

Organic Matters

Quarterly Newsletter | Spring 2022

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Organically Speaking

"It's the right thing to do." The more I talk to our clients, the more I hear that phrase about organic farming. It is clear to me how passionate and heartfelt you all feel about the work you do, and in many cases right now, how there is intention to pass on something we believe in to the next generation. By passing down an organic family farm to your children or just taking plain good care of the environment, the economic sense of organic farming meets the core principles of taking care of the earth and each other.

Nature has limits, and as part of it, so do we. Whether you're up at dawn and working 12 hours a day outside or in a different part of organic work that involves feeling isolated and mentally fatigued from too many hours at your computer, we hope you will take the time to properly take care of yourself as we kick off the many activities of this very busy season. That is also the right thing to do! As with every spring's inventory and renewal of life inside and outside, we forecast, adjust, and hopefully reach out when we need support and more information. If you aren't already part of their networks, I urge you to connect to our partners at Pasa Sustainable Agriculture and Rodale Institute to participate in their programming (listed in our monthly e-news) and get the technical support and comradery you need from experts, peers, and mentors.

If your need for support goes deeper, please remember – mental health is part of overall health, and the PA Dept. of Agriculture's partnership with AgriSafe Network connects farmers and their families to mental health resources and healthcare professionals 24 hours a day, seven days a week at 833-897-AGRI (2474). Outside Pennsylvania, you can find a list of resources at nationalaglawcenter.org/wp-content/uploads/assets/hotlines/US.pdf.

We continue to work hard to bring you the services you need and to make getting them easier, including the following that are top of mind this quarter:

- Creating a new Client Services Team and continuing to evolve our software/support capabilities
- Applying to offer Regenerative Organic Certified™ (ROC) as an add-on certification
- Being a part of multiple proposals for USDA's Climate Smart Grants
- Participating with a consortium of certifiers and universities in the Northeast US through an NOP grant

funded program to develop the next generation of inspectors and specialists

- Continuing to steward the OPT grass-fed standard
- Continuing to refine our business model at PCO to be more effective and sustainable

Our mission, vision, and strategic plan, are undergoing revisions, and we are developing our purpose statement for the Diversity Equity and Inclusion (DEI) work we are doing. If you receive surveys related to these processes, please offer your honest feedback. Organic food is healthier for all of us, and moving forward we'll be looking at ways to create a more equitable and diverse system inside and outside of PCO to make sure there is access for all, including our most vulnerable urban and rural populations. With the weather variations we are experiencing due to climate change, food security will continue to be an issue of great focus in the country and the world. We know we already produce enough food to feed the world, but we must tackle the problems of food waste and distribution/access. For anyone operating in the agriculture space, these are also the right things to do.

Though quite a few of our staff are farmers or were farmers, I was not built of that tough of stuff; I do have the utmost respect for and believe whole-heartedly in the work you all do every day, as does our staff, and that informs our high standard of working hard for you and the greater community served by PCO. We believe it's the right thing to do.

Thank you for all you do to support and buoy us – we love hearing from you!

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VISION

All communities are enriched through organic food and farming

MISSION

To ensure the integrity of organic products and serve our farming community

CORE VALUES

- 1. People & Service** – Keep people at the center of every action, interaction, and decision
- 2. Organic Spirit & Environment** – Promote restorative practices that improve the world for future generations
- 3. Honesty & Integrity** – Embrace transparency and integrity in all our work.

Organic Matters

Spring 2022



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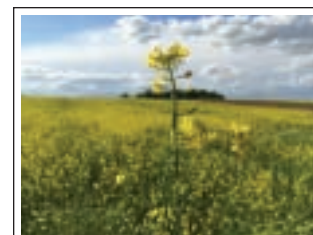
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COVER PHOTO: Mary-Howell Martens, Lakeview Organic Grain, Penn Yan, NY.

Weed Control In Organic Systems

Examining core cultural controls for effective mechanical controls

NICOLAS PODOLL, MIDWEST ORGANIC CONSULTANT
RODALE INSTITUTE

One of the major challenges for any organic grower is weed control. Even the most seasoned organic farmer can find themselves in trouble, especially due to weather and climate challenges. Farmers must remain continually vigilant and observant while diligently working to adapt their systems to stay one step ahead. For newer organic growers or those with land that is newer to organic management, recognize where you are starting from and give yourself time to make incremental progress towards achieving good weed control. Most difficulties with weeds cannot be solved in just one season. The first goal with weed control is to make sure that you are never letting a weed problem get worse and implement the practices necessary to accomplish that.

Weed control starts with cultural control in an organic system. If not working to promote diversity within crop rotation and building long term soil health, farmers will never get ahead of the weeds. The longer and more diverse crop rotations, the better. Crops need to be sequenced properly to break weed, pest, and disease cycles while managing fertility, nutrient availability/cycling, and moisture. Cover crops should be integrated into that sequence and serving several of those functions. The planting dates of the crops in the rotation should vary and include cool season, warm season, and fall/winter annual. Perennial crops such as alfalfa hay and/or incorporating a full cover crop/green manure year with high biomass into the rotation, are necessary to combat perennial weeds. A rotation can begin to be evaluated from a weed control perspective by asking the question, "Does this rotation suppress and reduce the weed seed bank over time or is it a risk to contribute to weed problems?" Areas of weakness in the rotation can then be identified and addressed accordingly.

