Organic Broadcaster

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Organic farming practices work with soil's natural processes

By Elaine Ingham, PhD

The idea that nutrients are depleted from soil when crops are harvested is not correct. Nutrients are removed when plants are harvested, but this doesn't mean the soil has no nutrients left. Consider that every second of every day nutrients are replenished from rocks, pebbles, gravel, bedrock and parent material. Organic farming practices nurture the organisms that perform the service of replenishing plant-available nutrients, while chemical-intensive practices destroy these very important organisms.

As defined by the "Father of Soil Science," Hans Jenny, soil is made up of (1) mineral components, (2) organic matter, and (3) organisms. With the proper sets of organisms in the soil, mineral nutrients are cycled from plant-unavailable forms in rocks, sand, silt, clay, etc. into plant-available forms every second of every day. But, the only way to make these nutrients available from the rocks, pebbles, gravel, sand, silt and/or clay is to have life in the soil.

There is no soil on this planet that lacks nutrients to grow plants. Nutrients abound in rocks, pebbles, sand grains, silt particles and clay colloids, as well as any organic matter present in the soil. Until the day your soil runs out of sand, silt, clay or rocks, there is no reason to add nutrient amendments to soil.

So, why do fields "need" inorganic fertilizers? Because something happened to destroy the food web of organisms that normally do the work to pull the nutrients from the rocks, sand, silt, clay and organic matter. The diversity of life is no longer present to make those nutrients available to a plant's root system. When these organisms are lost, soil structure cannot be built, leading to inability to hold water or nutrients. Erosion will occur once these services are lost. Without the correct soil life to support the plants we desire, we get weeds, diseases and pests.

What causes plant-beneficial organisms to disappear from soil? Why does our soil turn into dirt? Simply put, the organisms are killed or put soundly to sleep. Any of the following insults will severely reduce, if not completely destroy, the beneficial organisms in soil.

- Tilling too much and in a highly destructive fashion slices, dices and crushes the organisms. Till only the strips where crops will be put in, or better yet, use zero-tillage. Both of these management practices require active, functioning sets of beneficial organisms in the soil in order to work.
- Stop the "nuke-it" approach. No pesticides should be used. All pesticides kill far more than just the target organism(s). Avoid copper, sulfur, or rotenone applications, even though they may be allowed by organic regulations.
- Avoid high levels of inorganic fertilizers.

To **Soil Biology** *on page 6*

Winter is coming: Steps to prepare dairy herd for barn life

By Hubert Karreman, VMD

Like it or not, winter is coming and the cows won't be grazing much longer. With good management of pasture land, cows might be able to graze into late November and December, at least to some extent. But once the snow piles up, any green underneath will be tasty tidbits but not much of a basis for the entire diet. Simply put, we need to plan for the upcoming winter when the animals are kept inside for long stretches in the northern climates of the U.S.

From years of working with organic dairy cows, starting with being a herdsman on an organic farm in the late 1980s and then becoming a veterinarian for over a hundred organic farms in Lancaster, Pa., I've come to realize that there are five basic factors for keeping healthy livestock. Though I'm a dairy practitioner, the following factors probably apply for most kinds of livestock.

1. lots of dry bedding
2. excellent ventilation with housing/shelter
3. fresh air and sunshine
4. high forage rations
5. well-managed pastures for grazing season

Making sure these are provided will keep problems to a minimum. I think most organic farmers see very few, if any, problems once they've been organic a few years. This is because by providing the five factors listed, we are giving the animals what they would need if left to themselves in nature.

Put another way, we are trying to mimic Mother Nature as closely as possible. For instance, by delivering a diet loaded with lots of forage we mimic cows eating fresh pasture – the grass's leafy blades along with some small seed heads (grain). This is a perfectly balanced combination in pasture that we need to provide when they are in the barn. Another example would be that on windy days flies don't bother cows. Thus having really good ventilation in barns also keeps flies away while cows are inside. Also, and perhaps radical to some but common sense to others, is letting calves directly suck on cows. Calves will suck 10-12 times a day if given a

In winter, cows do best on bedded packs in barns with good ventilation.

Photo by Dr. Hue Karreman

To **Livestock & Winter** *on page 10*

ORGANIC BROADCASTER™

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Notes from the Executive Director's Desk

As fall turns to winter and activities slow down on my farm, I think of all the amazing farmers who have spent their whole lives proving that organic farming works. My thanks to them — and to all of you for making a difference every day with the work you do.

MOSES is here to help farmers thrive in a sustainable, organic system of agriculture. MOSES is not a membership organization. We serve all farmers and anyone who is looking for information about growing using organic practices. Without a membership base to support us, though, we need to reach out to folks like you for help. We're sending out our annual fall appeal in the next few weeks. When you get it, please take a moment to send back your donation to sustain our farmer-focused programs and resources—nearly all of which we provide without charging users.

Do you find value in this newspaper? It's one example of the many practical farmer education projects we provide without a fee. Our popular Guidebook for Organic Certification is another. Your donation supports these resources and the many other services MOSES provides. If you're inspired to donate right now, go online to mosesorganic.org/donate. We really appreciate your support!

This issue of the Broadcaster includes a thoughtful Inside Organics column by Organic Specialist Harriet Behar (see the next page). She really hits the nail on the head as to why the approval of a new GM crop-herbicide is leading agriculture in the wrong direction. Harriet and Joe Pedretti, our Organic Specialists answer dozens of farmers' questions each month, and share some of those answers in their Ask a Specialist column on page 4, and on our website at mosesorganic.org/ask.

We're in full conference mode at MOSES, and look forward to seeing many of you at the 26th MOSES Organic Farming Conference Feb. 26-28, 2015 in La Crosse, Wis. Watch for your conference registration guide in the mail at the end of this month.

Wishing you all a joyful and happy end of the year. *~ Faye Jones, MOSES Executive Director*

Approval of new GM crop-herbicide combo leads country in wrong direction

By Harriet Behar

As organic farmers and supporters, we know instinctively and from experience that our method of agricultural production is the right direction for a healthy future. Organic can be a source of great optimism for those who produce and consume its products, but it seems there are always dark clouds on the horizon.

Our rivers, streams, and groundwater are being polluted with agricultural chemicals. The biological life in our soils—the source of nutrient transfer to our crops—has been damaged greatly by these chemicals. They're impacting the pollinators and beneficial insects we rely on for growing food, too. Rather than recognizing the damage caused by these chemicals, the prevailing agricultural system in our country continues to pour money into developing more toxic herbicides and insecticides and genetically modifying crops to pair with them.

Just last month, Dow AgriScience received approval for its Enlist system—new genetically modified corn and soybeans and Enlist Duo, the partner herbicide that contains glyphosate (Roundup is one brand name) and 2,4-D. The EPA and USDA paid lip service to the environmental problems caused by GMOs in agriculture, but went ahead with granting approval.

This is a big blow to those of us who know that this type of technology does not build a strong foundation for a sustainable future. Everyone, including the companies that promote and sell these products and the government agencies that approve them, knows that this type of technology is inherently flawed. Weeds or insects will continually build resistance to any toxic material used to kill them. This is the way of nature.

GMO technology is like a hamster on a treadmill—no matter how fast the hamster runs, it doesn't actually get anywhere. The GMO agricultural scientists are running as fast as they can to stay ahead of weed resistance, but they are going backwards instead of forwards. 2,4-D, a very toxic herbicide (a significant component of Agent Orange), has been around since the 1940s. There are weeds that already are resistant to 2,4-D—they provided the genes needed to develop the 2,4-D-resistant corn and soybeans. This new product is doomed to fail from the start, with pre-existing resistant weeds and the likelihood that more weeds will develop resistance as farmers spray an increasing amount of 2,4-D and glyphosate on fields across the country.

EPA Deputy Administrator Jim Jones acknowledged this when he said, "EPA shares the concern of many farmers and environmental groups that the resistance to glyphosate experienced by growers will simply be repeated by 2,4-D, contributing to a pattern of increased herbicide use." Dow, too, noted weed resistance when defending its reason for developing Enlist Duo, saying about 70 million acres of weeds are no longer controlled by glyphosate, double the amount identified in 2009.

In the USDA's news release announcing the approval of these new genetically modified crops and the partner herbicide blend, Secretary Vilsack said, "We must continue to identify ways to encourage producers to adopt diverse tactics for weed management in addition to herbicide control." The USDA is soliciting grant proposals for "conservation systems" that would address herbicide-resistant weeds, and developing Best Management Practices. While this acknowledges the problem, the mitigation proposals do not actually address it.

In granting approval last month, the EPA put restrictions in place it believes will help to avoid drift of this new herbicide blend. The restrictions limit application to ground-only and not when the wind speed is over 15 mph, and require a 30-foot in-field buffer zone around the application area. The EPA has also stated it is imposing a new, robust set of requirements on the registrant. These requirements include grower education, extensive surveying and reporting to the EPA, and remediation plans. The registration of this new herbicide will expire in six years to allow the EPA to revisit the issue of resistance. In the future, the agency intends to apply this approach to weed resistance management for all existing and new herbicides used on herbicide-tolerant crops.

Just imagine if all of the money spent on developing these GMOs and accompanying herbicides was put toward understanding systems that avoid the use of toxic materials and instead work to mimic the processes already succeeding in nature?

We will have to wait and see how this all plays out, but the track record is not good. Farmers who planted GM corn with Bt embedded in its DNA were supposed to plant 20% of their corn acres to non-GM corn as refuges. The USDA has admitted that there was not enough oversight and that the 20% requirement wasn't done. Who will be doing the oversight on the EPA requirements? There are numerous pesticide drift incidents every year in every state, and wind-speed spraying requirements are not consistently followed now. Why should we assume the letter of the law will be followed for this new product? Plus, these restrictions do not address the many negative effects on human and environmental health caused by the heavy use of herbicides and insecticides in our ecosystems.

Just imagine if all of the money spent on developing these GMOs and accompanying herbicides was put toward understanding systems that avoid the use of toxic materials and instead work to mimic the processes already succeeding in nature? The minuscule percentage the U.S. spends on organic agricultural research compared to the overall agricultural research budget would need to be increased by a thousand times. If there truly were a commitment to change, we would be so much further along in developing a sustainable system of agriculture that can feed the world.

Dow has stated its profits will greatly increase due to this new herbicide and GMO approval. However, organic producers have shown that farming within the natural systems, rather than working to destroy them, can be profitable as well. Farming is a business, but it can be done in both an economically viable and environmentally beneficial way.

As organic farmers, we can lead by example, promoting environmental health on all of our acres. Our farms are refuges, places where the milkweed can grow and provide food for the once-numerous and now-threatened monarch butterfly (whose numbers have plummeted 90% over the last 20 years). By not using toxic materials such as neonicotinoids and other insecticides, we promote clean water for waterfowl, fish and other aquatic species. By continually improving the organic matter and diversity of biological life in our soils, we increase the health and yields of our crops both now and for the future.

Organic farmers are environmental heroes. We deserve more positive recognition and financial support as we develop a long-term environmentally beneficial agricultural system. Our planet desperately needs the numbers of organic farms to exponentially grow and prosper.

It is time for everyone to recognize that we need to measure progress not only in monetary terms, but also in environmental impact. Environmentally damaging activities need to be replaced not with environmentally benign activities, but with environmentally beneficial ones. We need to turn the tide; the status quo is not acceptable.

Harriet Behar is an organic farmer and a MOSES Organic Speciaist. She serves on state and national committees, providing the organic farmer perspective.

Ask a MOSES Specialist

"I know I am supposed to plant organic seeds if I sell my crop production as organic. How do I accomplish this?"

Answer by Harriet Behar

The National Organic Program (NOP) mandates the use of organic seed for crops that will be sold as organic unless you can show that you could not find the quality, quantity or equivalent variety of seed you wanted to plant. Under no circumstance can seeds treated with GMO nitrogen-fixing bacteria or non-approved synthetic fungicides or insecticides be used when you sell your crop in the marketplace as organic. This rule also applies to producers who sell less than $5,000 in organically labeled products, making them exempt from organic certification (but not from following organic standards). If prohibited materials are used on the seed, or a GMO seed is planted, the land cannot be used for organic production for three years.

More and more seed companies are developing organic seed varieties that function well in organic systems to meet the demand of the organic marketplace. By supporting organic seed suppliers, you encourage further research and development of organic seeds that compete well with weeds, grow vigorously with slow-release fertility inputs and are resistant to disease and pests. Also, certified organic seed would never have prohibited seed treatments.

An excellent resource for finding organic seed of all types is the website www.organicseedfinder.com. Field crops, vegetables, fruits, herbs and flower sources are all listed. This website is also helpful for finding seed suppliers that would be the most likely to carry organic seed varieties.

A broader list of organic seed suppliers is in the Upper Midwest Organic Resource Directory, which is on the MOSES website (mosesorganic.org) under the Publications tab. The "Seed Suppliers" section lists not only suppliers of seed, but also farms that supply seed potatoes or grow crops for seed. The directory also is available in print. You may request a copy by calling the MOSES office at 715-778-5775.

If the specific variety of seed you want is not available, you are required to purchase organic seed of an equivalent variety. If you are unsure if the organic variety is similar or equivalent, consider purchasing some organic seed and trialing out new organic varieties to see if they do as well as the non-organic seed that you are used to growing. Remember, the NOP does not consider price to be a valid reason not to purchase organic seed.

If you plant untreated non-organic seed, you will need to document why your search for organic seed was unsuccessful—quantity, quality, and variety are all valid reasons for buying non-organic seed. For example, the organic seed only came in one-ounce packets and you wanted to purchase 20 pounds (quantity). Or, the organic seed germination rate was only 20%, and the non-organic seed had a germination rate of 95% (quality). Or, you wanted to grow an orange oxheart tomato, and could not find it from at least three sources that typically sell organic seed (variety). Searching at your local garden center which does not typically sell organic seed is not considered a viable organic seed search by most certification agencies. You should be trying to find organic seed from the many suppliers that offer it. Even a search on the Internet for organic seed varieties can be fruitful.

Organic seed can be in short supply. It is a good idea to start your organic seed searches in winter and not wait until late spring when they often are sold out.

MOSES Organic Specialists are experienced professionals who can answer your questions about organic production and organic certification.

CALL: **Organic Answer Line 888-551-4769 or 715-778-5775**

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"I have an infestation of fruit flies in my greenhouse. How do I get rid of them organically?"

Answer by Joe Pedretti

First, you need to make sure that they are actually fruit flies. Fruit flies are often confused with a different insect called a fungus gnat. Fruit flies have red eyes, a round body and tend to hover or fly pretty slowly. They are slower moving while walking on the ground, too.

Fruit flies need overripe, damaged or rotting fruit in order to feed and breed. They are also known as vinegar flies, and are attracted to the smell of acetic acid (rotting fruit and vegetables). If you keep these materials out of the greenhouse, you are not likely to have fruit fly problems. Clean up damaged fruit and remove ripe fruit as soon as possible. The old baited fly trap with vinegar and a little soap works well to reduce their numbers, but you have to control the food source with good sanitation to get rid of fruit flies completely.

If your sanitation is good, and you are still seeing small files, they are likely fungus gnats. Fungus gnats are quite fast, both in the air and on the ground, are more thin bodied and do not have colored eyes.

Fungus gnats breed in the organic matter of soil mixes that are kept too wet and thus breeds molds, which the fungus gnat larvae feed upon. The solutions to control fungus gnats are to avoid overwatering plants in the greenhouse, improve drainage, and allow the potting soil to dry in between each watering.

Fungus gnats are not harmful to plants, but the conditions they like are also the same conditions that can lead to fungal and bacterial diseases.

Either fly problem is best solved by cultural techniques, rather than approved sprays.

Research shows 'sandblasting' works to control weeds

By Kelli Boylen

The unlikely hobby of growing apricots in Minnesota may have led a research agronomist to a new way to control in-row weeds on organic farms: blasting them away.

Frank Forcella works for the USDA North Central Soil Conservation Research Laboratory in Morris, Minn. He and his wife, Jessica, have been growing apricots since 1991. In 2007 they had a very productive year, and Forcella wanted to find a way to use the pits left over from making jams and dried fruit instead of letting them go to waste.

