in winter," Lucas says. "It was good to start with the fields - they can be done in a year and are inexpensive. We have found folks we invite to the farm to be very helpful."

At Blue Spruce Farm, Audet says, "Water quality affects everyone and we all have an impact on the planet. We make tough decisions every day in caring for our animals and the land that feeds them. At the end of the day, we hope that our community is better environmentally, socially, and economically, than if we were not here. Are we perfect? No. But that doesn't stop us from getting up every day, and doing our best."

Corn silage field at Lucas Dairy LLC in Starksboro, VT planted with a winter rye cover crop after corn harvest. Photo courtesy of UVM Extension

After ten years of working on dairy farms, Lucas and his wife and four young children are now responsible for their own plot of farmland and take the responsibility seriously. "Every stream leads to somewhere where someone is using water for recreation - swimming, boating, fishing, kayaking, and drinking water," Lucas states. "Here in Vermont we hear a lot about Lake Champlain because of the magnitude of challenges. But all bodies of water need to be protected."

For more information visit:
Champlain Valley Farmer Coalition: www.champlainvalleyfarmercoalition.com
Audet's Blue Spruce Farm: www.bluesprucefarmvt.com
Lucas Dairy LLC: www.cabotcheese.coop/lucas-dairy-farm-llc
Vermont Farm to Plate: www.vtfarmtoplate.com

Rachel Carter is the communications director at the Vermont Sustainable Jobs Fund, a non-profit organization created by the State of Vermont to help develop Vermont's sustainable agriculture, renewable energy, and forest product businesses. She can be reached at 802-318-5527 or rachel@vsjf.org.