Buckwheat makes an excellent cover crop in organic vegetable or grain rotations that outcompetes and smothers weeds. It can also be raised to maturity for a profitable certified

organic grain crop that provides a fresh look in the rotation.

It is also important to understand weed biology: physiology and life cycles – annual/biennial/perennial, broadleaves/grasses, winter/spring/summer. Know when they emerge, how rapidly, and for how long they continue to germinate. Know when they begin to flower, produce viable seed, how much seed is produced, and how long that seed can lie dormant in the soil. Take general note of the relative populations of weed species on your farm. Are they balanced or are there particular weed(s) dominating? Also understand how negatively they impact crop nutrition and economic thresholds. Successful strategies to manage weeds cannot begin until all of these factors are understood.

Another major facet of good cultural control is seed quality and purity. Farmers need to plant the cleanest, highest quality seed and choose varieties with good disease resistance that are adapted to specific regions in order to produce vigorous stands that outcompete weeds. Other aspects of planting can also be modified to provide advantages to the crop. Delaying planting so spring flushes of weeds can be tilled in order to plant into a stale seedbed and warm soil temperatures is often prudent. Adjusting plant populations and seeding patterns can be helpful as well.

All these cultural controls combine to form the basis of weed control in organic systems, with crop rotation at the very core, which must be in place if mechanical controls are to be effective. It creates a system that prevents the establishment of specialized populations of weeds. It also does not eliminate weeds entirely. Instead, it promotes a weed population that is composed of a wide diversity of species that are each present in relatively low densities and therefore do not pose a large threat to crops.

After examining cultural controls, it is important to understand options for mechanical controls. However, before discussing tillage implements, nothing replaces the precision of a hoe or your own two hands. If there are weeds that your cultural controls did not prevent and your tillage/cultivation implements did not address, do not delay in putting in the time and

Amount of seed produced per plant by different weed and crop species.

Adapted from Renner, 2000.

WEED SPECIES	SEEDS/PLANT	WEED SPECIES	SEEDS/PLANT
Canadian thistle	680/stem	Waterhemp	23,000
Giant foxtail	900	Common chickweed	25,000
Cocklebur	900	Burdock	31,600
Wild mustard	1,200	Shepardspurse	35,000
Wild buckwheat	1,200	Common purslane	52,000
Common ragweed	3,500	Lambsquarters	72,500
Yellow foxtail	6,500	Redroot pigweed	117,400
Common sunflower	7,200	Horseweed (marestail)	200,000
Velvetleaf	17,800	Common mullein	223,200
Eastern black nightshade	10,000		
Giant ragweed	10,300	CROP SPECIES	SEEDS/PLANT
Hemp dogbane	12,000	Corn	800
Kochia	14,600	Soybean	50
Dandelion	15,000	Winter wheat	110
Smartweed	19,500		

This table shows the number of viable seeds produced by many of the most common weed species compared to common field crops, from Risk Management Guide for Organic Producers, University of Minnesota, 2010

physical labor to remove them. On a smaller scale, such as in many smaller vegetable operations, this may already be part of the regular work and is more practical at such a scale. However, even on larger operations with row crops, hiring a crew to hoe and hand pull weeds is worth the investment. Even if it seems like a hand-weeding operation is cutting heavily into profits this year, the amount of profit it will preserve in future crops is exponentially greater. Weeds that are allowed to mature produce massive amounts of seed that can lie dormant and continue to cause even greater economic injury for years or even decades down the road. It is always worth the time and effort to remove them by hand whenever necessary. This extra work can provide some motivation and an opportunity to take the time to observe and think deeply about how to refine and improve cultural controls.

It is important to have a good understanding of tillage and how tillage implements can be used to achieve good weed control and not contribute to weed problems. Primary tillage operations are those that accomplish the initial incorporation of the preceding crop residue or a green manure cover crop. This is typically done with implements such as a moldboard plow, chisel plow, or heavy disk plow. Primary tillage can achieve weed control to some degree, such as burying weed

seed with a moldboard plow, but not relying too much on primary tillage for weed control is more ideal. Performing primary tillage correctly is key to not creating further weed problems. Some perennial weeds with underground root reserves, such as Canada thistle, can be made even more prolific with tillage passes that break up those root networks and just create more pieces of root from which it can regrow. There is also risk of spreading weeds to other fields if tillage operations are not done in the right order (i.e. weediest fields done last) or equipment is not cleaned off well enough between fields with particular weed problems that shouldn't be spread to others.

Secondary tillage operations usually involve weed control to a greater degree. This includes disking or harrowing, which smooths plowed ground and further incorporates residue, but also kills weed flushes and creates a stale seedbed for planting. Cultivation is also considered secondary tillage, but at a lighter intensity than previous passes. Cultivation passes are the main method of mechanical weed control. This includes blind cultivation with rotary hoes and tine weeders as well as typical cultivation with a row cultivator.