A little online research taught him that ground shells of apricot pits are used in "sandblasting." In fact, many modern sandblasting techniques use plant-based products. He was discussing this with Dean Peterson when both men had the same idea of sandblasting weeds.

He and Peterson spent about $50 on a handheld sandblaster, connected it to an air compressor and started testing it in the greenhouse. "We'd have corn and weeds growing in a pot and we learned right away that we could knock down the weeds and the corn would be okay. We repeated the experiment many times and had reasonably good success," he said. When aimed at the bases of crop plants growing in rows, the propelled grit kills weed seedlings through abrasion.

To test the method on corn growing in the field, they bought a bigger sandblasting unit, and hauled the air compressor around on an ATV. "We learned if we made two or three passes at the right times we could get full-season weed control," Forcella recalled.

Researcher Frank Forcella applies abrasive grit to corn rows using an air compresser hauled by a graduate student on an ATV. Forcella found that just two to three passes at strategic times provided full-season weed control.

Photo by USDA-ARS

Forcella admits he is not "mechanically astute." So when it came time to build a prototype of a larger unit he needed help. He applied for and received a grant from the North Central Sustainable Agriculture Research and Education (NC-SARE) for an "Air-Propelled Abrasive Grit Management" (PAGMan) system.

Forcella said it took a little while to find someone who was an expert ag engineer who worked with steel, but they were fortunate to find Dan Humberg, a professor of ag engineering at South Dakota State University (SDSU).

SDSU graduate student Cory Lanoue took an interest in the project and started working on it with CAD (computer aided design) software. Then, using the design he developed over nearly a year, he and fellow grad students, under the supervision of Humberg, put together their abrasive grit applicator machine in about two months.

"It was an impressive feat in my eyes," said Forcella. "Cory did a fantastic job."

They developed PAGMan "for selective, post-emergence, in-row weed control in corn, soybean, and other crops that are grown in widely spaced rows."

The 2013 and 2014 growing seasons were their first using the four-row, eight-nozzle unit. Forcella admitted that the unit may seem small to many of today's large-scale farmers, but the size is realistic for a family organic farm.

The field tests were performed on organically certified land at the West Central Research and Outreach Center of the University of Minnesota. These experiments are being led by SDSU graduate student Mauricio Erazo-Barradas under the direction of Sharon Clay, a weed scientist.

The idea is that farmers will clear weeds from between crop rows like they traditionally have for years with inter-row cultivation, flaming or mowing, but they will use the sandblasting method to kill the weeds next to the corn plants. The field tests include all of these treatments.

"I think of using abrasive grit for weeds as one more tool in the toolbox for controlling weeds," Forcella said. "It's not the only tool—you need lot of them—but this definitely can be one more tool for organic producers to use."

Ground corn cobs make an effective grit for "sandblasting" weeds. Any gritty material that is about 0.5mm works with the PAGMan system.

Photo by USDA-ARS

Through their trials, they learned that the system works best when the nozzles are about two feet from the plants using air pressure of 70 to 100 psi. If the nozzles are too far away or the pressure too light it doesn't kill the weeds. If the nozzles are too close or there's too much pressure, it can damage the corn.

Forcella said they have been focusing on the control of the most common annual weeds, such as lambsquarters, pigweed, and foxtail (*Chenopodium album, Amaranthus retroflexus,* and *Setaria viridis*), which are common throughout the nation and especially abundant in the Corn Belt.

"Timing is crucial," Forcella said, and the weeds must be seedlings no more than two or three inches tall. The two necessary times to blast the weeds are once at the 1-leaf stage of the corn (4-6 inches) and again at the 3-leaf to 5-leaf stage (about 8-12 inches) in order to provide season-long weed control. This also maintains corn yields comparable to those in weed-free crops.

Using sandblasting along with cultivation offers 80 to 90 percent weed control, which Forcella described as "quite reasonable, especially for organic production." Weed control at 80 to 90 percent is enough to prevent yield loss in field corn. A weedy corn field can easily lose 20 to 50 percent yield.

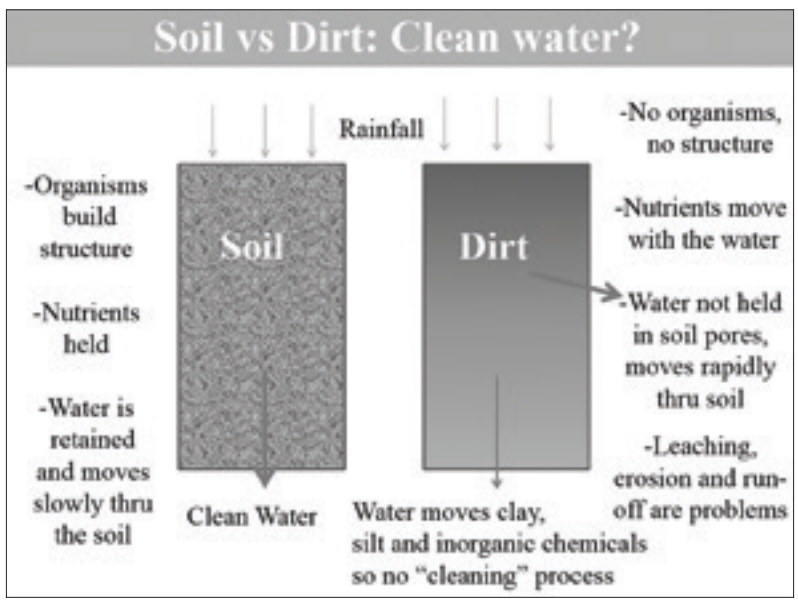
Although blasting works well with annual broadleaf weeds, it is not as effective with seedlings of grassy weeds because their growing points are below ground. When foxtail is the

To **PAGMan** *on page 16*

On average, application of more than 100 pounds per acre per year will result in loss of critically important beneficial soil organisms. As explained above, applying inorganic fertilizers, lime, gypsum, etc. is just adding more of what is already present in the soil. Why waste money, time, and equipment?

- Avoid driving equipment over the soil, as heavy objects cannot help but compact the soil. Compaction reduces movement of oxygen into the soil, and when anaerobic organisms begin to grow, soluble nutrients will be lost through volatilization and leaching. Soil pH will drop, soil structure will be lost, and highly toxic compounds will be produced. Roots of most plants die in anaerobic zones, with the exception of wetland or riparian plants.

With the loss of aerobic organisms, soluble nutrients will leach from the soil easily, polluting surface and ground waters. Anaerobic conditions promote the growth of organisms which volatilize N, P, and S, contributing to greenhouse gas emissions. Because of all these losses, conventional chemical systems require massive inputs of soluble inorganic N, P, S, Ca, Mg, Fe, B, etc. to be "added back" to the soil each cropping cycle in hopes that some of those nutrients will be captured by contact with root systems. But in dirt, most nutrients are lost, destroying water quality for everything downstream.



Soil, which has living organisms in it, cycles nutrients and water better than dirt, which has little to no life in it. *Illustration by Elaine Ingham, PhD*

Nutrient Cycling

Plant roots release exudates, or in more everyday language, "cakes and cookies," which select for the growth of the thousand or so bacterial and fungal species the plant might need on any particular day (depending on the temperature, moisture, etc.). If a plant is limited for cobalt, or iron, or zinc, the plant releases the specific exudates (i.e., cakes and cookies) that feed the specific bacteria and/or fungi which make the specific enzymes to convert the non-plant-available mineral nutrients in the rocks, sand, silt, clay, or organic matter into bacterial or fungal biomass. The bacteria and fungi have to then be eaten by one of their predators—protozoa, nematodes, microarthropods, earthworms, etc.—in order to release, right at the plant root surface, the soluble nutrients the plant requires. The plant controls this process, and what better controller of nutrient cycling for the plant than the plant?

When soil organisms are lacking in soil—which should then properly be called dirt—nutrients that are in mineral forms (e.g., rocks, sand, silt, clay) cannot be processed into plant-available forms. Scientists raised in the "Green Revolution" era, whose research was funded by the inorganic fertilizer and pesticide industries, were taught nothing about soil life. They were encouraged to ignore any evidence that soil life could be important, and in fact were taught to ridicule anyone suggesting that soil organisms served important functions. The only way to grow plants, therefore, was to pour on more and more soluble, inorganic fertilizers.

Consider however that inorganic fertilizers do not supply the full balance of nutrients that plants require. Nitrates or phosphates or calcium is applied in extremely high concentrations because the fertilizer industry knows that most of it will leach or volatilize out of the dirt where it is applied. But plants need a proper balance of all nutrients, not just the standard N-P-K. The nutrient cycling performed by soil life supplies the full balance of all the soluble nutrients the plant needs.

Would you rather eat products from plants grown with the full balance of all the nutrients—the exact balances controlled by the plant—or products from plants where the plant has been overloaded with just N, or P, or Ca at different times of its life, but never allowed to have the full balance of everything?

Benefits of Compost

Compost and water-extracts of compost, properly made and aerobic, will replenish the complex, highly diverse sets of organisms needed to support a healthy plant. Compost also replenishes organic matter which feeds the organisms the plant needs. Although compost contains plenty of nutrients, its real value is that it replenishes living microorganisms.

Be aware that compost, extracts and teas do not normally contain adequate soluble, inorganic nutrients to allow them to be sold as chemical-industry defined "fertilizers." Most composts are labeled "soil amendments" because the chemical industry has co-opted the term "fertilizer" to mean only the soluble inorganic forms. Check EPA and USDA regulations to find out more about this interesting conundrum. But in fact, compost and water extracts of compost (extracts and teas) do not—and should not—contain high levels of in-solution, ionic or inorganic forms of nutrients. Nutrients in compost should be present as organisms and organic matter. With the right biology, these nutrients will rapidly meet the demands of the plants growing in that aerobic, properly made compost.

Issues with Soil Tests

When you send a sample into a soil chemistry lab, what information appears on that soil chemistry report? What's the difference between soluble nutrients and exchangeable nutrients? How important is the extracting agent used to assess soluble nutrients or exchangeable nutrients? Why is it that each and every extracting agent gives different numbers? Each extracting agent extracts something different, so it is important to know which agent was used, or you will think your nutrients levels are increasing or decreasing when in fact they may not be changing at all. Which extracting agent tells you how much nutrient the plant is going to take up, or how much of that pool the plant could potentially take up?

Newsflash: none of them. There is no good correlation. Across hundreds or thousands or tens of thousands of samples, we can't predict how much of the "soluble pool" extracted by any extracting agent will actually end up in the plant.

Let's back up for a second and define these "pools of nutrients" in soil. Soluble nutrients are those in the form of salts. Salts dissolve in water because they have positive "ends" and negative "ends" which allows water to "pull them apart" so they dissolve. Exchangeable nutrients are nutrients bound to surfaces of rocks, pebbles, sand, silt, clay, organic matter, etc. Again, they have to have positive or negative parts of the molecules so they will interact with positive or negative sites on these surfaces. Thus, these nutrients on these surfaces can "exchange" with soluble nutrients dissolved in water.

To **Soil Biology** *on page 8*

Book Review

Updated book outlines everything market farmers need to know

By Chris Blanchard

As I got started in the world of market farming back in the early 1990s, Lynn Byczynzki's magazine, Growing for Market, was a constant companion. Whether I scrounged back issues from a farmer's bathroom wall pocket, or matured to the point where I got my own subscription, the magazine's focus on the fundamental how-to's of market farming provided an ongoing education on the basics, as well as inspiration and new ideas for how to improve the farms I worked on, and eventually, my own operation.

The revised and expanded edition of "Market Farming Success," published in 2013, organizes and condenses the information from over 20 years of Growing for Market into a coherent explanation of the basics of market farming.

Lynn Byczynski has been farming since the 1980s, and her magazine and this book have always reflected her farming roots. "Market Farming Success" reflects Lynn's own experience as well as that of the hundreds of farmers featured in the pages of Growing for Market through the years. She has grown vegetables and cut flowers in the field and in the high tunnel, and sold her produce at farmers' markets, to florists, chefs, and grocers, and through a cooperative CSA.

"Market Farming Success" doesn't pretend to provide a model for how to achieve market farming success. Instead, it provides an overview of the things a grower needs to think about in order to achieve it. Most chapters go just deep enough to provide information to help a grower formulate the sorts of intelligent questions that can point to other books to read, questions to ask other growers, and the best workshops to attend at winter farming conferences.

Best of all, the book comes with an extensive, chapter-by-chapter resource listing. A full 24 pages provide a curated guide to information resources and input suppliers around the country.

The book's organization reflects Growing for Market's focus on the fundamentals of market farming. A short overview of "getting started in market farming" sets modest expectations for farming's economic returns, and provides a reality check about the importance of location, and the considerations for locating the ideal piece of farm land. (Hint: "Soil quality can be the single biggest factor in your success as a farmer.")

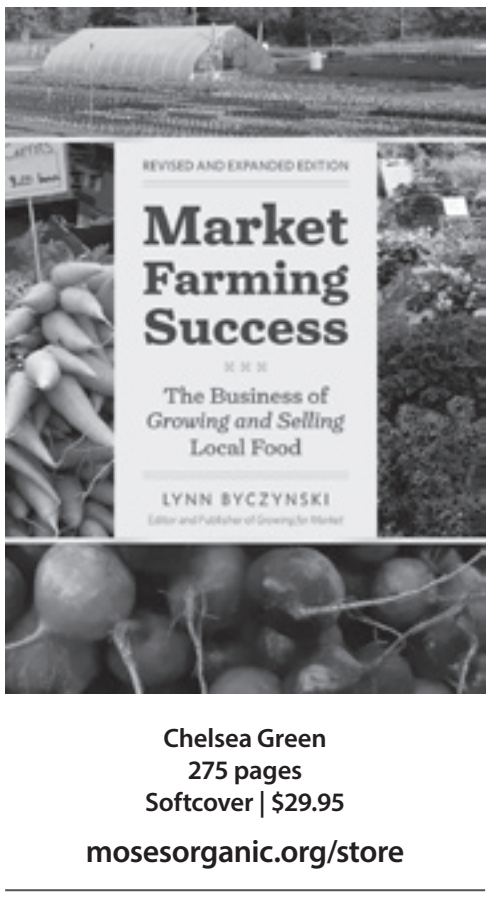
Then, unlike so many books on making money from growing vegetables, Lynn takes a long focus on markets. Not the sexy nuts and bolts of marketing—that comes later—but the various approaches to selling your produce that are available to market farmers. Then she looks at the crops you might choose to grow, but not on the normal, all-too-technical crop-by-crop approach. Instead, she considers the different kinds of crops a farm might choose to pursue —the common crops, season-extended crops, storage crops, heirloom crops, baby crops, and more. Hundreds of books have been published with the details of growing tomatoes, and we don't need another one; Lynn has helped the reader understand why they might choose to grow this tomato over that one.

From there, the discussion moves on to tools, planning, and planting, tending, and harvesting your crops. The section on marketing alone is worth the read just as a reminder of the basics—if you've worked farmers markets for years, this section is a great reminder of all of the knowledge that you take for granted about using color, creating an appearance of bounty, using signs, and attracting attention. For interns or market helpers, the marketing section really highlights why some market stands pop while others flop.

The final section covers managing your business, and takes a hard look at record-keeping, employee management, legal structure, and the different kinds of insurance farmers should consider—the sorts of things that aren't a lot of fun to think about, and which too many farmers don't think about until a problem arises.

Throughout the book, Lynn provides plenty of practical examples from a variety of farmers, and tricks of the trade that can take a long time to discover on your own, but which are an important part of being an efficient producer. I especially appreciate the guidance with

To **Market Farming Book** *next page*



Chelsea Green
275 pages
Softcover | $29.95

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Soil Biology — *from page 6*

Back to the conundrum with that soil chemistry report. There are hundreds of extracting agents touted as "the best" in order to measure exchangeable nutrients, and perhaps as many as a thousand different extracting agents that have been used to extract soluble nutrients from soil. Which extracting agent gives the highest value? But is highest actually the best? Which agent actually gives you information on what the plant will take up? Isn't that what we want to know? Just because you use an extremely strong acid or base to extract nutrients does not mean anything relative to what the plant will obtain. So in terms of telling us how much inorganic fertilizer needs to be added, these measurements are misleading at best and a complete waste of money at worst.