Timing of cultivation and the implement used is critical relative to the crop species, growth stage of the crop, size of the weeds, and soil conditions. For example, in early blind cultivation, a rotary hoe has some limitations in corn and soybeans compared to a tine weeder because the spacing is farther apart, the down pressure is not adjustable, and tine weeders can be run in a wider variety of soil moisture conditions. However, the rotary hoe still has its place because if there is too much residue on the surface, a tine weeder will simply plug up and cannot be used in that situation. With either implement, be careful about the growth stage of the crop. For example, if the hypocotyl of an emerging soybean breaks off, it will die and the crop stand will be damaged, so avoiding blind cultivation at that growth stage is necessary. As always, disturbing weeds at an earlier growth stage, the easier they are to kill. It is important not to let weeds get too large or blind cultivation will no longer be effective. Sometimes this is unavoidable due to unfavorable weather. At that point, standard row cultivation will be the only option left. Adding attachments such as finger weeders to a row cultivator can help some, but in-row weed control will typically suffer if weeds get too large to bury or soil conditions do not allow soil to flow into the row properly.



Tine weeder in action at Rodale Institute.



If you are interested in transitioning to organic production or have questions about developing an effective crop rotation and weed control strategy for your organic operation, contact the Rodale Institute's farm consulting program!

One of our organic consultants will reach out to you to discuss your needs and find a solution that is right for you! Consulting@RodaleInstitute.org; (610) 683-1416

Navigating the Organic Dairy Market for Farmers & Consumers

Developing value added markets to meet consumer demand for local products

BY: RYAN SIWINSKI RODALE INSTITUTE | ORGANIC CONSULTING



The volatility that exists within the organic dairy industry can be a daunting topic to discuss. There has been a roller coaster of emotions that have fueled concern in an industry that is continuously evolving. The

changes in consumer behavior, production efficiencies, and quality assurance have led to production changes in recent years. Various organic dairy brands have been in the news lately about ending contracts with a substantial amount of small dairy farms in the Northeastern United States (Held). This news has sent concern through a network of hard working, organic dairy farmers who are trying to make an honest living.

Although this news has led to hardships throughout the organic dairy industry, the outlook on the future of the organic dairy market may be on the rise. Through reputable organic dairy brands, US dairy consumption increases, implementation of pasture based grazing systems, and a surge in “buying local”; dairy may be able to thrive in the coming years.

REPUTABLE BRANDS SUPPLYING DAIRY CONTRACTS

In recent news, Organic Valley announced that they have sent offers to 90 Northeastern US dairies that have recently lost their contracts. Stonyfield is also actively procuring additional dairy contracts with farmers in the Northeastern region (Gruber). This news has allowed organic dairies to continue the path to success after the recent contract terminations from other brands.

Organic dairy producers typically pursue an organic milk contract with a local or national brand that has a supply chain within the locality. In fact, Organic Valley & Stonyfield reported that organic dairy producers in their portfolio were receiving on average \$31 per cwt compared to the \$18 per cwt that conventional producers were earning (Stonyfield 2020 Impact Report). This opportunity can provide a feasible cost-benefit



Product diversification in the dairy industry

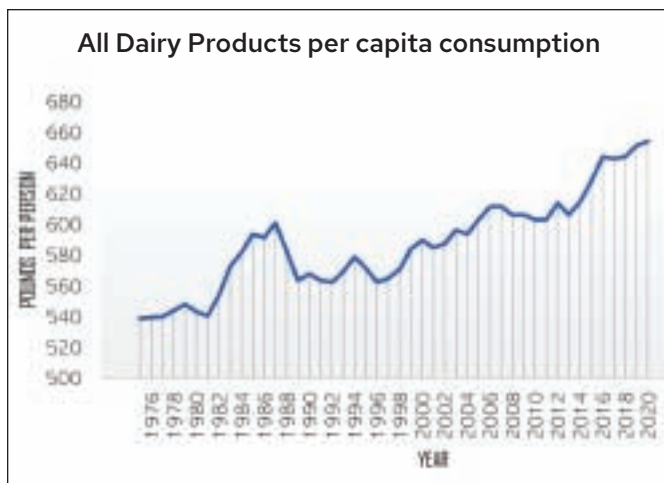
for the dairy farmer to obtain organic certification and have a viable market to earn income.

Additionally, Pennsylvania dairy farmers have begun to transition to becoming Regenerative Organic Certified. This certification is coupling the existing USDA Organic certification with Animal Welfare and Social Fairness certifications to ultimately achieve a higher standard in agriculture. Although the certification requires additional standards to be met, this will be another option for farmers to unlock new markets in hopes for a higher price premium.

US DAIRY CONSUMPTION INCREASES

Despite worries about plant-based alternatives flooding the market, US dairy consumption is on the rise. Overall dairy consumption per capita in the United States is nearing a 10% increase in the last 10 years (USDA Dairy Data). The USDA reports that while fluid milk consumption is down, value added products such as yogurt, cheese, butter, and ice cream are on the rise. This report is reassuring to the dairy industry.

In a study published in NCBI (National Library of Medicine), Young Woo Park mentions the nutritional variation between dairy products and plant-based alternatives (Park). It later dis-



USDA Dairy Data: All Dairy Products per capita consumption since 1976

cusses the differences which include higher bioavailability for protein, healthy fats, lactoferrin, and other vitamins and minerals that are unattainable from plant-based alternatives. Although there is a market for plant-based alternatives, dairy products will continue to be one of the highest nutritionally available options in the grocery store.

To provide additional granularity, Dr. Stephan van Vliet completed a study regarding health-promoting phytonutrients in grass-fed vs. grain fed meat and milk production (van Vliet). This study provides clarity for farmers and consumers to start paying attention to the benefits of grass-fed dairy animal products. For consumers, it is becoming increasingly noticeable to find transparency in food brands. This positively helps a consumer to establish a producer that meets these standards. For conventional farmers this would be a great reason to shift to a pasture-based system and unlock the rising demand for these products.

PASTURE BASED SYSTEMS

In the National Organic Program, farmers that are raising ruminant animals must meet a 30% dry matter intake from pasture. This means that farmers need to implement a grazing strategy to ensure that their herd is consuming at least 30% of its diet directly from pasture during the grazing season. While certified organic does not guarantee that the product is 100% grass-fed, many certified organic producers are raising the bar to achieve that standard. This can be a synergistic win for soil health, animal health, and human health alike.

To successfully achieve a pasture-based system, it is paramount to establish grazing infrastructure for the herd. This may include permanent fencing, temporary fencing for rotations, water access, milking parlor access for dairies, and a sufficient forage plan. Although this can be a large change for a conventional confined operation, it can also lower operating costs and increase quality of life for the animals and the soil. Adaptive grazing can help boost livestock health, lower dependency for imported feed, improve the farmland, and improve the overall quality of the meat and milk products. Additionally, 100% grass-fed milk products typically command a higher premium when compared to traditional grain supplemented livestock.

LOCAL FOOD PURCHASING AND MARKETS

Consumers have increasingly shifted spending behaviors to purchase high quality food from local producers. Local food production will continue to present a positive impact for organic dairy farmers across the country (Acosta). Brands such as Whole Foods Market have established an Emerging Accelerator Program to identify smaller producers and suppliers to gain access to financial support and opportunities on their local Whole Foods Market shelves.

As an Organic Livestock & Dairy Consultant at the Rodale Institute, I work with dairy producers that ultimately want to obtain organic certification. This may include a startup dairy, conventional producer turned grazer, and anything in between. The first thing that we discuss revolves around ensuring that there is a market for their production once they have successfully certified their operation. The questions that arise are as follow: Is there a contract awaiting you once you are certified? Are you planning to sell direct to consumer? Is there a wholesale partnership out there that you can attain? What type of processing capabilities are within your geographical capabilities? What other opportunities are available to you as a producer? If the option for an organic dairy contract, like Organic Valley or Stonyfield, is not available at the present time for an interested dairy farmer – are farmers able to pursue the opportunity to successfully operate a dairy farm? The answer to this question can be yes if the farmer can channel creativity in their overall business plan.

In the evolving organic dairy market, there are farms that are successfully selling products through various distribution channels within their locale. These options may include an ecommerce website, a milk CSA, herdshare, on-farm dispensing tank, or a wide variety of local wholesale partnerships. The creativity behind these opportunities can be endless to begin to build a market within the community, region, and state.

Farms can also differentiate their product line to fight for a competitive edge. This can help a farmer evolve fluid milk production into specialty products like cheese, yogurt, ice cream and other highly sought-after products that typically command an additional premium. This route tends to come with additional responsibilities. A farmer will have to create a brand and

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Guernsey Cattle Grazing Pasture in Chester County, PA

Orchard Soil Health

Managing fertility and disease through forest soil management

Herbalist, orchardist, and author
Michael Phillips



This article was originally featured in the Summer 2015 Organic Matters issue and authored by Lee Rinehart, Sustainable Agriculture Specialist for the National Center for Appropriate Technology's Northeast Regional Office.

It's often said that the most difficult crop to grow, whether you're an organic grower or a conventional orchardist, is tree fruit. Insects and disease often have the right of way and dealing with these issues can be daunting. But just as we foster diverse and complex ecosystems to mitigate these concerns in field and vegetable crops, fruit production is responsive to the same kind of attention, with interesting twists that make fruit production not only successful but interesting and fun!

Tree health, like crop health, begins with the right soil biology, notes Michael Phillips, an orchard specialist and proprietor of the Holistic Orchard Network and Lost Nation Orchard in Groveton, NH. Phillips, author of *Apple Grower: A Guide for the Organic Orchardist*, *The Holistic Orchard: Tree Fruits and Berries the Biological Way*, and *Mycorrhizal Planet: How Fungi and Plants Work Together*, teaches how to tap into the fertility loop of soil organic matter to successfully grow tree fruit through his books, online resources, workshops, consultations and intensives.

FOREST ECOLOGY

Tame orchards, just like wild forests, thrive in a fungal dominated soil ecology. Our job, according to Phillips, is to foster a fungal soil biology in orchards and new plantings, and then, simply, "not screw it up." Mycorrhizal fungi (MF) form the basis of a healthy forest soil environment and can increase a tree's soil volume reach up to 100 times. MF connects trees together, allowing for nutrient sharing among trees. Through this underground highway trees will trade plant sugars with MF for nutrients, establishing a resilient underground economy. Also, these fungi can give signals that disease has struck, alerting the plant

that it's time to kick in phyto-chemical defenses. Thanks to this fungal dominated soil ecology the tree achieves balanced nutrition and protection, and an environment that favors the fungi is established. It's complementary symbiosis in the orchard!