To predict which nutrients will be available to plants requires knowledge of how much food is available for the bacteria and fungi to do their jobs of making enzymes to solubilize nutrients from the rocks, from sand, silt clay, from humus and organic matter. We want to know the populations of the predators of the bacteria and fungi that are actively consuming bacteria and fungi, and thus releasing soluble nutrients, right next to the root.

Consider the following information based on extractions of nutrients from a set of soil samples. The original soil contained on average only 1.8 µg of phosphate per gram (ppm) of soil (average of five replicate soil samples). Rock phosphate and compost were added to achieve a value of 75 ppm phosphate, on average, through the entire field. Two weeks later, five separate samples of soil were taken from the same field using the same methods, but now phosphate measured 200 ppm. Bacteria had decreased slightly, and fungi had increased by nearly two-fold compared to the soil at the beginning, before the fertilizer addition. Nothing else was added to the field during those two weeks—no fertilizer, no pesticides, no tillage, no seed—just grass growing in the field. Where did the "extra" phosphate come from?

Did the chemistry lab mess up? Let's think it through. Plants were growing, making exudates, feeding bacteria and fungi in the root system. Phosphate was solubilized from the TOTAL mineral not detected with either exchangeable or soluble extracting agents. Predators eat the bacteria and fungi, and nutrients were released in soluble forms, which can be detected by both soluble and exchangeable extracting agents. No error—just an explanation that doesn't enter into the lexicon of conventional agriculture.

The lesson here is that the plant itself provides the best test of its potential uptake. So let the plant take care of itself. Let it be the determinant of what bacteria and fungi are going to be working, and what nutrients will be taken from the soil. Let the predators do their jobs. And consider that every second of every day, the parent material underlying your soil is being broken down into rocks, pebbles, sand, silt and clay, such that until the bedrock of the planet "runs out," or you run out of organic matter, you should never have to worry about a lack of minerals in your soil.

The problem in agriculture has not been a lack of nutrients, but a lack of the proper biology to make those nutrients available to plants. Total nutrients are present in natural soil in great excess. But in agriculture, the soil has been abused with excess tillage and excess toxic chemical use, and the organisms which supply nutrients to plants have been destroyed.

Rather than applying nutrients and minerals, we must concentrate on repopulating the soil biology so that the organisms can break down the nutrients to make them available to plants. Organic farming practices, such as the application of properly made aerobic compost, repopulate the bacteria and fungi which solubilize nutrients from rocks, sand, silt and clay as well as organic matter, and the protozoa, nematodes and microarthropods which will release nutrients from the bacteria and fungi in balanced, plant-available forms. That's how organic farming practices work with the natural soil system rather than against it.

Dr. Elaine Ingham is a world-renowned soil microbiologist and founder of Soil Foodweb, Inc., an organization that helps farmers all over the world grow more resilient crops by understanding and improving soil life.

Dr. Ingham will present "Soil Biology and the Soil Food Web" at the 2015 Organic University on Feb. 26, prior to the 2015 MOSES Conference.

MOSES ORGANIC UNIVERSITY™
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Market Farming Book — *from previous page*

regards to the tools and techniques that are appropriate at different scales of production; not only does the beginning farmer learn about where to start with a market farm, but they gain perspective on where they might be going.

I work with a number of farmers in my consulting practice, and I often find them chasing after the purchase of this tool or that system as a silver-bullet solution to whatever challenge they face. I love my fancy tools as much as the next farmer, but I especially appreciated the book's approach to planting and tending crops, which avoids most discussion of the great toys you can buy and focuses on the considerations you might bring to tillage, what you need to know to understand pests, and the basics of drip irrigation. Without getting into the wonders of soil balancing, the promotion of a "plant positive" approach to pest control, or a chapter on a new wonder-technology for irrigation, the book provides some basic information and a firm reminder: you are going to have to deal with this, so get ready to learn some more if you want to succeed in this business.

I'm glad that Lynn wrote and revised this book, and I expect to refer to it again and again as a sort of checklist of the things I want to think about when working with beginning and advanced market farmers. I recommend this book as an essential read for anyone who wants to understand the breadth of knowledge and considerations necessary to run a successful market farm.

Chris Blanchard (www.flyingrutabagaworks.com) is an educator and consultant for farms and nonprofits. As owner-operator of Rock Spring Farm, he raised 20 acres of vegetables and herbs, marketed through a 200-member CSA, food stores, and farmers' markets.

He will present two workshops at the 2015 MOSES Conference: "Packing House Layout and Necessities" and "Too Many Rutabagas: Time and Productivity Management for Farmers."

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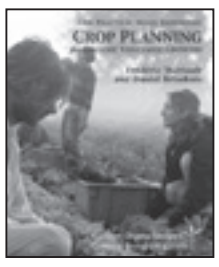
Additional Books on Market Farming



Crop Planning for Organic Vegetable Growers
Frederic Theriault and Daniel Brisebois
136 pages

The Market Gardener
Jean-Martin Fortier
224 pages

Sustainable Market Farming
Pam Dawling
456 pages

mosesorganic.org/store

Biopesticides offer effective, progressive pest management

By Bill Stoneman

"All the pests that out of earth arise, the earth itself the antidote supplies."
Lithica circa 400 B.C.

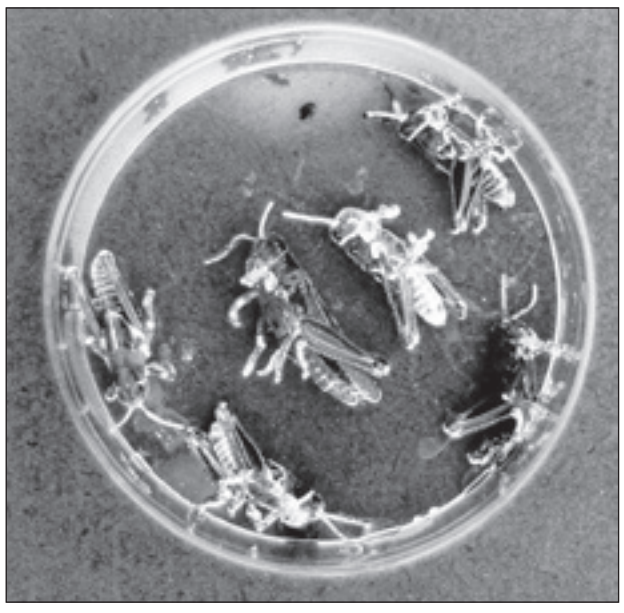
Through organic soil management practices, farmers foster a very important soil microbial and biochemical resource for successful biological control of potential pests affecting their crops or livestock. Within the soil are a great diversity of microorganisms and biochemicals produced by those microorganisms and plants, some with roles very important to the natural management of pests. Soil microbiologists know that a single gram of soil (about a thimble full) may contain as many as 1 billion living cells of microorganisms from up to 10,000 different species. Many of these microorganisms are unknown or cannot be cultured. In organic-matter-rich soils and those well managed with organic practices the numbers are likely much higher. It is from this biodiversity that many microbial and biochemical biological pesticides (biopesticides) are born.

The soil is the source of nearly all microorganisms used in food processing and agricultural applications. Yogurt cultures, cheese cultures, cheese molds (blue and green), and meat-curing cultures all originate from the biodiversity of the soil. Organic dairymen are familiar with silage inoculant bacteria and enzymes, as well as the nitrogen-fixing bacterial cultures important to establishing alfalfa. Foresters and growers who practice permaculture rely on mycorrhizal fungi to conduct essential nutrients and moisture to plants' roots. Livestock producers know the value of direct-fed microbials (probiotics) for animal health. These important microbes are all from the vast biodiversity of the soil.

The active ingredients in biopesticides—or biorationals, as some refer to them—are all of the Earth and, by definition, naturally occurring. Not all biopesticides are made up of microorganisms, however. The U.S. Environmental Protection Agency (EPA), which regulates biopesticides, defines them as "certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals."[1] The EPA further defines biopesticides by three main categories: microbial, biochemical, and plant-incorporated.

Microbial pesticides have a microorganism (e.g., a bacterium, fungus, virus or protozoan) as the active ingredient. Biochemical pesticides are naturally occurring substances that control pests by non-toxic mechanisms.

1 **www.epa.gov/pesticides/biopesticides/whatare-biopesticides.htm**



These grasshoppers are infested with the biological pesticide *Beauveria bassiana,* a fungus that grows naturally in soils throughout the world and acts as a parasite on various arthropod species, causing white muscardine disease.
Photo by Stefan Jaronski, USDA-ARS

Plant-Incorporated-Protectants (PIPs) are pesticidal substances that plants produce from genetic material that has been added to the plant. PIPs are genetically modified plants (GMOs) and are not allowed in organic agriculture. Outside of the EPA's definition, PIPs are not widely considered "biopesticides." Biopesticides in the United States are regulated by the EPA much like conventional pesticides and undergo much of the same evaluations for human health and safety as well as environmental effects.

The National Organic Standards allows biopesticides under certain conditions after all other potential cultural practices and other methods (e.g., variety selection) have been attempted to control the weed, insect or disease. Of course it is not only the active ingredients that are considered when determining if a biopesticide is allowed in organic agriculture, but also the inert ingredients (carriers, surfactants, diluents and others).

The most widely used microbial biopesticide is *Bacillus thuringiensis*, more commonly known as Bt. A well-known brand used in organic agriculture is Dipel® for caterpillar control. Bt is a naturally occurring bacterium common in soils throughout the world. It produces proteins that react with the gut lining in susceptible insects, paralyzing their digestive system so they stop feeding and die from starvation. In 1901, Bt was isolated from a diseased silkworm by Japanese biologist Shigetane Ishiwata. 10 years later, German biologist Ernst Berliner rediscovered it in a diseased flour moth caterpillar and named it after the German town of Thuringia. The French began to use Bt as a biological insecticide in the 1920s.

Other well-known products widely used in organic farming include Actinovate® and Serenade® (bacterial agents) for control or suppression of a variety of plant diseases, Contans® WG (a fungal agent) for control of white mold or lettuce drop, and Bio-Save® 10LP (a bacterial agent) for postharvest treatment of potatoes and fruit to prevent damage from blue mold or gray mold in storage.

Paecilomyces fumosoroseus is a naturally occurring fungus used in a greenhouse environment to control several species of insects including
whiteflies, thrips, aphids, and spider mites. *Paecilomyces lilacinus* is used to control nematodes that attack plant roots in field crops, including many vegetables, fruit, turf, and ornamental crops. It is sold in the United States under the brand MeloCon® WG.

Perhaps the best-known biochemical pesticide is pyrethrum, which is derived from chrysanthemums (natural plant extract) and sold under the brand Pyganic®. However, it is not regulated as a biopesticide and does not fall under that definition within the EPA because it has what is considered a "toxic" mode of action to the insects it controls. Because Pyganic's active ingredient is naturally derived, however, it is allowed in organic agriculture.

To be defined as a biopesticide by the EPA a biochemical must have a non-toxic mode of action—which can be confusing since, in order to be of any value, the material must control or suppress a pest (insect, weed or disease), implying it is toxic to that pest. What the EPA means by "non-toxic" is that the activity of the biochemical pesticide must not be by a biochemical pathway within the pest, but by a more mechanical activity such as smothering, breaking a weed's waxy leaf cuticle or by damage due to strong oxidative activity. Vinegar is an example of a non-toxic weed control agent. It damages the weed it is sprayed on causing desiccation or drying action that eventually suppresses or even kills the weed.

Plant extracts were likely the earliest biochemical biopesticides, as history records that nicotine was used to control plum beetles as early as the 17th century. Neem oils have been used for hundreds of years to control pests. Neem oil is a

To **Biopesticides** *on page 16*

Livestock & Winter — *from page 1*

choice and grow quickly because they are biologically satisfied. This practice can be done on pasture during grazing season or during the winter in the barn in box stalls (but at no time use any confirmed or suspected Johnes cow).

What's important is that we optimize the animal-environment interaction. If possible, let cows outside on nice days in the winter to get the fresh air, sunshine and exercise—things which can only be approximated in the barn.

With any of these suggestions, it helps to be a good observer. Spend extra time with your cows and notice what they are doing when they don't know they are being observed. Then, adapt and change management if the animals are telling you that changes are needed.

Cows are always telling us how they are doing. Whether we understand what they are telling us is an entirely different matter. The CowSignals® system of evaluating cows is an excellent tool to help understand what the cows are telling you in terms of good or poor housing and feed management. CowSignals should resonate with graziers because the concept is based entirely upon knowing what is normal for cows in pasture and providing nearly the same experience for the herd while it's in the barn. In this system, six key areas are evaluated in a checklist manner after farmers attend a slide show and are shown examples of what makes for healthy cows and what does not.

The goal of CowSignals is to increase milk production by providing what the cows need while in the barn. The six factors that are evaluated are: 1) feed; 2) water; 3) light; 4) air; 5) rest; and, 6) space.

Do individual cows get enough space? Are they lying down long enough during the day? Are they displaying air-seeking behavior? Is there enough light while not giving too much? Is the water easy to reach and is it clean? Is feed available 24 hours a day? These and many more questions that are asked in a checklist format will tell you if your wintertime barn conditions are enabling (or hindering) good milk production.

Lactating cows always need clean and dry udders. There are various grading systems to score cleanliness of udders, whether the cows are in the barn or grazing. Put simply, if you feel that you don't need to clean your cows' teats prior to milking (because they are very clean), then you know that your cows have enough clean bedding and that manure is being cleaned away frequently enough.

This is not to say that cows need not have teats cleaned prior to milking – they do (if only to help stimulate milk letdown). If every cow truly needs to have manure splatter washed off prior to every milking, then there needs to be more bedding and/or more frequent raking back of manure from stalls. If cows' hooves are clean when coming into the parlor or while standing in stalls, then removal of manure from walking areas is being done promptly enough. If hooves are always covered with manure, then more time is needed to get manure away and not built up. Damp hooves always covered in manure will lead to higher rates of strawberry heel/hairy heel wart. Are there any bumps, bruises lesions or swellings along the torso, legs or back of the cows? If so, stall dimensions are incorrect and/or there is not enough bedding being provided.

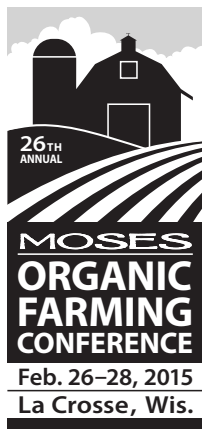
Getting cows ready to come inside for the winter will also mean a feed change. Always try to complete a feed change over one to two weeks. This allows the rumen bugs to change and adapt to the new feeds. In reality, feed changes happen very quickly, sometimes between two milkings. While cows grazing pasture will encounter many different plants from which to choose and to which their rumen bugs constantly adapt, major feed changes with stored feeds can dramatically shift the pH and rumen bugs, sometimes with big die-offs of the resident bugs. This can sometimes put cows off feed, creating a digestive upset and diarrhea, and even a displaced abomasum (twisted stomach). Milk output will be reduced. To avoid such scenarios, always include some extra dry hay in the diet during a feed change. This will help create a healthy fiber mat in the rumen with cows chewing cud more (always good). Feeding added probiotics during a feed change also makes sense.

Considering that the air won't be as fresh in the barns as outside, and that you will be having a higher density of animals confined under a single roof and enclosed by four walls, giving a vaccine prior to bringing the cows inside may be beneficial especially if respiratory problems have happened on the farm historically. If wanting to only address respiratory problems, using one of the intranasal vaccines (Inforce 3, TSV-2, and Nasalgen) about 1 week prior to bringing the animals inside will help prevent respiratory problems for about 3 months. If wanting to vaccinate also against BVD and Lepto, an injectible modified-live vaccine (like Cattle Master and Bovi-shield) will be needed and depends on the animals being open (not pregnant). If using killed vaccines against the same series of germs, they need initially to be given twice, three weeks apart, and then yearly to be effective. Many farmers vaccinate with the killed products twice yearly, which calls into question the vaccine's effectiveness. If there haven't been problems with respiratory disease or abortions when animals are housed inside, then vaccination is optional.

By mimicking Mother Nature as closely as possible and by providing a living environment in the barn that closely approximates life on pasture, animal health in the barn should remain as good as it was during the pasture season.

Dr. Hubert Karreman is the veterinarian at the Rodale Institute and has worked with organic dairy cows since 1988, both as herdsman and a veterinarian.

Dr. Karreman will present a workshop on the CowSignals® system at the 2015 MOSES Organic Farming Conference. He'll also teach a pre-conference Organic University advanced course on organic dairy animal health.



Urban farmers face unique challenges to certification

By Claire Strader

Urban agriculture means different things to different people. Community gardens, backyard plots, and educational youth gardens seem to be the most common associations with the term. These types of gardens are popular and easily accessible to the broad community of home-scale food producers. But they are only one part of the picture. Urban agriculture also includes rooftop gardens, aquaponics, hydroponics, and vertical farming systems that require significant infrastructure for everything from growing medium support to water cycling, heat, and even artificial light. These systems tend to be less accessible because of both the costs associated with the infrastructure and the specialized growing techniques that are required. They also start to cross over from purely household production to production of crops for sale.

Voss Organics is a certified organic sub-acre urban farm on Madison's north side, marketing to farmers markets, Willy Street Co-op, and several restaurants in Madison.

Photo submitted

A third piece of urban agriculture consists of market farms using in-ground production and selling those products for profit. This last slice of urban agriculture has fairly low barriers to entry, and has the potential to contribute a significant volume of food to urban communities while earning significant income for urban farmers.

My own interest in urban agriculture has long been within that third category. I have grown vegetables for market at four different farms across the country, and have been exposed to various scales, philosophies, and techniques of organic vegetable production. Within the vegetable world, as in other agricultural sectors, there is a certain pressure to increase efficiencies through mechanization and economies of scale. Though they require skill and dedication of the farmer, those pathways are familiar and common. Less common are resources on how to stay small, achieve similar efficiencies, and earn a reasonable profit. In urban centers where land is limited, those are the challenges of the urban farmer.

Reasons to Grow in the City

More and more farmers are taking on those challenges for a few key reasons. Proximity to urban markets, access to affordable land, reduced capital requirements, and consumer demand for local foods are some of the main drivers in the growth of urban market farms. As one indicator, the SPIN (Small Plot INtensive) farming system lists 94 established farms in 86 different cities throughout the U.S. and Canada on its website. These are all commercial farmers serving local markets from small plots (generally less than 1 acre). They, like other urban farmers, are using neighbors' lawns, public parks, and other open plots at no or low cost for hand-scale commercial food production.

Their techniques involve tight spacing, intensive composting, multi-crop succession planting, and very little mechanical assistance in their work. When it all comes together, these farms can gross $50,000 or, in some cases, much more per acre.

Direct markets and the higher prices those markets command are vital to the success of these small urban farms. They are serving the increasing demand for local foods and catering to a clientele that wants to know the people behind the farm stand. Their proximity to markets saves them time and money; and being an urban farm can make for a unique farm story that is attractive to customers. In this setting, both farmers and consumers may question the need for organic certification. Often there is an assumption that when the customer knows the farmer and can ask about their production practices, that relationship is enough to assure that the food is "clean" or "chemical-free" or "organic." There is a perception, true or not, that each customer is equipped to be his or her own certifier by interacting directly with the farmer.

Farmers' markets and CSAs are not the only markets where urban farmers wish to sell their products, however. Restaurant and grocery store accounts can fetch good prices with less uncertainty in sales than farmers' markets and with less demand on crop diversity than CSAs. Those accounts, once established, also generally require less time spent on marketing and can be an important component of a strong business plan. Organic certification for these accounts is not only valuable, but often required. Without it, those establishments cannot label the food as organic. For some urban farmers I know, it is often a desire to sell to these direct wholesale accounts that sways them to certify their farms.

To **Urban Farming** *on page 14*

Integrated systems approach needed to control fire blight without antibiotics

By Harold Ostenson and David Granatstein

Editor's Note: The National Organic Program's sunset date for the use of antibiotics for fire blight control in organic orchards passed last month. U.S. organic apple and pear growers with fire blight-prone cultivars need to find new management tools. The Organic Center has produced a publication with emerging research and experiential knowledge from growers who have implemented non-antibiotic fire blight control over the past decade. This article has been compiled from that publication, which is on the MOSES website orchard section: mosesorganic.org/farming/farming-topics/orchard.

There is no cure for fire blight (FB), and there is no single "silver bullet" (including antibiotics) that will prevent FB infection. Successful non-antibiotic FB control combines an integrated systems approach with fungal control, insect control, bloom thinning, spray coverage, tree training, soil and foliar nutrients, and cultivar and root stock selection.

Growers will need to evaluate ideas presented here in light of their particular orchard situation and align this information with new research and new products as they become available. Not all organic materials discussed are approved for use in every state. Always check with your organic certifier before using a new organic material.

General Management Considerations

• Integrated Systems Approach

For the most part, FB suppression sprays are the same materials already being applied against other organic orchard horticulture problems such as scab, mites, mildew, fruitlet thinning, and insect pest control (e.g., delayed dormant sprays of copper, oil, lime sulfur; fall sprays of oil, lime sulfur). Integrating your overall orchard spray program with effective FB suppression sprays will be paramount to your non-antibiotic FB control success.

• Tree Training Systems

FB-prone cultivars grow best in high density, eight-foot "pedestrian" (no ladders), two-dimensional type plantings. Growers should consider this approach when planning orchard renewal. This type of planting reduces FB infection potential, improves the full foliage coverage required of FB control sprays (the same for scab control, etc.), and can transition tree pruning from winter to summer and early fall, when warm, dry conditions make pruning "wounds" less prone to shoot blight infection.

• Crop Load Management

Consistent crop loads from year to year reduces FB infection potential by controlling over-vigorous shoot growth in the "off" production, biennial year. Crop load management of apples and some pear cultivars for organic growers occurs during bloom when the potential for FB infection is usually the highest. Organic thinning to control apple fruit set usually involves a combination of materials including lime sulfur which provides FB suppression during bloom. (Note: lime sulfur applications will be toxic to biocontrol materials such as BloomTime™, Blight Ban™, or Blossom Protect™ and should not be tank mixed).

Bloom thinning, especially for apples, is a key component of a successful integrated systems approach, specifically because: (1) it compacts the bloom window and reduces bloom exposure to FB infection; (2) the same organic bloom thinning materials are effective against scab, mildew, and other fungal threats; (3) these materials suppress over-wintering pests such as aphids, leaf rollers, scale, and others that can spread the FB bacteria; (4) a good bloom thinning program reduces excessive tree shoot growth in light crop years. The end of the bloom-thinning window marks a pivotal point in the annual fruit production cycle because many of the issues facing the organic grower for the rest of the season will be determined at this time: crop load, tree vigor management, FB infection potential, scab-mildew-fungus infection potential, pest level potential, and return bloom and next year's crop potential.

• Equipment

Two items that could reduce FB potential as much as other actions are a chain saw to lower the tree canopy, and a tower sprayer to apply the chemical sprays downward onto the tree canopy and flowers. A tower sprayer can provide economic benefit in high-density orchards by reducing spray materials by up to 50%. It also provides consistent spray coverage throughout the tree canopy on older trees with large canopies. If a ground power air blast sprayer is the only option, consider 300 gallon per acre (GPA) nozzles on the top one-third of the sprayer application pattern, 200 GPA nozzles in the middle, and 100 GPA on the bottom third nozzles. This will "throw" more spray farther to the tops of the trees and reduce the fruit russet potential from material blast in the tree bottoms. Invest in a good pH meter to ensure that your tank mix is at a pH level that maximizes the survival of any antagonistic FB organisms you are applying.

Symptoms of fire blight include dead branches, water-soaked blossoms, light brown to blackened leaves, discolored bark, black "shepherd's crook" twigs, and dried fruits. *Photo by Dr. Jay Norelli, USDA-ARS*

• Spray Volumes

Growers have two approaches: (1) lowest spray volume with high active material concentration, which still gives full canopy coverage while also keeping spray deposited on fruit from forming droplets on the calyxes which dry and turn black; and (2) dilute spray volume in the 300 GPA range, with active material rates very low so that the droplet residue concentration forming on fruit calyxes is too low to cause residue marking. Weather, spray equipment, pear cultivar mix and tree canopy size all contribute to the spray volume decision.

• Pre-bloom Foliar Nutrient Sprays

Pre-bloom nutrient sprays accelerate tree leaf expansion and the startup of photosynthesis, resulting in a shortened bloom period, faster fruit set, and a reduction in FB infection exposure. Growers have found sprays of cytokines, fish products, and carbohydrates to be very effec-tive in apples and pears. A condensed bloom period results in less bi-annual bearing, consistent tree

To **Fire Blight** *next page*

Fire Blight — *from previous page*

shoot vigor, larger fruit, and less shoot FB during the 30 days following bloom.

To mitigate a spring bloom time environment that favors FB infection conditions, avoid irrigating during bloom. If irrigation is required, a drip (trickle) irrigation system would help keep orchard humidity lower. If you have wind machines for frost control, think about using them to increase air movement in your orchard to shorten the dry-out period during potential FB infection windows. Reduce tree canopy wetness by striving to increase air flow and sunlight in your tree training systems, including two-dimensional canopies conducive to fast drying.

• Sanitation

In addition to standard orchard sanitation practices to control FB infection levels, consider a fall application of dilute lime sulfur and oil and/or copper just prior to leaf drop. This action may reduce overwintering pests, scab, and FB inoculum levels. The spray should be timed late enough that predator insect populations have ceased to be active. Sprays help dry out cankers and reduce insect transfer on the surface. A mix of horticulture oil with copper painted on trunks in late winter has been used by growers for 20 years and is very effective in curing overwintering FB cankers and drying them up prior to spring. The copper treats the cambium layer. In many orchards, the copper/oil mix is still visible in subsequent years with no new canker activity.

• Vigor Control

It has been said that going organic results in less production, less tree vigor, and smaller fruit. For many organic growers, this is not the case. Tree vigor can be controlled in organic orchards while producing prime sizes and volumes of fruit through these techniques:

- Reduce dormant pruning and move to controlling growth in summer and early fall. This will help reduce excessive spring shoot growth.
- Use a steady diet of compost and build up the soil biology and nutrient reserve which will keep tree canopy and fruit production levels in balance.
- Use pre-bloom foliar sprays to produce strong flowers, shorten the bloom window, and reduce the excess vigor potential that leads to increased FB damage.
- Aggressively bloom thin to increase fruit size, maintain consistent crop loads, improve fruit color, and avoid biennial bearing.

Most orchards need to apply the same amount of calcium as nitrogen each year. Sulfur applied in low concentration with full canopy coverage in early June will help to set tree shoot terminal buds, reduce shoot blight, and counter aphids and mildew. Both of these actions improve the tree nutritional balance, reduce vigorous green shoot growth, reduce FB opportunities and increase fruit size and quality parameters.

Specifics for Apples

• Dormant Stage to Tight Cluster Stage

[silver tip, green tip, half-inch green, tight cluster]

Spray applications during these early apple bud development stages for arthropod pest and disease control, as well as crop load success for the entire growing season. This is also the time when sprays will have a minimal impact on beneficial insects. The more susceptible your cultivar is to russetting, the more intense the spray program must be during these early spring bud stages. Use active organic coppers, combined with or separate from lime sulfur and oil in dilute sprays of 200-500 gallons/acre with full coverage on every row.

• Pink Bud Stage through 50% Bloom

Warmer temperatures and conditions favor FB infection. Since exposing the flower and developing fruitlets to the strongest FB control materials leads to fruit russet, use "softer" materials that only address a single orchard problem category: pest control, fungal control, or crop load management. Spray water volumes need to move from dilute (200-400 GPA) to semi-dilute volumes (100-200 GPA) to reduce the potential for leaf/flower burn and fruit russet. Use fatty acid soluble copper materials (e.g. Cueva™) rather than active copper products during this period to control scab, and FB bacteria growth, and to minimize fruit marking. An upcoming lime sulfur thinning spray can provide mildew control at that time.

Cankers on the bark ooze liquid that contains the pathogen, which is picked up and spread by insects.

Photo by Dr. Jay Norelli, USDA-ARS

• Full Bloom Stage

One of the main purposes of the integrated FB control program is to initiate a multiple spray program early in the spring growth cycle to minimize the potential for FB bacteria to infect during bloom. In full bloom stage, FB bacteria have a direct route into the plant via the flower nectary. This period also is critical for controlling scab, mildew, insect pest emergence, and organically managing fruit set, crop load, and return bloom, which means it's not possible to concentrate solely on FB control.

Lime sulfur or lime sulfur + oil with 200 GPA spray volume suppresses scab, overwintering insect pest emergence, mildew, scale, and FB, while compacting the bloom window. Experienced growers use 2-3 applications of bloom thinning spray in the 200 GPA spray volume range every 3-4 days to cover an 8-12 day bloom window. While a lime sulfur application suppresses beneficial organisms in FB biocontrol products, in most cases, it is worth using for its multiple simultaneous actions on various diseases, insect pests, bloom window compaction, and crop load reduction.

Soluble coppers might be the option of choice after lime sulfur bloom applications to reduce the russet potential from high accumulations of bacteria/yeast on russet-prone apple cultivars under extended wet and humid conditions. Probably any spray applied during this time carries some risk of fruit russet. In most cases, spraying apples post bloom more often with higher rates of water and lower active spray material concentrations will help to minimize russet.

To **Fire Blight** *on page 20*

Urban Farming — *from page 11*

Though the requirements for organic certification in the city are the same as those in the country, urban farmers face three particular challenges that many rural farmers overcome with greater ease.

Buffer Zones

The first of those is establishing adequate buffer zones. Urban farmers using lawns in residential neighborhoods do not have enough space to set aside the usual 20 to 25 feet that MOSA, for instance, prefers. According to section 205.202(c) of the organic rule, the purpose of buffer zones is "to prevent the unintended application of prohibited materials." The prohibited material of most concern in residential neighborhoods is the standard "weed and feed" lawn application. When used according to directions, these products are applied on a calm day to a moist lawn in order to help the product stick to weeds and grass, minimizing the possibility of drift. Where certifiers are willing to consider more narrow buffers and/or physical barriers such as shrubs and fences that can both meet the goal of the rule and minimize the loss of land to buffer zones, this requirement is certainly achievable for urban farmers.

Non-Contaminated Soil

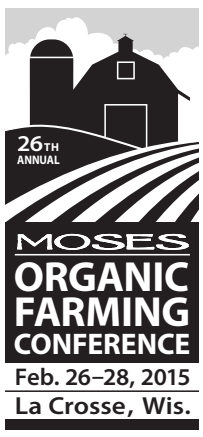
The second challenge is ensuring the farm is established on non-contaminated soil. In section 205.202 (b), the organic rule requires that the land "have no prohibited substances…applied for a period of 3 years immediately preceding harvest of the crop." In an urban setting where lead, other heavy metals, solvents, and other pollutants are more commonly found in the soil, farmers may need to go a step further. Research into current and prior uses of the area can reveal if a gas station, dry cleaner, or factory may have contaminated the soil—in which case, the site should be avoided. Soil tests for lead are common, affordable, and easy to do on all residential land where lead paint or proximity to roadways could result in high lead levels in the soil. Where contaminates are found, urban farmers may need to avoid those plots, remediate the soil, and/or use raised beds.

Land Tenure

The third challenge is not about a requirement for organic certification, but rather about the particular difficulty urban farmers may have with land tenure. In both urban and rural settings land is valuable not only for food production but also for homes, businesses, and other forms of development. Where urban farmers are using land that is owned by neighbors, businesses, or municipalities, there is always the threat that the land will become unavailable to the farmer. For example, neighbors sell their homes, businesses need more space for parking, and municipalities always have new uses for land. While farmers renting land in rural areas also face difficulties with land tenure, the risk of losing access to established urban farmland can be quite high. This increased risk is due to development pressures in the city, and also simply to the fact that urban farmers are often working multiple plots of land owned by different entities with various priorities for the land. Excellent communication between urban farmers and landowners is essential so that farmers can anticipate and plan for moving their farms to new plots as needed—where again they will need to test for contamination and establish buffers.