Mycorrhizal fungi inhabit much of the belowground environment; according to Phillips, if we see mushrooms we're just seeing the tip of the iceberg. Complementary biological activity is rampant and largely unseen. Some of the most important reactions occur solely underground, such as the pulsing of tree root systems twice a year, encouraging MF to colonize the roots, or pulsing glomalin (a carbon coating on the MF that binds aggregates to give soil its structure).

With this knowledge, managing soils for orchards and tree fruit plots becomes the task of managing for a thriving fungal environment. Forest soils, or "ent" soils, are wild soil where trees have historically grown or where trees are dominant. When establishing fruit trees in a new or disturbed area, pay careful attention to creating an "ent" soil rely on an inoculum. Inoculating the soil with fungal spores helps to colonize new root systems and establish a beneficial symbiotic and sustainable system.

OPTIONS FOR MANAGING FRUIT TREE FERTILITY

So, how do we do this? Phillips uses and suggests several different ways to build "ent" soils. One method is the use of biochar¹, or carbonized wood, that can be a long term fertility bank for mycorrhizal growth. Another method is using Hugelkultur, an Austrian practice, which involves making raised beds and filling them with decomposing wood. Hugelkultur is usually accomplished by burying or mounding woody debris and cov-

To be approved in organic production, biochar must be derived from untreated plant material and activated by physical methods (e.g. steam activation). Chemical activation is prohibited

ering with rotting hay and topsoil in swales or ridges, making a long term bank for MF. This woods-based fertility is the analog to garden composting.

Making orchard or forest compost is pretty simple and yields multiple benefits, as it really works to create the fungal soil biology that trees thrive in. Since forest soils have a soil ecology that favors fungi, Phillips suggests treating an orchard and the orchard compost pile as you would the edge of the forest. Here, branches and leaves drop, raspberry canes fall over, and fertility is generated on its own. The soil food web is completed through humification, where soils take organic matter and carry it all the way to humus, generating long term fertility.

RAMIAL PILES AS A COMPOST DEVELOPER

Utilizing ramial wood chips is an excellent way to develop compost for orchards and tree fruit plots. Ramial Chipped Wood is a wood product used in cultivation for mulching, fertilizing, and soil enrichment.

The raw material consists of the twigs and branches of trees and woody shrubs, preferably deciduous, including small limbs, less than 2" in diameter. It is processed into small pieces by chipping, and the resulting product has a relatively high ratio of cambium to cellulose compared to other chipped wood products. In small diameter wood there is more cambium in proportion to heartwood, with a carbon to nitrogen ratio of 30-1 to 50-1, whereas bigger and older wood material has around 700-1 C-N. Because nutrients are stored in the green inner bark (cambium), ramial wood chips are higher in nutrients and make an effective promoter of the growth of soil fungi and of soil-building in general. Incorporating ramial wood chips can be an effective way to develop an airy and spongy soil that holds an ideal amount of water and resists evaporation and compaction, while containing a long-term source of fertility.

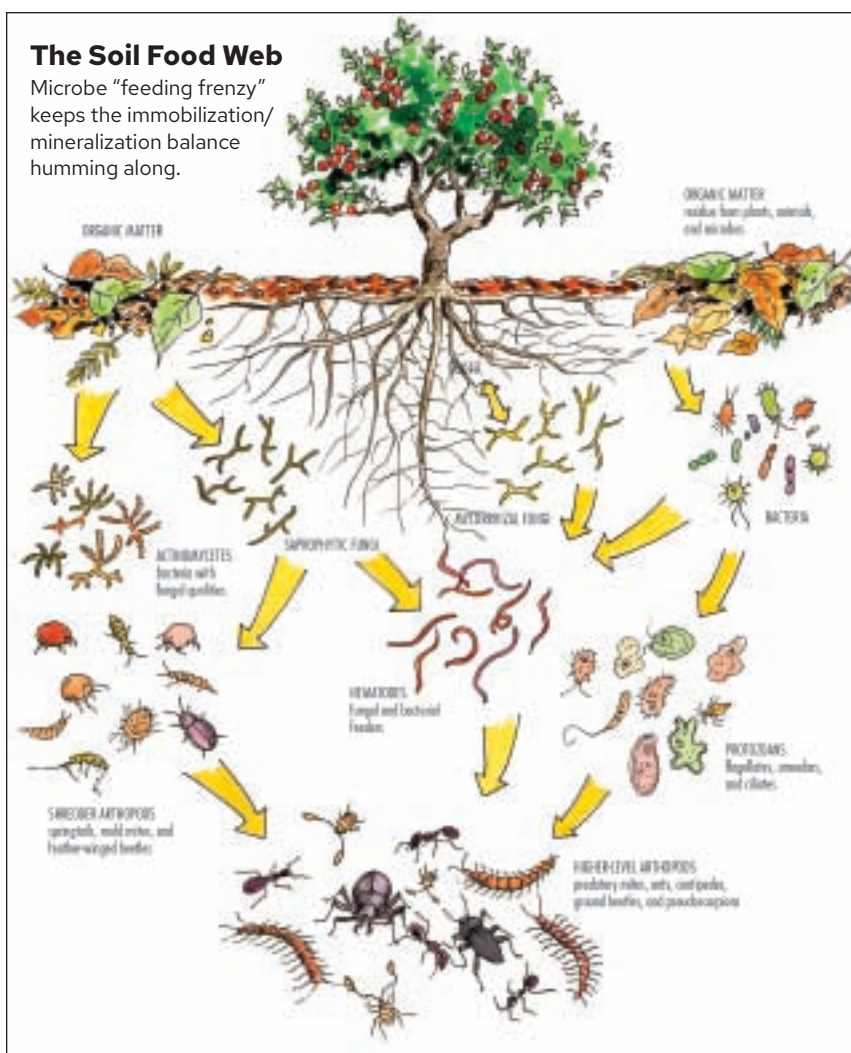
The choice of wood material for making ramial wood chips is pretty important, because different organisms break down different types of wood. The brown rot organisms that break down soft wood (i.e. conifers) produce an allelopathy that keeps hardwoods from growing, so softwoods are favored when ramial wood chips are produced from softwoods. Hardwood materials are broken down by white rots, which take soluble lignins in fresh wood and produce acids that lead to humification. This is why it's important to build ramial wood chip piles from materials similar to the orchard trees. When orchard prunings become ramial wood chips, they don't have to go through a chipper. Instead, you get the small diameter material on soil surface where the white rots can get to it and begin their work. Phillips notes it's important to break them up and get them onto the soil