In order for urban farmers to find it worthwhile to go to the trouble of certifying their farms, the benefits of doing so must be clear. The ability to sell organic food to direct wholesale accounts is one clear benefit. A marketing edge at a farmers' market or in a CSA may or may not be perceived as another. Is there a benefit to the farmer in inviting the oversight of an organic certification agency and the education and possibility for improvement that may be part of that relationship? As a certified organic vegetable farmer, I always thought so.

Meanwhile, urban agriculture of every type is growing. From the community gardener, to the kid raising cherry tomatoes in a school garden, to the new organic grower raising market vegetables on her neighbors' lawns, food production is returning to a central place in more and more people's lives. As a result, many of these people are also interested in and educated about agricultural issues. And for the most part, they all want "organic" food. One of the challenges for the organic community will be to convey the importance, benefits, and achievability of organic certification for urban market farmers. Now is the time to think about how organic certification and urban agriculture will work together.



Claire Strader is the Small-Scale and Organic Produce Educator for Dane County Extension and the FairShare CSA Coalition. She was the Farm Director at Troy Community Farm in Madison, Wis. for 12 years, where she grew four acres of certified organic vegetables for CSA and other direct markets.

Strader will present "Vegetable Crop Planning—Keep Planting!" at the 2015 MOSES Conference.

Resources for Urban Farmers

Tips from the 2014 MOSES Conference workshop "Farming in the City," presented by Anne Pfieffer, Julie Dawson, Alex Liebman, and Claire Strader.

- Succession planting is vital to the success of an urban farm operation. Make up for limitations in space by maximizing the amount of time that beds are producing saleable crops.
- Tight spacing (and soil fertility to accommodate it) is important for maximum productivity. Use a tape measure to ensure exact spacing.
- Begin as early as possible in the season and continue as late as possible with the use of cold frames, low tunnels, row covers, etc.
- Crop rotations are just as important in urban ag as in rural ag. Rotating blocks of beds among crop families can reduce the risk of diseases and pests even in small spaces.
- Consider harvest windows as well as crop families when planning blocks of crops. Grouping crops that mature at the same time can make transitions to later successions easier.
- Effective weed control also facilitates easier transition from crop to crop.
- Plan crops to minimize changes in irrigation equipment throughout season. For example, a succession of carrots→arugula→spinach can be on overhead sprinklers all season.
- Crops such as radishes, carrots, or lettuce heads where the entire plant is pulled at harvest are excellent preceding crops for finely seeded plants like salad mix, spinach, etc.
- Soil tests are vital to make sure nutrient levels are maintained over time.
- Build soil while crops grow with hay/straw mulch. Mulch is best used on transplants that will be in place for most of the season (leeks, kale, tomatoes). Also, clover can be sown beneath the mulch in the spring to improve germination and allow it to grow slowly through the season.
- Cover crops can grow under cash crops. For example, clover can be sown under crops like melons or winter squash at the first weeding; oats/peas or rye/vetch can be broadcast under crops like kale or tomatoes in late summer.
- Leaves can be used to mulch beds in the fall. Hundreds of pounds of biomass can be collected along city streets or by contacting landscape companies to drop off shredded leaves.
- Urban farms have access to plenty of labor. Knowing how to hire, train, and manage good help can make a big difference in getting the work done.

Handouts from this workshop are available along with many other resources for market farmers on the FairShare CSA Coalition website (www.csacoalition.org/our-farms/resources-for-farmers).

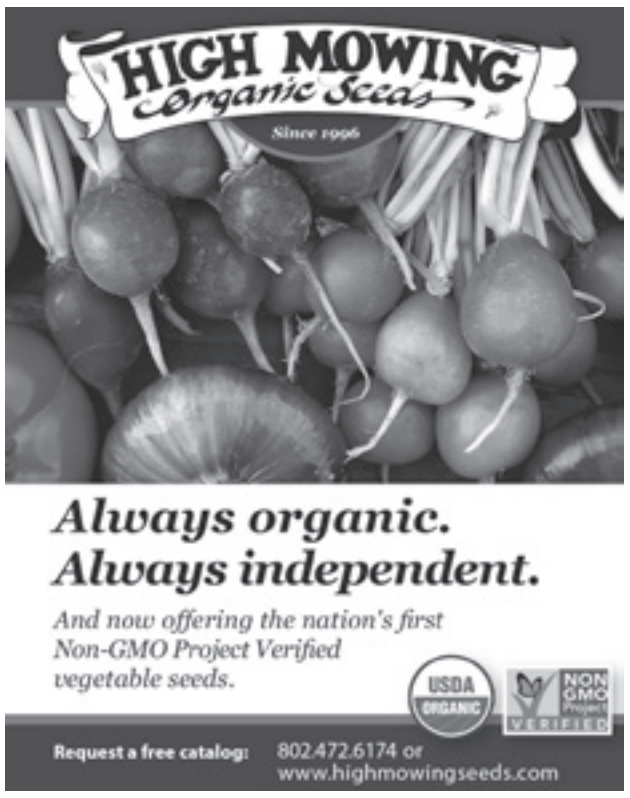
Business Planning

The Urban Farm Business Plan Handbook and Urban Farm Business Plan Worksheets
www.epa.gov/brownfields/urbanag

Soil Testing

Test bags and testing services usually are available through county extension offices.

The Upper Midwest Organic Resource Directory lists companies that provide soil management consulting and soil inputs under the category "Fertilizer and Soil Inputs." The directory is on the MOSES website (mosesorganic.org) under the Publications tab.



Plan now to grow healthy transplants for next season

By John Biernbaum

This year I worked with a team of colleagues to start a teaching and incubator vegetable farm in Michigan's Upper Peninsula. We developed an initial crop plan based on the Michigan State University (MSU) Student Organic Farm plan and the help of a neighboring farmer who was very generous with his crop variety information and planting schedule. This farmer grew transplants for our initial season. For next season, we plan to create a sweat chamber and germination room (and media storage) in the basement of one of the existing structures to use for the early transplants (February, March) and a heated polyethylene-walled room in our high tunnel as a finishing space for the short term. This planning process has been a good reminder of all the decisions that current and new farmers have to face when getting started. It also is a reminder of the importance of reviewing the farm transplant process each year.

Planning Basics

Transplant production is a series of questions and decisions, similar to or perhaps in miniature of the overall process of farming in the field. The questions don't change much from year to year, but the answers change as the experience and maturity of the farmer and farm evolves. The end of the field season is a good time to start the review process and make written notes about any changes to be put in place at the start of the next transplant season. It can also be a part of putting together that seed order earlier so you get the varieties you want while the seed is available.

When I teach transplant workshops for farmers or the online organic transplant class through MSU, one of the activities I use is the development of a transplant action plan. Action plans are typically a method of providing the step-by-step actions necessary to implement the various goals of a business plan. Action plans can also be a method of keeping records and laying out farm or crop production plans that can be electronically modified and updated each year. There are three key parts to an action plan:

1. The tasks to be completed
2. The person responsible
3. A date for task completion

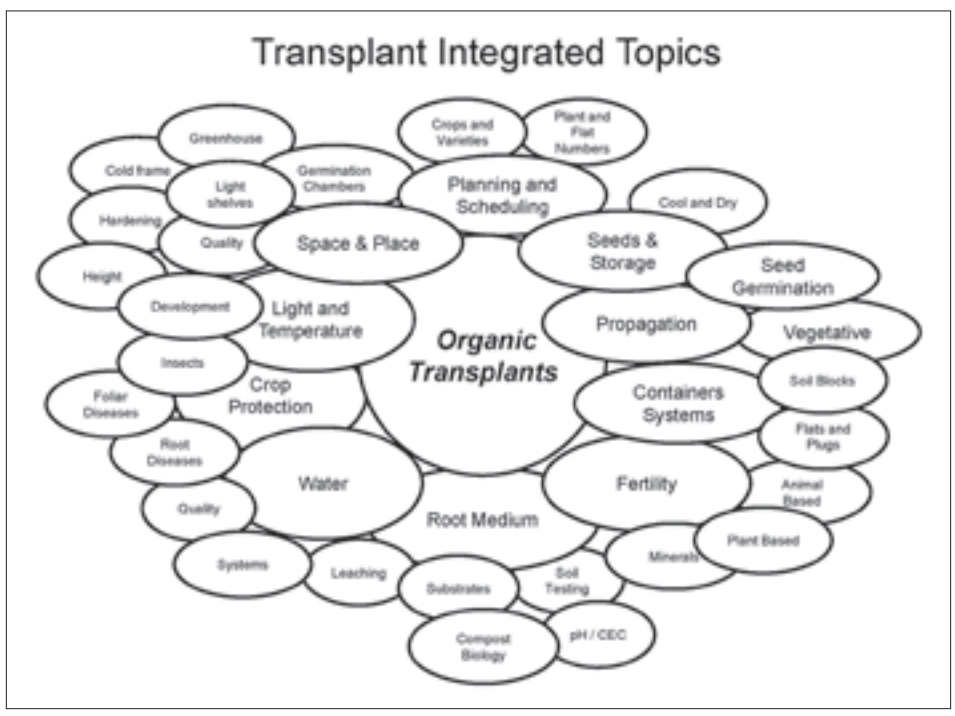
Composts for Transplants

Composts are an excellent media component for starting transplants. Keep in mind that composts can vary dramatically. What makes a compost good for transplant production? One factor is appropriate physical properties as characterized by texture (particle size), structure (aeration/water holding capacity) and uniformity. Screening for use in small cells is beneficial. The bulk density (weight per unit volume) is one measure of physical properties. Dry peat-based media weigh about 0.13 g/cc while soil weighs 1.3 g/cc. Composts are in between. Ours range from 0.3 to 0.9 g/cc, primarily dependent on how much soil is added.

A second factor is a balance between soluble and long-term nutrients. Electrical conductivity (EC) can be a simple measure of soluble nutrients. The saturated medium extract (SME) or greenhouse test is a recommended method of soil testing compost or root media for transplant production.

A third factor is the biology present in the compost. In addition to improving the growth of transplants, compost in transplant media can be a great way to move valuable long-term nutrients, organic matter and diverse biology uniformly into fields and intensive growing areas. A group of Cornell University researchers designed a research project to address the question of whether soil biology in transplants impacts plant roots during the season. The researchers grew tomato transplants in a variety of root media containing plant-based amendments, compost or vermicompost. Transplants were then established in the field and at regular (monthly) intervals the microorganisms in the root rhizosphere were compared. For some treatments, particularly vermicompost, the transplant media had a lasting effect on the microorganisms in the root rhizosphere for several months.

To further investigate the potential benefits of vermicompost, the Cornell researchers identified how vermicompost can protect plant roots from *Pythium* damping off and root rot organisms. The presence of vermicompost leads to the plant roots being protected from infection by *Pythium* by a coating of microorganisms. More details are available by watching this YouTube video: www.youtube.com/watch?v=Fee4decPazA.



Our standard transplant compost for 15 years has been:

2 bales of hay
1 bale of straw
1 bale (3 ft3 compressed) pine shavings
1 bale of garden-grade sphagnum peat (3 ft3 compressed)

This mixture will create a pallet-size pile that routinely heats to 150° F in three days if properly moistened (soak contents briefly to absorb 75-80 gallons water). A loam soil can be added at the start of composting to increase nutrient retention and wetting (1 or 2 5-gallon buckets). The mature compost can be used for transplant media, but at the Student Organic Farm, it is typically mixed with 25% peat and 25% vermiculite.

Over the years, we have learned that factors like hay quality (more nitrogen in the hay leads to more in the finished compost), maintaining the moisture during composting, preventing leaching of the compost pile by heavy rainfall (i.e. cover the piles after the hot phase), and the storage conditions for October through January while the compost is maturing (temperatures above 50°F) can influence the quality and soluble fertility of the compost.

When the price of hay went from $4 to $8 to $12 in the summer of 2012 due to dry weather conditions, there was motivation for alternative locally available feedstocks. For the past two summers as part of a graduate student research project, we have produced three mixtures (2:1, 1:1, 1:2) of aged tree leaves (previous fall) and fresh clipped (flail mower) and raked "hay" from grassy unplanted areas at the Student Organic Farm. Other composts include adding peat,

To **Transplants** *on page 18*

PAGMan — *from page 5*

most common weed, three applications may be needed for good control; at the 1-leaf, 3-leaf, and 5-leaf stages of corn. The system likely will not be effective on perennials, as these weeds are simply too tough-stemmed, and they tend to have large root reserves, which allows them to sprout continuously.

Forcella and his colleagues have tried many different types of abrasive grit: walnut shells, ground up corn cobs and even plain sand. "As long as it's the right size (about 0.5 mm) and gritty, it will work," he said. Most of their experiments have been done with corn cob grit because it is inexpensive and readily available.

When they presented the idea to organic producers, they quickly realized it was more likely to be adopted if the applicator could be doing "double duty" when moving across the field. Luckily, Forcella said, many nitrogen-rich organic fertilizers have a gritty texture as well. They started experimenting with corn gluten meal, alfalfa meal, cotton seed meal, canola seed meal and even lime to neutralize acidic soil. "All the grits work equally well to control small weed seedlings," he said. Their planned trials include looking at how and when the plants uptake nitrogen after gritty organic fertilizers are applied to control weeds.

Other upcoming trials will include determining what type of nozzle and spray pattern work best and looking at how the idea can be applied to organic vegetable production.

The project has taken on an international angle as well. For several years Forcella has collaborated with a weed scientist, Professor Jose Urbano, from the University of Seville (UdS) in Spain. One of Urbano's colleagues at UdS, Manuel Perez Ruiz, is an ag engineer. He was interested in the concept as well and secured funding from his government to determine how to apply the idea to olive orchards and vineyards. His group is investigating how to integrate GPS and robotic technology with the PAGMan system. This new work is in collaboration with Professor David Slaughter at the University of California-Davis and the USDA-Agricultural Research Service.

The four-row, eight-nozzle PAGMan provides selective, post-emergence, in-row weed control for corn, soybean, and other crops grown in widely spaced rows.

Photo by USDA-ARS

One of the drawbacks of the system thus far is that the unit needs to move at a rather slow speed, about one to one-and-a-half miles per hour, so it is time-consuming. Forcella explained that maintaining the diligence needed to drive at a very slow speed and staying aligned as to not damage the corn plants is difficult. GPS and robotic technology could help eliminate this drawback for the farmer.

Still others are working to help make this project come together. Sam Wortman at the University of Illinois recently was awarded a grant from the National Institute of Food and Agriculture's Organic Research and Extension Initiative. This new project will extend the technology to organic vegetable production. The aforementioned researchers at SDSU and USDA-ARS will collaborate on this venture.

Forcella said as a public employee working on a project like this he has no interest in trying to patent the idea. Since the idea has already been shared with so many others, the overall concept may not even be patentable at this point, but smaller things such as the nozzle design could be.

Even though the idea may not be patented in the future, the unit is not something that could easily be built by someone on their own, he added. Forcella and his colleagues hope that a larger equipment company, a few of which have expressed interest, will decide to build and market the unit. He hopes the unit will be commercially available within the next five years.

Kelli Boylen is a freelance writer with an agricultural background. She lives with her family on a homestead in Iowa. Her work has been featured in local, regional, and national publications, including the Progressive Dairyman.

Biopesticides — *from page 9*

naturally occurring biopesticide found in seeds from the neem tree. Azadirachtin is the most active component in neem oils, and some biopesticide products contain this compound in purified forms. Neem has several modes by which it controls or suppresses insects, including activity as a natural repellent and as an insect growth regulator. Neem and its active components are generally considered safe for beneficials because pesticidal activity is directed at sucking and chewing insects.

Another widely used biochemical biofungicide is Regalia®. It is derived from the extraction of certain components of giant knotweed. It creates a defense response in the treated plants and stimulates additional plant pathways that strengthen the plant structure and act against the pathogen.