surface because black rot fungus gets in to wood that is exposed to the air, then sporulates in the spring. In turn, this fungus gets on spring apple leaves and causes a leaf rot.

Building ramial pockets is a rather haphazard mulching, and you can think of it as fungal duff management. Just take random old bales of hay (but don't break them apart), and place them over the small wood material in contact with the soil. Nature will do its thing and break the material down, and as an added bonus you are making a habitat for many beneficial field creatures and organisms. These ramial piles become homes for field mice, and when the nest becomes abandoned you may hear the deep rumble of bumblebee nests, whose favorite home is an abandoned field mouse nest. Then, you can break the hay in the next winter when bees are gone.

Ramial piles can be placed in ridges and rows right in the orchard; in fact this is where they will do the most good. Medicinal herbs, raspberry leaves, and canes from clearcuts can be placed under the trees, where they can be mowed to get them in small pieces and covered with hay or wood chips. Woody material that is treated in this manner becomes beneficial and ceases to be a disease factor anymore. For instance, as fire blight overwinters as a canker in the wood of a branch, and is

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The Holistic Orchard by Michael Phillips, Chelsea Green Publishing. Illustration by Elayne Sears.

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Soil Orchard Health

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pruned in the winter, it can become a disease vector. However, if buried we change the dynamic of disease dissemination and reduce the spread of the blight.

MANAGING FUNGAL DUFFS IN ORCHARDS

Much like we do with garden rows, we can use mulching to control vegetation in orchards by using wood chips and medicinal plants. For rougher ground consider using mulch rings of hay or, ideally, ramial wood chips. This will keep the ground open for 4-6 years while the tree grows its branch structure after which not as much attention is needed. If quackgrass infiltrates the rings you have a battle, though Phillips advises that a heavy mulching of hay encourages the quackgrass rhizomes to occupy that space, instead of your rings. Quackgrass growing in your mulched hay is much easier to remove, due to its lessened soil bond.

As the orchard or fruit plot trees grow they will start to shade the ground underneath. This is an opportune time to introduce plant allies like comfrey. The tree is manageable and on "cruise control," so there is more time and room for management of different plants. Year 4-5 is a good time to plant comfrey about 6-8 feet out from the trunk, so as to not overcrowd the tree. Interspersing comfrey with your fruit trees not only fosters orchard diversity (while creating a visually appealing orchard), but also serves a purpose, as flowering plants draw insects and reduces mowing of grasses that causes a shift in succession to less diversity.

Comfrey roots can penetrate 6-10 feet in the soil, so once you plant them they are there forever and form a living mulch. This insect haven draws bumblebees and beneficial insects that overwinter in plant stubble. In addition, the deep tap-rooted plants like comfrey, chicory, and dandelions are dynamic accumulators of minerals and potassium. Woody shrub Nitrogen-fixers and legumes, those plants especially important for young fruit trees, include Siberian pea shrub, buffalo berry, and alder. These shrubs create a polyculture and add dynamic orchard diversity. They can be managed by chopping and dropping them to the soil, and once their root systems are established they will come back and make ramial wood chips in succeeding years. Additionally, red and crimson clover can be spread among this dynamic polyculture. They serve as great bumblebee fodder and can even initiate a turn toward fungal dominance in the orchard. Adult beneficial insects need a source of food, so be sure to encourage the growth of small flower plants such as Queen Anne's lace, rhubarb, buckwheat, yarrow, and sweet cicely. In fact, these are choice cover crops that create a conducive soil environment prior to planting new fruit trees.