Pest resistance to conventional chemical pesticides is a significant grower and industry concern. Scientific research has repeatedly demonstrated that continuous use of the same class of pesticides (especially those reliant on a single mode of action) will result in the emergence of a pest population resistant to those products. Populations of insect pests, plant pathogens and weeds all have the ability to develop resistance quickly, even to different types of functionally similar chemistries. This phenomenon is called cross-resistance and is caused by multi-chemistry detoxification mechanisms present in many pest populations. Biological pesticides often offer multiple activities against pests and are not prone to resistance development.

Today's consumers are increasingly sensitive to chemical use in food production. Many consider produce grown organically with the judicious use of biological control and biopesticides as healthier, safer, and friendlier for the environment.

Biopesticide use reduces consumer exposure to regulated chemical residues. Most biopesticides are exempt from residue limits on fresh and processed foods around the world. For growers, food retailers, and consumers alike, this means that biopesticides can be used to manage pests without sacrificing food safety or quality.

Bill Stoneman is the Executive Director of the Biopesticide Industry Alliance (BPIA) and an Independent Organic Inspector. He also serves on the Organic Materials Review Institute (OMRI) Board of Directors and the Wisconsin Organic Advisory Counsel.

New commodity programs help farmers manage risk

By Harriet Behar

Organic producers may wish to review these new commodity programs from the Farm Service Agency, even though they are tied to commodity crop prices and either county average production yields or your own historical yields. The new Dairy Margin Protection Program (MPP-Dairy) is similar in that it is based upon average national conventional feed costs and national average conventional milk price, but might be a consideration as a revenue safety net. Organic and non-organic farmers alike will be speculating on future conventional commodity and milk prices, and receiving payments only when prices or yields are very low. These programs have specific details on who can sign up, how to sign up and your options. This article is meant to be an overview. Contact your local Farm Service Agency for more information.

The most recently passed farm bill has put in place a variety of options to the Direct Counter Cyclical Payment program and the ACRE program. The Price Loss Coverage (PLC) and Agricultural Risk Coverage (ARC) programs are offered for commodity crop growers to manage both price fluctuations as well as yield-related financial losses for crop years 2014-2018. These programs are tied to the base acres the FSA has assigned to your farm; you should have received notification of your current base acre allocations from FSA in the past month.

Even though FSA base acres have not changed for many decades, and many farmers are planting more commodity crops than in the past, farmers do not have an opportunity in this farm bill cycle to increase base acres. However, they do have the opportunity to reallocate their base acre numbers among a variety of commodities as well as update yields used to calculate payments. In order to be changed, the base and yields must relate to historical production data from the crop years 2009-2012. The timeframe to reallocate base acres and historical yield data with the FSA is Sept. 29, 2014 to Feb. 27, 2015. Farmers who do not elect a change will retain their current base acres and yields.

If you have FSA-listed base acres totaling more than 10 acres, you are automatically enrolled in the PLC program, unless you choose one of the two options of the ARC program. Whichever program you decide to elect by March 31, 2015, will be the program you will remain with for the five years of the farm bill. Two of these programs seek to manage the risk of low prices (PLC), or lower than average yields and low prices (ARC-CO using county yield averages). The third program, ARC with Individual Coverage, is tied to your own historical revenues of the various commodities, but is only paid on 65% of the base acres, rather than 85% of the PLC or ARC-CO.

The PLC program will pay the difference between the "reference price" declared by the FSA, as compared to the "effective" or the "Marketing Year Average Price" (MYA), for each commodity on 85% of the base acreage of each commodity as well as the yield determined at the original signup. Payments are made on each commodity within the base acres and the historical yields, regardless if that specific crop was planted that year or not. ARC-CO uses county average yield and revenue data for the 5 previous years (tossing out the high and low numbers and averaging the remaining three), and pays the farmer if there is a revenue loss according to these numbers during a specific crop year. ARC-IR pays on the actual acres planted of each commodity crop and the historical revenue received from that sale in relationship to the current MYA price. The University of Illinois website has a handy worksheet to help you compare these three commodity crop options to help you decide which, if any, would be useful. See bitly/farmbilltool. More information is also available at fsa.usapas.com and fsa.usda.gov.

Dairy Program

The Margin Protection Program for Dairy producers replaces the Milk Income Loss Contract (MILC) program. Payments are made to dairy farmers when the margin between national cost of conventional feed and national conventional price of milk are within $4 for the catastrophic coverage and up to $8 for the premium program. Dairy producers must provide proof of their historical milk production, and be willing to pay an annual administrative fee to the FSA of $100. There are no production or income limits, and you must comply with basic conservation requirements. There are a variety of ways to prove your eligibility, manage movement of dairy herds between farms and ways for new operations to be part of the program as well. Existing dairy operations can take the highest annual production history from the previous three years as their production history.

Dairy producers need to register for the program by Nov. 28, 2014 to participate in 2014 and/or 2015. After that, the signup period will be July 1-September 30 of the previous year. This program goes from year to year, and producers must re-sign up to continue. Once signed up for the year, they cannot withdraw or change election until the following year. For the catastrophic (CAT) coverage, producers pay the $100 annual administrative fee which will cover 90% of the milk amount of the production history when the margin falls to $4. Producers can choose to pay an extra premium for margins between $4.50 and $8, with these premiums spelled out in the web link below. At least 25% of the premium is due by February of the applicable calendar year, with the full balance due by June, or coverage will be terminated.

The feed cost calculation was developed from a ration to meet a rolling herd average of approximately 21,000 pounds of milk. By multiplying the national price of corn by 1.0728, the central Illinois price of soybean meal by .000735 and the national price of alfalfa hay by .0137, this cost of conventional feed will be determined. While organic dairy feed costs and organic milk pricing is not tied to non-organic prices, there is some correlation at times. Conventional dairy publications and the FSA will be doing conventional dairy feed and milk price projections, so it might be useful to watch these news releases to see if payments might be a possibility in the coming year, before paying the annual $100 fee or added premium. This link has projected premiums and payments (or lack of) for 2014: bitly/MPPDairy. The FSA information bulletin on the MPP-dairy program can be found here: bitly/marginprotection.

Risk Management Programs

Lastly, there are new Risk Management Agency-supported crop insurance programs that address the needs of organic producers in a more focused way, such as insurance for pasture and hay ground during times of drought and Whole Farm Revenue insurance that is flexible enough to serve diverse operations of many sizes and types. A future Organic Broadcaster article will cover these crop insurance products.

Harriet Behar is an organic farmer and a MOSES Organic Speciaist. She serves on state and national committees, providing the organic farmer perspective.

Transplants — *from page 15*

paper, pine shavings and manure to the 1:1 leaf/grass mixture or wrapping the leaf/grass mixture in plastic film to reduce oxygen and maintain moisture. The variety of C:N ratio finished composts will be used to grow vegetable transplants next spring.

Worm or vermicompost as a root medium component or a supplemental source of nutrients has been a transplant production option for several decades. However the limited availability (primarily dairy manure-based products) and higher cost of vermicompost compared to thermophilic compost has limited use for small-scale transplant production. Much of the previous plant growing research using vermicompost has been with large-scale production from dairy manure-based feedstocks.

Both thermophilic and vermicomposting of dairy manure will result in nutrient-rich composts that can be added to root media at only 10 to 20% by volume. It is not appropriate to characterize all vermicomposts as that nutrient rich. Like thermophilic composting, the feedstocks and prevention of nutrient loss during vermicomposting determine the final nutrient availability. Vermicompost made from food scraps, coffee grounds and leaf mold has lower nutrient availability compared to dairy manure vermicompost and can be used for transplants at much higher rates, possibly 100% of the medium.

Since 2010 MSU has provided funding for research of on-farm composting and vermicomposting of food scraps at the MSU Student Organic Farm. Our original proposal was to test the use of a hoophouse for developing on-farm vermicompost systems. Four years later, we have learned a great deal about how vermicompost can be produced on farm with lower cost small-scale methods. Worms have survived the winter in composting systems in a high tunnel for all four winters, including the extremely cold season this past winter. We are now beginning to evaluate the vermicompost for transplant production. A key question to address is whether vermicomposts are different from hot composts made with the same feedstocks/ingredients and if so how. The Cornell research project mentioned previously did find a difference.

See John Biernbaum's website for more resources on:

- **Organic Transplant Production**
- **Crop Planning**
- **Transplant Action Plan**
- **Transplant Fertility Management**
- **Vermicomposting**

www.hrt.msu.edu/john-biernbaum/pg4

Topdressing

One alternative to liquid fertilizers during production or prior to setting out is to add a top dressing of mature compost with soluble nutrients to the surface of the trays or flat prior to an irrigation. In some sense this is comparable to making a water extract of the compost (5 to 1 or 10 to 1 dilution) for use as a soluble fertilizer. Top dressing may be suitable for lower numbers of flats (<100). A cup (range 0.5 to 2 cups) of screened compost or vermicompost can be sprinkled uniformly over a flat in about the time it would take to water the flat. One of the keys is have a mature compost or vermicompost with balanced soluble nutrients. That may mean adding minerals during the composting process.

Improving Nutrient Capacity

Perlite and vermiculite are mined minerals that are heated to high temperature (>1000°F) to provide a rapid expansion like popcorn. The lightweight materials help provide structure to root media (perlite) and water- and nutrient-holding capacity (vermiculite).

When considering on-farm alternatives, one possibility is the use of biochar. It is very likely that biochar will provide aeration, structure and water- and nutrient- and biology-holding capacity in lightweight container media. If purchased, the cost of the biochar at the quantities needed is a key factor for consideration; on farm production of biochar is an option as well.

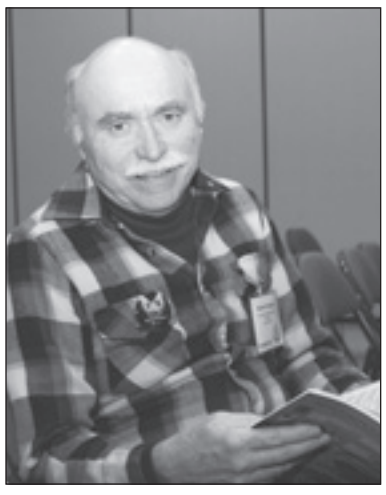
Improving on transplant production is both a short- and long-term investment in the farm. Focus on the basics by developing an action plan, as well as key variables like compost for the transplant media. Both can improve overall farm performance.

John Biernbaum is a Professor of Horticulture at Michigan State University, where he teaches greenhouse management, organic farming principles and practices, organic transplant production, and compost production.

John will present the workshop "Vermicomposting for the Cold Climate Farm" at the 2015 MOSES Conference.

Pack your plaid for annual MOSES Conference

By Audrey Alwell




The MOSES Organic Farming Conference—where plaid is the preferred fashion—takes place Feb. 26-28, 2015 at the La Crosse Center in downtown La Crosse, Wis. This much-anticipated annual event draws together more than 3,000 farmers, educators, and ag professionals for learning, networking, "shopping" the two-floor Exhibit Hall, and sharing social time with like-minded people.

Registration for the 26th MOSES Conference opens Nov. 24. Both print and secure online registration will be available again this year. The conference website (mosesorganic.org/conference) features details about workshops, presenters, exhibitors and more, including information on volunteering or applying for a scholarship to the conference.

The conference website soon will have links to download the free conference app, which works on iPhones, Androids, tablets and desktop browsers. Along with the details from the Conference Program, the app features exclusive information about area businesses and hotels, plus access to coupons and promotions from Exhibit Hall vendors and sponsors.

The MOSES Conference Registration Guide will be mailed out around Thanksgiving. It will also be available on the conference website. If you don't have Internet access and don't receive a guide by Dec. 5, you may call the MOSES office at 715-778-5775 to request one.

New for MOSES 2015

This year's conference packs in the learning opportunities while alleviating the packed rooms that have become an issue as the conference has grown. By opening up additional workshop space in the Radisson hotel, adjacent to the La Crosse Center, we have been able to expand the size of workshop rooms in the main conference area. The Radisson workshop rooms can be accessed through the heated skywalk off the Concourse or by a short walk across the hotel parking lot. The General Session space, which was moved to a larger room in North Hall last year, also will be used for a workshop.

Conference-goers can choose from a total of 67 unique workshops offered over six sessions. To make it easier to navigate the hallways, we're staggering the start and end times of the 90-minute morning workshops. Session 1-a starts at 8:15 and ends at 9:45. Session 1-b starts at 8:45 and ends at 10:15, a half hour after the first group's start and end times. Session 2-a starts at 10:30 and ends at noon. 2-b starts at 11 and ends at 12:30. Participants can choose one workshops in either the "a" or "b" group during each session. Free time between workshop sessions gives participants the chance to network, visit the Exhibit Hall, or shop the MOSES Bookstore. The afternoon workshops will all run concurrently from 3:30 to 5 p.m.

We've moved the General Sessions to the afternoons—a welcome break right after lunch. The keynote speaker this year is John Jeavons, internationally known researcher, teacher and visionary behind biointensive farming. He'll share his vision during the General Session on Friday.

The 2015 MOSES Organic Farmer of the Year takes the stage during the General Session Saturday to share his/her farm story. The MOSES Board of Directors presents the award to this inspiring farmer at the Conference KickOff Thursday evening.

We've retooled the KickOff celebration, too. It starts with an orientation session for first-time conference-goers (and others who want to know how to take advantage of everything happening at the conference). Then, the Board reveals who has won the prestigious Organic Farmer of the Year award. After that, we're thrilled to welcome acclaimed singer-songwriter Susan Werner for a two-hour performance of homespun tunes from her Hayseed album and more. Dubbed by NPR as the "Empress of the Unexpected," Susan is sure to set the stage for a colorful and inspiring conference—plaid shirts optional.

Audrey Alwell is the Communications Director for MOSES, Managing Editor of the Organic Broadcaster, and a big fan of Susan Werner.

Accelerate your learning with an Organic University™ course
Feb. 26, 2015
—preceding the MOSES Conference.

See page 20 for details.

Fire Blight — *from page 13*

If it is particularly wet (rain or high humidity) during the later portion of bloom, a spray combination of Serenade Optimum™, or similar biological material, or an organic SAR (Sytemic Aquired Resistence) product such as Regalia™, with or without wettable sulfur may be a good option against FB, scab, mildew, and other fungi.

Under heavy scab pressure, it may be necessary to go from the last lime sulfur treatments at bloom directly to a soluble copper program because the bio-fungicide option against FB, Blossom Protect™, will not prevent scab infection.

•Petal Fall - Post Petal Fall [+30 days]

This is the stage where spray mix compatibility, coupled with timely spray responses targeting a broad range of fruit and tree quality threats, becomes a critical integrated control challenge for the organic tree fruit grower.

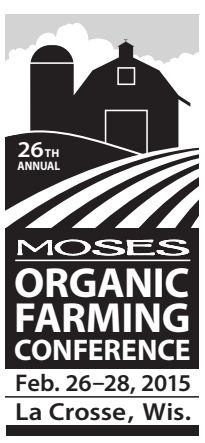
If the integrated FB control program after lime sulfur consists of Blossom Protect™ followed by a soluble copper application (a successful FB control based on preliminary trials), additional soluble copper sprays at petal fall can proceed if required under a forecast of relative dry weather. This is especially true if scab and shoot blight are concurrently the major concern. Consider adding a biological, or SAR product, or Kaligreen™ with the soluble copper if scab or mildew infection potential is high. In the event that petal fall and post petal fall phases are met with heavy rain or extended high humidity conditions, a Serenade™ application should be initiated prior to forecasted rain.

With russet prone apple cultivars, non-lime sulfur and non-copper program alternatives may be a better approach to reduce russet potential.

If shoot blight after petal fall is a major threat to the orchard, multiple applications of soluble copper are probably the best approach even at the expense of fruit russet. Controlling overly vigorous new growth via horticultural practices should also be a high priority. Control of chewing and sucking insect pests during this stage is important as they can be a factor in the spread of the FB bacteria that will cause shoot blight.

Harold Ostenson is a tree fruit consultant. David Granatstein is a Sustainable Agriculture Specialist at Washington State University.

David Granatstein and Jessica Shade, Director of Science Programs at The Organic Center, will present a workshop on "Managing for FB without the use of Antibiotics" at the 2015 MOSES Conference as part of the Organic Research Forum.



Intensive, full-day courses offer chance to learn more about farming topics

Organic University™ gives farmers the chance for in-depth education on a particular farming topic. The courses are taught by experienced farmers and educators. Each course includes a custom-made companion resource book. Courses run from 9:30 a.m. to 5 p.m. Thursday, Feb. 26, 2015 at the La Crosse Center in La Crosse, Wis. (just prior to the MOSES Organic Farming Conference). Registration, which opens Nov. 24, can be done online or by mail. Since class size is limited by room capacity, popular topics can fill up quickly. For more information about presenters, pricing and registration, see mosesorganic.org/organic-university.

MOSES ORGANIC UNIVERSITY™
Pre-Conference Courses: Feb. 26, 2015

Soil Biology and the Soil Food Web
Elaine Ingham, PhD

Soils teeming with diverse and healthy biological activity grow healthy plants. Learn how to encourage a healthy and diverse soil biology to improve your vegetables, fruits, row crops, forages and pastures.

Health Care for Organic Dairy Cattle
Hue Karremen, DVM

This class will cover prevention strategies, modes of treatment and case studies applicable to all sizes of farms. Learn biological, botanical, homeopathic, acupuncture, and intuitive approaches to treating cows without using hormones or antibiotics.

Storage Options for Season Extension
John Fisher-Merritt and John Hendrickson

CSA members, retail produce buyers, and chefs want local produce 365 days a year. Take advantage of this market opportunity by storing crops—such as potatoes, carrots, beets, and winter squash, and cabbage. Learn which storage structures work best for your situation.

Farmscale Permaculture
Grant Schultz and Mark Krawzcyk

Learn how to plan, install, and operate large-scale permaculture systems for maximum resiliency and economic stability. Topics include keyline design, multi-species grazing, alleycropping, agroforestry, and commercial production of fruit and nut trees.

Resources to Empower Women Farmers
Panel

Seasoned female growers share how to develop a diversified business plan with livestock, produce, value-added products and agritourism. The panel also discusses how to do it all while caring for family and self.

Farming with Native Beneficial Insects
Eric Lee-Mäder

Learn how to enhance populations of good insects that prey upon crop pests and pollinate crops on your farm. Gain practical information for creating insectary strips, hedgerows, beetle banks, and more. Plus, learn how to access financial and technical assistance to implement beneficial insect conservation on your farm.

Farming for More Income, Less Work
John Jeavons

Learn strategies that build on your current farming system in order to significantly increase income while using less land with fewer resource inputs. Focus will be on CSA options, farm stands, distribution systems, value-added, and greenhouse production.

Profitable Fruit Processing
Jackie and Harry Hoch

Processing low-grade fruits into value-added products can help improve your orchard's bottom line. Learn how to avoid the common mistakes that can take the profit out of processing. Plus, learn how to label your organic products, source organic ingredients, figure pricing, create labels and barcodes, and meet food safety regulations.

Successful Organic Grass Fed Beef
Rod Ofte and Allen Williams

Learn how to cost effectively produce organic grass-fed beef in a manner that provides both an excellent product and positive returns on your investment. Topics include genetics, forage and grazing management, seasonal and year-round finishing, processing, labeling, and marketing.

Small Grains to Improve Crop Systems
Klaas Martens

Small grains are key to a more diverse and resilient type of farming. Learn about the factors that affect yield and how they can be optimized. This course covers everything from variety selection to post-harvest management.

News Briefs

Call for Organic Research Posters

For the sixth year, the 2015 MOSES Organic Farming Conference will include an organic research poster session Feb. 27 and 28 as part of the Organic Research Forum. The poster session will document completed and on-going research projects related to organic agriculture.Researchers, academic faculty and staff, graduate/undergraduate students and farmer researchers may submit poster proposals for consideration by Jan. 2, 2015 related to the following topics:

1. Organic fruit, vegetable and row crop production (including bio-fuels & fibers)
2. Organic dairy production
3. Economic and marketing research
4. Organic livestock production (other than dairy) and crop-livestock integration
5. Insect and disease management
6. Nutritional quality of organic foods
7. Consumer and market trends

Research abstracts/summaries (under 300 words) should cover the study's purpose, experimental treatments used, results obtained, significance of findings, conclusions and implications. Focus should be on the implications of the research and less on methodology. Email submissions to joe@mosesorganic.org either as a Microsoft Word-compatible attachment or simply in the text of the email. Include full contact information. Space is limited to 40 posters.

All accepted poster presenters receive full conference admission. Limited scholarships are available to offset the cost of lodging and travel. To be considered for a scholarship, submit a request with the poster abstract/summary.

Season Extension

Farmers looking for ways to extend the growing season can find resources, suppliers, research, and more on the MOSES website under "Farming By Topic" in the Farming tab. Find high tunnel techniques ranging from growing fruit in cold weather to using thermal banking to save on energy costs.

Food Chains Film

The new film FOOD CHAIN$ will be screened at the 2015 MOSES Conference. The film explores the state of labor within the U.S. agriculture sector and reveals the human cost in the food supply. The narrative of the film focuses on an intrepid and lauded group of tomato pickers from Southern Florida—the Coalition of Immokalee Workers—who are revolutionizing farm labor. Their story is one of hope for the triumph of morality over corporate greed, ensuring a dignified life for farm workers and a more humane, transparent food chain. See the trailer at www.foodchainsfilm.com.

New Produce Rating System

Whole Foods Market has announced the launch of "Responsibly Grown," a "good, better, best" rating system for produce and flowers that assesses growing practices that impact human health and the environment. The ratings cover pest management, farmworker welfare, water conservation, soil health, ecosystem biodiversity, waste reduction, renewable energy and climate. See details at media.wholefoodsmarket.com/news/responsibly-grown.

Local Food Systems Resource

The Leopold Center for Sustainable Agriculture has collected information about 31 federal, state and private grant programs that can fund the development of local food systems. "Funding Opportunities in Local Foods" summarizes each grant program, general eligibility and deadlines, and provides active links to websites for more details. Find it at www.leopold.iastate.edu/funding-opportunities-in-local-foods.

Deep Winter Crop Research

The University of Minnesota is researching crop production in deep winter greenhouse operations. Crops include kale, spinach, strawberries, cucumbers, and mesclun mix. The study will include economic analyses and examine the potential market for deep winter crops. To receive periodic updates on the progress of this study, contact Greg Schweser at 612-625-9706 or schwe233@umn.edu.

Organic Farming Risk Study

The National Center for Appropriate Technology (NCAT), based in Butte, Mont., has received a four-year $750,000 USDA grant to look at the risks of organic farming and whether a lack of good crop insurance is preventing organic food from diversifying and expanding, both in production and markets. For more information, contact Jeff Schahczenski at 406-494-8636 or jeffs@ncat.org, or visit www.ncat.org.

Cover Crops Field Guide

An updated and expanded edition of the Midwest Cover Crops Field Guide has been published by Purdue University and the Midwest Cover Crops Council. The pocket-sized guide is designed to help farmers choose, grow and use appropriate cover crops in their farming operations. The updated edition features seven new topics, including suggested cover crops for common rotations, seeding rates, and research on cover crops' impacts on cash crop yields. The 166-page resource is $5. It is available by searching www.extension.purdue.edu.

Publications in Spanish

SARE now offers four of its popular publications in Spanish: ¿Qué es la Agricultura Sustentable? (What is Sustainable Agriculture?), Avicultura Rentable (Profitable Poultry), 25 Años de SARE (25 Years of SARE), and Estrategias Económico-Am bientales en la Crianza de Cerdos (Profitable Pork).

Farmer Rancher Grant

The application period for NCR-SARE's Farmer Rancher Grant Program runs through Nov. 20, 2014. This competitive grants program helps farmers and ranchers explore sustainable solutions to problems through on-farm research, demonstration, and education projects. Find more grant opportunities on the Funds for Farmers page on the MOSES website under "Farm Finances" in the Farming tab.

Farm Loans

The USDA's Farm Service Agency (FSA) is raising the borrowing limit for its microloan program from $35,000 to $50,000; simplifying the lending process; updating required "farming experience" to include other valuable experiences; and expanding eligible business entities to reflect changes in the way family farms are owned and operated. These changes become effective Nov. 7, 2014. Comment period on FSA loans closes Dec. 8, 2014, at bit.ly/FSAloans.

SFA Conference

The 2015 SFA Annual Conference takes place Feb. 14, 2015 at the College of Saint Benedict in St. Joseph, Minn. The conference provides a forum for farmer-led networking discussions and exhibits by vendors with products or services related to sustainable farming. Pre-registration ends Jan. 30. See www.sfa-mn.org/conference.

Grant Advising

Farmers can get free help with grant applications from Deirdre Birmingham, who is an organic farmer and the Grants Advisor at Michael Fields Agricultural Institute. Contact her at deirdreb4@gmail.com or 608-219-4279 for help or to join her email list for funding updates. Find grant information at www.michaelfields.org/grant-advising-resources and on the MOSES website on the Funds for Farmers page under "Farm Finances" in the Farming tab.

News Briefs

Biodegradable Mulch

Biodegradable biobased mulch film has been added to the National List of Allowed and Prohibited Substances effective Oct. 30, 2014. The nine-page final rule includes restrictive annotations based on recommendations from the National Organic Standards Board (NOSB). To qualify for organic production, the film must be produced without organisms or feedstock derived from excluded methods. The rule defines allowed biodegradable biobased mulch films based on criteria and third-party standards for compostability, biodegradability, and biobased content.

Fish Farming

The Center for Food Safety (CFS) has released a report showing how allowing organic ocean-based fish farming would weaken the USDA organic label. Inputs and outputs to the system, like a fish's exposure to synthetic chemicals, can't be controlled or monitored. Escaped farmed fish can carry diseases which restructure food webs. Escaped fish could also be seen as invasive species, which could lead to the extinction of wild fish competing for the same resources. "Like Water and Oil: Ocean-Based Fish Farming and Organic Don't Mix" is at www.centerforfoodsafety.org/reports/3552/like-water-and-oil-ocean-based-fish-farming-and-organic-dont-mix.

Organic Farming Videos

The Organic Farmer's Agency for Relationship Marketing (OFARM) with support from the Ceres Trust has created a video series explaining why organic farming is best for the environment, communities, and people. The videos are being released weekly through the first week of December. See them at organictherealnatural.com.

Award for Kirchenmann

Fred Kirchenmann recently received the One World Award for Lifetime Achievement from the International Federation of Organic Agriculture Movements (IFOAM). Kirchenmann is an organic farmer from North Dakota, president of Stone Barns Center for Food and Agriculture in New York, and a Distinguished Fellow at the Leopold Center for Sustainable Agriculture at Iowa State University. He created the Northern Plains Sustainable Agriculture Society and Farm Verified Organic Inc., an international certification agency. He also has worked with the multi-state task force Agriculture of the Middle, and served as chair of the Whiterock Conservancy. The One World Award is presented every two years. See one-world-award.com.

FSMA Revisions

The Food and Drug Administration (FDA) is taking comments through Dec. 15, 2014 on its revised food safety proposed rules for the Food Safety Modernization Act (FSMA). The revisions cover issues such as water quality standards and testing, and using raw manure and compost. They also include provisions for diverse and value-added operations. MOSES is working with the National Sustainable Agriculture Coalition (NSAC) to ensure the revisions allow farmers to use sustainable farming practices and don't subject them to excessive or inappropriate regulation. Details about the proposals and action steps are on NSAC's FSMA Action Center: sustainableagriculture.net/fsma.

FairRent

The Center for Farm Financial Management at University of Minnesota Extension now offers a free web-based version of FairRent, a program farmers and landowners can use to evaluate cash, share, and flexible rental arrangements.

National Organic Grain and Feedstuffs - Bi-Weekly

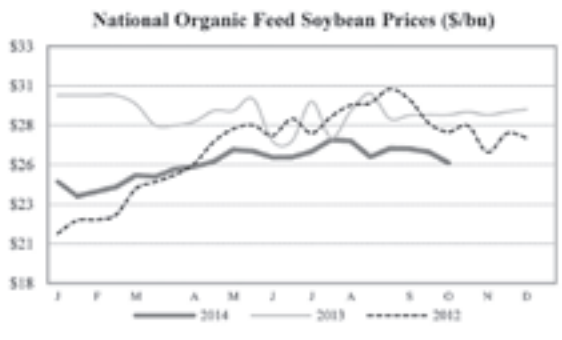
Des Moines, Iowa — Wed, Oct 15, 2014 — USDA Livestock, Poultry & Grain Market News

Bi-Weekly Weighted Average Report for the Week Period: 10/03/2014 to 10/11/2014

Prices are generally steady for all reported commodities with new crop organic corn prices trading towards the low side of the range. Market activity is slow to moderate for old and new crop organic corn and soybeans. Market activity on organic wheat and organic smaller grains such as barley and oats is moderate to active. Demand for organic corn and soybeans is light to moderate, organic wheat is moderate to good and especially good food grade quality, and on other reported organic grains light to moderate. Industry remains focused on the harvest at hand and resulting yields, as well as storage, transportation, and new crop prices. Other concerns involve the recent wet weather throughout the country delaying harvest efforts, moisture levels and drying costs, and mixed wheat yields due to weather challenges and associated plant diseases.

Prices negotiated spot market, FOB the farm and reported with a weighted average. Prices quoted $/bushel, except soybean meal ($/ton and FOB the mill). Hay reported FOB the stack or barn unless otherwise noted. Soybean oil, sunflowers, spelt, cents/lb.

		Price			This Week	2 Weeks Ago	Year Ago
Organic Corn	Food Yellow	12.75	-	13.00	12.86		11.00
	Feed Yellow	9.60	-	13.25	10.99	11.71	10.04
Organic Soybeans	Food Grade	29.00	-	29.00	29.00	29.01	28.65
	Feed Grade	22.56	-	27.00	25.62	26.30	24.47
	Meal	1150.00	-	1150.00	1150.00	1147.14	1091.67
	Roasted					970.00	
	Oil	0.38	-	0.40	0.39		
Organic Oats	Feed Grade	5.00	-	6.00	5.48	5.28	
Organic Barley	Feed Grade	9.50	-	10.00	9.90	8.00	
Organic Wheat	Food Grade HRS	19.00	-	19.00	19.00	19.93	17.75
	Feed Grade HRS	11.00	-	11.50	11.25		10.00
	Food Grade SRW					23.50	
	Feed Grade SRW						
	Food Grade HRW	18.00	-	22.00	19.63	19.86	
	Feed Grade HRW	11.00	-	13.50	12.70	11.38	



Contracts/Other Items:

Alfalfa	Premium	265.00	OR
Alfalfa	Premium	315.00	CA
Alfalfa	Fair	288.00-295.00	CA
Triticale	Premium	170.00	OR
Milo	Feed	9.25	TX

Published every two weeks by the USDA Agricultural Marketing Service. To receive reports by email, contact Jason.Karwal@ams.usda.gov.

Organic Commodity Pricing Resources

Organic Milk Prices

NODPA
30 Keets Rd, Deerfield, MA 01342
www.nodpa.com/payprice.shtml
413-772-0444

Organic Livestock Prices

CROPP Cooperative Organic Trader
farmers.coop/feed-program/organic-trader
1-888-809-9297

Find Buyers and Sellers of Organic Products

MOSES Organic Resource Directory

Most up-to-date listings:
mosesorganic.org/publications/organic-resource-directory

Request print copy at 715-778-5775.

Classified Advertising

EQUIPMENT

Locust fence posts for organic agriculture (4-6" dia/8-22' long) $1.30/foot we cut; $0.80/foot you cut. Available now/next spring. Fountain City, WI. Info: Ted 608-687-7003 or ewilson@winona.edu.

4-row Holland transplanter. Purchased 4/1997. Used lightly several years. Frame excellent shape. Seats need covered. Needs adjustments and minor repairs. Located near, Wy. $1,500. 307-758-4488.