Incorporating diversity in an orchard can be done in many ways, and planting flowers that bloom throughout the season is always a wise choice. Woodsy herbs like rosemary, thyme, lavender, etc, when planted in clumps among the ramial piles in the orchard, become mycorrhizal accumulators, further steering the orchard toward a more sustainable polyculture. "You won't

grow wrong steering your orchard ecosystem towards the forest edge," notes Phillips. You can think of it as "understory agriculture," where fungal ascendancy dominates, beneficial plants apportion Nitrogen in the right form, and disease resistance from secondary plant metabolites keep pathogens in check.

Starting a new orchard, or renovating an unhealthy one, takes time and effort. But keeping in mind the principles of forest ecology and fungal soil dominance will allow the orchard to develop as a natural system. The biological transition for developing healthy forest soils can take 3-9 years to become a fully functioning biology. The result is a resilient system, both above and below ground, which can provide quality fruits and exponential environmental benefits to the farm.

For more information on Phillip's work visit: GrowOrganicApples.com and HerbsAndApples.com.

IN MEMORIAM

PCO learned of the death of Michael Phillips this past February 2022. Michael passed away in his Lost Nation Orchard on Heart-song Farm in northern New Hampshire, where he and his family grow apples, including some varieties aging close to 150 years, and a variety of medicinal herbs. Michael was an orchardist, farmer, builder, talented author of books on holistic growing and herbal healing, and a gifted teacher on organic apples and soil health. Michael was a founding member of the North Country Peace Network, the Lancaster Farmers' Market and the first Community Supported Agriculture (CSA) in New Hampshire. His knowledge of regenerative practices for the farm, garden, orchard, forest, and landscape are irreplaceable contributions.

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From the Board

The New Beginnings of Spring

JOE MILLER, PRESIDENT & MANAGING BOARD CHAIR



For several weeks I have been exploring my lawn and the local woods for those first signs of spring! As the birds migrate back north, the hibernating animals begin to venture back out and plants begin to bud, consumers start anticipating that first fresh local tomato (or other vegetables) again. At

the New Year we often make our resolutions for the year ahead but spring is the time that gives many of us the excitement and energy to press forward in our endeavors. As farmers and gardeners, we know that each season is important for the soil and good crops. However, spring is a time that we can see the new growth and get excited for what tomorrow holds.

These past several months have been busy for the PCO Board and leadership. In February we met in Lancaster, PA for our annual member meeting and quarterly board meeting. We are very grateful to those of you who took the time to join us – whether in-person or via our livestream option. During the annual meeting we heard from various PCO board and staff who presented updates on our current programs and operations. We also welcomed Evelyn Rosas, Certification Manager from the Regenerative Organic Alliance, who gave us an overview of the Regenerative Organic Certification (ROC™). This exciting certification will support any member who wishes to showcase, via a third party, the efforts you put into your operation to improve your soil, animal welfare and social fairness for work. Today, more than ever before, consumers look for products from farmers who showcase their efforts to

leave their farm and the environment a better place for future generations. I want to applaud the PCO staff for their work to make this certification available to our members. I believe it will make a real difference for our future environment as well as support your sales of sustainable, regeneratively grown foods and fibers in the marketplace.

At our annual member meeting, we opened voting for our new Bylaws and Articles of Incorporation. The process of updating these organizational documents has been a multi-year process involving our board, the PCO leadership, and our attorneys. The new Bylaws will enable us to be a much more efficient and resilient organization as we work to support you and our organization for the next 25 years. At the time of this communication, we are still gathering votes from our certified clients. I hope in the end you will have all done your part in advancing PCO by placing your vote. If you have further questions about these documents and our organizational structure prior to our next update, our Executive Director, Diana Kobus, can be contacted at 814-571-3736.

As the PCO board begins a new term, our focus will be on developing our next strategic plan. Included in this work will be a deep dive into our mission and vision statements and how we establish metrics that help us define and evaluate how we fulfill these statements for our clients and the organic industry at large. In order to gain the valuable perspective of an outsider looking in, we have hired an organizational development firm to lead us through this journey. Part of the process will be to get input from organization and industry stakeholders. Keep your eyes open for opportunities to be a contributor to this process. The best outcomes will result with everyone's voice at the table – and that means you! Please make sure to complete any surveys that come your way.

We are continually grateful for your commitment to organic production and PCO as your chosen certification agency.

Joe Miller, joehasit@gmail.com • 717-385-4610

Joe is the Sales & Brand Manager for Kalona SuperNatural



Plans are underway to bring us together throughout the year to celebrate our clients and their contributions to the organic industry.

Keep your eyes open for announcements in our quarterly Organic Matters issues and our monthly electronic E-news.

PCO Core Values in Action

PCO staff engage in creating our Diversity, Equity, Inclusion purpose statement

DIANA UNDERWOOD, DIRECTOR OF OPERATIONS

PCO's core values serve as a guide for how PCO works and makes decisions every day. In short, these values reflect what is most important to us as a company and are the foundation by which we make decisions and set the standard for behavior and performance without compromise. It is this commitment to uphold our core values that guides *how* we do the important work of fulfilling our vision: all communities are enriched through organic food and farming. *How* we do this work is just as important as what we are working towards.