Farm Equipment For Sale: 2-30ft Kovar harrows $5k; 66ft harrow sections $100; 24ft JD 400 rotary hoe $1,500; JD 6-30 front mount cultivator $700; 24ft spike tooth harrow with cart $700; JD 722 24ft soil finisher $5,500; 10 inch axle hubs fit IH $100; JD 730 D $6,500. Call 641-220-3279.

13-foot Falc Rotovator. Like New. $25,000. 260-413-3813.

LIVESTOCK

Introducing Dairyman's Helper: Providing natural essential oil based herd health products for cows and horses. Reduce antibiotic use naturally without sacrificing quality or production. Call today: 262-949-7512. Online store: www.dairymanshelper.com.

FORAGES

Got organic hay? **1st crop 4 x 5 round net wrapped for sale**, MOSA certified, stored inside, 400 + bales. Call Debbie or Larry for prices. Medford, WI 715-748-6863.

2014 Certified Organic Alfalfa and Alfalfa/Grass mix. 4 Lots that saw no rain throughout curing are each nutritionally analyzed and sold by the RFQ point per ton. Approx 450 Tons 1st crop in 4X5 net and twine wrapped rounds. Approx 250 Tons 2nd and 3rd crops (all 4X5 net-wrapped rounds) available end of August. Medow Farms Organic LLC. 715-473-2154 medow@medowfarmsorganic.com.

Organic Alfalfa and Alfalfa/grass 3x3x8 square bales. Test results available. Good quality and fairly priced. Delivery available. Located in Linton ND. Dave Silbernagel Organic Farms 208-867-9939.

Certified Organic Hay (Alfalfa) First Cutting Rounds, RFV=108, Protein=19.5%, 60 Available, $100/ton; First Cutting Round (Balage), RFV=129, Protein=21%, 115 Available, $100/ton; Second Cutting Lg. Square, RFV=140, Protein=17.7%, 158 Available, $225/ton; Second Cutting Lg. Square, RFV=115, Protein=22%, 117 Available, $225/ton; Complete Test Available, Bloomfield, IA, Doug, 641-208-0273.

For sale: **2014 organic oat or wheat straw** available. 4 x 5 round bales. $48/bale. Transportation available. Kent Wolf 608-553-1136.

250+ Organic Certified and tested, net wrapped, 4'x5', alfalfa/timothy grass, 1,400lb, round bales, 1st crop 2013. Dry baled with no rain. Asking $50/bale. Call Stacy 608-487-4855 or Tim 608-790-3373. Elroy, WI area.

Forages For Sale: **Organic oats straw and wheat straw**, 3X3X8 large square bales, 90 oats, 290 wheat, average wt. 600 lbs. North Central South Dakota, 605-460-1545.

Organic dry heifer hay for sale. There was no rain on these medium square bales. One lot of 1100 bales at 115 RFV, another lot of 302 bales at 136 RFV. Moorhead, MN, Lee Thomas, 218-790-0236.

For Sale: **Organic Hay**, MOSA. 160 1st crop trefoil-grass baleage $65 each; 110 2nd crop clover-grass baleage $65 each; 120 1st crop net wrapped heat damage bedding $45 each; 50 1st crop grass horse, dry cow hay net wrapped $50 each. David Ames, W6732 County Road M, Ogema, WI 54459, 715-922-0031 or 715-767-5388.

For sale: **OCIA certified organic wrapped alfalfa hay**, first, second and third crops. Big squares and five foot rounds. 150 round bales of oatlage with red clover. Tests will be available. Dennis, West Central Minnesota, 320-491-0788

GRAINS

Non-GMO oats, wheat, barley, rye feed mix (untreated/cleaned) suitable for all livestock, $125/ton semi loads available. 507-373-3161 or 800-352-5247.

Certified organic, VNS winter rye. Cleaned and bagged in 2200# (39 bu.) Super sack @ $750.00 OR 56# bushel paper bags (40 on a pallet). $21.00/bushel or full pallet for $800.00 ($20.00/bu.). Paul, 608-574-2307.

Organic winter wheat and winter barley mix $9.50 bu. Large square bales organic 3rd crop hay. Benton, Wis. 608-732-3807.

OPPORTUNITIES

Looking for a seasoned couple to manage our farms, located in WIllow Springs, MO. Requirements - Must Have/Be: Cattle/Sheep Experience; Honest & Trustworthy; Hay Rolling Experience; Good communication skills; Experience with Heavy Machinery; Able to Operate Tractors/Attachments; Some Mechanic Skills/Able to Troubleshoot; Able to Report back to Corporate Office on Daily Basis; Willing to Grow with Company; Good Work Ethic; Work independent/solo; Pass drug screening/background check; Take direction from Corporate Office; Reliable Transportation; Reliable means of Communication (Smart phone, computer, etc). Preferred: CDL Driver License; Good Mechanic Skills. Compensation: Home to live in (utilities manager responsibility); Salary ($ TBD on experience). WE WILL NOT LOOK AT INQUIRES THAT DO NOT INCLUDE ... 3 Professional References; Resume; Fit all above REQUIREMENTS. Please contact Travis 707-499-0995 PST, or organic-cattleexchange@gmail.com.

We are looking for **harvest & pack shed team members** to help us finish out the year; potentially leading to a harvest or pack shed coordinator position in 2015. Contact Mike at: mike.lind@driftlessorganics.com or visit: www.driftlessorganics.com.

The Cage Free Company. We are looking for a few producers that are detail oriented and have an interest in producing Free Range Eggs. We offer an income opportunity of up to 130,000.00 per flock. Call or email John Brunnquell, 414-704-1344 or jbrunnquell@egginnovations.com.

Looking for **Organic farmer to farm 80 acres** in Webster County, IA. Farm not certified Organic. Transitioning to Organic. Landowner open to new ideas. Email Karin at scottyboydoggie@gmail.com.

FARMS/LAND

For Sale: 54.5 acres, 40 tillable, no pesticides or herbicides, 3 bedroom house, good barn, swimming pool, adjoins former Boy Scout camp, near Buchanan, MI. E. Crane, 312-641-6777.

320 acre farmstead in the Penokee Mountains in the Chequamegon National Forest. Near semi-wilderness area and numerous no-cottage lakes. Wildlife of all sorts. No close neighbors, absolute peace and quiet. Fields, woods, river frontage, organic gardens. Electricity, easy year-around access. Twenty miles from Lake Superior and college town. Once in a lifetime opportunity. James 715-274-5502.

80+ acres mixed fields and trees, no chemicals or synthetic fertilizers, located in Central Wisconsin. Home is 5 bedroom, 3 bath. Also included is barn, grainery, chicken coop, and wood shed. Call for more details: 715-340-7323.

For Sale: 30 acres in Decorah, Iowa area - 20 organic tillable and remaining woods and outbuildings, including small pole barn, 2 insulated buildings (one heated), and large root cellar with rainwater storage system. Reliable off-grid solar power system. Surrounded by state land and CRP. Pristine area, great opportunity for organic CSA homestead and other possibilities. Call 763-301-1243.

Farm for sale: 173 acres of prime continuous land to be auctioned Dec 11 to settle the Grabill estate. Located at 12536 Mason, Grant, MI. Excellent location. Has been a dairy farm in one family for 71 years. Offered in parcels or entirety. House and barns. Sale managed by Miedema Auctioneering, www.1800LastBid.com.

MISCELLANEOUS

For Sale: **ORGANIC FISH FERTILIZER 15-1-1**, 100% dry water soluble, 5-7 times more nutritious than liquid fish. Will not clog drip irrigation. 1 lb or 55 lb packaging, can be shipped UPS. Frommelt Ag Service, Greeley, IA, 563-920-3674.

WINTER GROWERS MARKET Never Ending Harvest® has created Simply Spinach to help you grow and market spinach successfully during the cold seasons. This DVD will take you from seed and ground preparation to market and delivery of your spinach. 1hr 45mins, 1-402-819-8304, www.neverendingharvest.com: videos@neverendingharvest.com.

Never Ending Harvest® WATCH, LEARN! Step by step winter greenhouse produce growing techniques. GROW SUCCESSFULLY! Cold hardy crops in the Fall, Winter and Spring. SELL PROFITABLY! Niche Markets for Top Dollar, 1-402-819-8304, www.neverendingharvest.com: videos@neverendingharvest.com.

Livestock Guardian Puppies, Maremma cross, raised with goats, sheep, chickens, parent dogs working on-site, $250, Prairie du Sac, WI, wonderacres@yahoo.com, 608-477-1981.

Agricultural Grade **COMPOST FOR SALE** - $90 / ton 2.5-6-3 analysis, plus micronutrients and organic matter Minimum purchase: 20 tons Sustane Natural Fertilizer, Inc. (Kenyon, MN) Call Kyle Lilly: 507-263-3003, Email: kylel@sustane.com ***OMRI certified granular, organic fertilizers also available.

Bovine Basics- composted cow manure Anaerobically digested cow manure and fully composted cow manure available in bulk, totes and bags. For more information contact Ed Rudberg at 952-212-6576 or ed@bovinebasics.com and see our website at http://www.bovinebasics.com.

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This form good through 12-2014.

Calendar of Events

Webinar: Starting a Small-Scale Commercial Poultry Operation
Nov. 6 | 6 p.m. Central
Hosted by eXtension, Andy Larson, University of Illinois extension educator in local food systems and small farms, will be discussing the things you should consider. bit.ly/1wdUBWv

Growing Power National-International Urban and Small Farm Conference
Nov. 6-9 | Potawatomi Bingo Casino | Milwaukee, Wis.
Get ready for an intensive conference that covers urban farming from top to bottom: aquaculture, composting and vermicomposting, planning strategies, education, youth programming, fund raising, food policy, food justice and much more! growingpower.org

Fall Harvest Gathering for Women
Nov. 7-9 | Cedar Valley Resort | Whalan, Minn.
Get to know other women who care passionately about farming and the earth. Some attendees farm and some want to farm, but all enjoy sharing and learning from each other at the annual Fall Harvest Gathering. All women are welcome. Cost: $135. Fee includes lodging and some meals. bit.ly/1wNrB5V

Webinar: Using Trap Crops to Control the Cruciferous Flea Beetle
Nov. 11 | 1 p.m. Central | Free
Join eOrganic for a webinar led by entomologist Joyce Parker. This webinar will explore the use of diverse trap crops, stands of plants grown to attract pest insects away from your target crop, as an approach to manage flea beetles in broccoli. The audiences targeted are small farms, home gardeners and anyone interested in learning more about trap cropping. bit.ly/1od56bJ

Agricultural Grants Workshop
Nov. 12 | Shawano, Wis.
UW-Extension along with partners are hosting this event to help farmers and other value-added food entrepreneurs learn about potential grants, get the basics on putting together a strong grant proposal, learn about cost share programs and other financing options. bit.ly/1sNlFe2

Cover Crops in a Corn/Soybean Rotation Field Day
Nov. 13 | 10 a.m.-3:15 p.m. | Free | Okabena, Minn.
UM-Extension along with partners bring you this field day to learn more about various cover crop seeding methods, timings, and mixes. Presented by local farmers, NCR-SARE, NRCS and more. bit.ly/1sW6OhW

Biodynamic Conference: Farming for Health
Nov. 13-16 | Hyatt Regency | Louisville, Ky.
The biennial Biodynamic Conference, hosted by the Biodynamic Association, is the foremost opportunity in North America to learn about biodynamics, along with innovations from organic, permaculture, and ecological agriculture. Events include over 60 workshops, on-farm field days, pre-conference workshops and more. biodynamics.com/conference2014

Bookmark the MOSES Community Calendar
mosesorganic.org
(Click on Events)

Aquaponics Master Class
Nov. 13-15 | 8:00 a.m. | Montello, Wis.
3-day Aquaponics Master Class is intended for anyone seriously considering getting into aquaponic food production, or those already doing aquaponics who want to learn more abou the technology. bit.ly/1CrZPhr

Women in Sustainable Agriculture Annual Conference
Nov. 14-15 | Fairfield, Iowa
Organized by the Women Food & Ag Network (WFAN), this conference will include field tours, on-site intensives, a screening of the female farmer veteran documentary film *Terra Firma* and much more. The MOSES Rural Women's Project Coordinator, Lisa Kivirist, will be presenting a plate to politics women's leadership training. wfan.org

Farmer Veteran Stakeholders Conference
Nov. 14-15 | Des Moines, Iowa
The Farmer Veteran Coalition and the Drake University Agricultural Law Center are convening the first national forum on programs and services for veterans pursuing careers related to food and agriculture. All stakeholders from the agricultural and veteran communities are invited: non-profits, businesses, philanthropists, government agencies, trade associations, and educators. bit.ly/1wNtOOL

Milling Small Grains and Aquaponics Production
Nov. 15 | 1-4 p.m. | Panora, Iowa
Hosted by Practical Farmers of Iowa, father-son team Earl and Jeff Hafner will show attendees their certified organic stone mill where they mill rye, buckwheat, wheat and corn. They will also lead a tour of their aquaponics production area. bit.ly/11wOOQG

14th Annual Iowa Organic Conference
Nov. 16-17 | Memorial Union | Iowa City, Iowa
The 2014 conference will feature the organic tradeshow and organic luncheon as well as new speakers including keynote speaker Mary Berry, Executive Director of the Wendell Berry Center. Network with agribusiness professionals, other organizations, and producers. bit.ly/IAConf

Webinar: Dehulling Ancient Grains
Nov. 18 | 1 p.m. Central | Free
Join eOrganic for a webinar on dehulling ancient grains, presented by members of the NIFA OREI project Value-added Grains for Local and Regional Food Systems. bit.ly/1sY7iVB

Webinar: Nutrient Budgeting
Dec. 2 | 4 p.m. | Free
Oregon Tilth and the USDA Natural Resources Conservation Service present this webinar about nutrient budgeting and organic considerations for implementing conservation practice standard 590. conservationwebinars.net

Webinar: IPM in Crucifer Crops: Focus on the Yellowmargined Leaf Beetle
Dec. 2 | 1 p.m. Central | Free
Join eOrganic for a webinar on the organic management of the yellowmargined leaf beetle. The presenters will discuss the identification and crop damage of the yellowmargined leaf beetle, as well as trap cropping, attractants, and biological control. bit.ly/11wRrlk

National Young Farmers Conference
Dec. 3-5 | Pocantico Hills, N.Y.
Stone Barns Center for Food and Agriculture hosts the 7th annual National Young Farmers Conference with speakers and workshops that address soil science, technical skills, agricultural policy, farm business management, conservation and more. bit.ly/NYFConf

2014 Acres U.S.A. Conference and Trade Show
Dec. 4-6 | Columbus, Ohio
The annual Acres U.S.A. Conference is where you find farmers and consultants from every side of eco-farming who come together to share their experience and expertise. Attend the non-stop event, learn the latest in cutting-edge technology and methods, and return home ready to make your farming operation the best it can be. acresusa.com/events

Webinar: The Beginning Farmer's Introduction
Dec. 8 | 1 p.m. Central | Free
Hosted by Farm Commons, beginning farmers will get a preview of the many legal issues they should consider when just starting out with farming. farmcommons.org/webinars

Webinar: Put Your CSA On Strong Legal Footing
Dec. 9 | 1 p.m. Central | Free
Hosted by Farm Commons, learn what you can do to protect your farm. CSA is an incredibly unique relationship between farmer and customer. But, this means it also has unique legal dynamics. CSA farmers who critically analyze their membership agreement, drop sites, and farm event programs beforehand set themselves up for success. farmcommons.org/webinars

Webinar: Hosting Safe, Legally Secure Farm Events
Jan. 5 | 1 p.m. Central | Free
Hosted by Farm Commons, learn how to make sure your farm isn't left with the short end of the stick after a good-intentioned event goes bad. From zoning compliance to guest injuries and serving prepared food, we'll work through a checklist of things a farm should address before hosting an event. farmcommons.org/webinars

Webinar: Adding Value Without Adding Legal Liability to Farm Products
Jan. 6 | 1 p.m. Central | Free
Hosted by Farm Commons. Although starting a processing operation, improving packaging, and developing new products are great ways to make the farm more profitable, these activities have a huge legal impact. Employment laws, liability potential, state/federal regulations, and tax factors all change when a farm begins to process product. farmcommons.org/webinars