Our core values do not serve just one of our many stakeholder groups, ultimately they recognize the interdependent relationships between ALL our stakeholders: certified clients, supporters and members, PCO staff and contractors, partner organizations, and the community and environment. So it is this entire stakeholder group that must be considered when we apply our values in our day to day business decisions.

The PCO staff and board contributed and adopted the below core values. Of course, this is not just one person's responsibility, it is something we all have to believe and commit to. That is why we created our values as a team and we uphold them as a team.

Keep people at the center of every action, interaction and decision (*Provide Support*).

Promote restorative practices that improve the world for future generations (*Engage Stewardship*).

Embrace transparency and integrity in all our work (*Cultivate Trust*).

There are many examples of how these values are applied within PCO's decision making process, both small and large decisions. Below are some examples to highlight these values in action.

PCO Fee Schedule: PCO recently updated our fee schedule, effective January 1, 2022. In order to embrace transparency (core value 3), we keep our fee schedule as simple as possible, so no client has to guess what their fees will be or try to figure out a complex fee structure. Updating fees is not an easy decision and involves multiple discussions to be sure revisions are necessary, grounded in data, and are aligned with our core values. We take the time to communicate, explain our rationale, and be transparent with the changes.

Professional Conduct Policy: Did you know PCO has a professional conduct policy that applies to all our stakeholders including clients, staff, inspectors, and board. This supports keeping people at the center of every action, interaction, and decision (core value 1). As a client you can be sure that you will experience professional interactions from our team and staff members can be assured that unprofessional conduct will not be tolerated from other team members, clients, or other stakeholders. While not often, PCO has upheld this core value through informing clients or other stakeholders when they have violated the policy.

Annual Update Renewal Process: Part of upholding our core values is owning when we make a mistake – embracing transparency (core value 3). Recently with the 2022 Annual Update renewal process, some clients experienced difficulty with their renewal in the client portal. While these challenges did not affect everyone, PCO did not uphold the level of communication and service that would have prevented some of the challenges or at least kept our clients informed along the way. One way we can make this right is by hearing your feedback, waiving late fees, and committing to more thorough communication in the future.

As PCO grows and changes, attention to our core values is even more essential to guide our decisions. As always, these values are foundational to who PCO is, meaning they do not change even as the organization matures. Learning, growing, and improving are all part of the important work we all do to support a vision where **all communities** are enriched through organic food and farming.

New Faces

Gwen Ayres
Certification Program Assistant Manager

As noted in the Certification Update, Gwen started with PCO in February and serves as a Certification Program Assistant Manager for the new Client Services Team. Gwen started working in organic agriculture in 2002 and has spent her career intertwining organic production and natural resources with education. Prior to PCO, Gwen spent six years working for the Idaho State Dept. of Agriculture, most recently as the Organic Program Manager. She has also spent several years working for the Organic Materials Review Institute (OMRI), several seasons with U.S. federal land management agencies doing conservation work, and a few years leading international study abroad trips. Her great passions are backpacking, cross-country skiing, organic gardening, and international travel where she has been able to work and learn on a variety of organic farms on five separate continents!



Certification Update

Kyla Smith
Certification Director



PCO CREATES CLIENT SERVICES TEAM

In 2021 PCO identified the need to focus on the new client application process. Onboarding new clients is a critical step for both PCO and the applicant to ensure a successful certification experience from the initial application throughout the client's time with PCO. A smooth onboarding can alleviate future compliance issues as the client gains familiarity with the regulatory requirements they are expected to comply with, the certification cycle and the overall compliance process.

To address this need PCO restructured our Certification Review Team to create the Client Services Team (CST). CST's primary responsibility is to interface with new clients through the application process and the first year of their certification journey. This includes answering questions, helping clients navigate their application forms, explaining the certification and compliance process and evaluating a client's Organic System Plan for compliance pre and post inspection.

We've hired an additional Certification Program Assistant Manager, Gwen Ayres, to lead this team. She started at PCO in February 2022. She's worked in organic certification for six years and in other parts of the organic industry as well. She brings a wealth of knowledge to PCO and we are thrilled to have her expertise to help shepherd this new team along. We are hiring additional staff to meet the needs of clients through their application process.

This team will also be responsible for the annual renewal process (e.g. sending and receiving of annual update paperwork) as well as other customer service related requests.

2022 ANNUAL UPDATES

As most of our readers are likely aware of, PCO launched a new certification database in March of 2021. With a new database brings new processes. The 2022 Annual Update process was one such process that was revamped. It did not go off without a hitch and we apologize if you had a negative experience. We'd like to hear your feedback so that we can make improvements for next year. Please look for a survey in the near future.

As a reminder, if you have yet to submit your Annual Update paperwork to PCO, please do so immediately, as they were due March 1, 2022. Submitting an annual update to PCO identifying any changes made to your Organic System Plan is a regulatory requirement of the USDA National Organic Program regulations. PCO will begin to issue noncompliances and assess late fees on May 1, 2022.

If you have questions about completing your Annual Update or have an urgent timing need for inspection, please contact your Certification Specialist so that we may assist you.

NEW FORMS AVAILABLE FOR EXPEDITED REQUESTS

PCO has created two new forms that may be used by certified operators requesting expedited services:

The **Product Review Request Form** may be submitted when requesting new or updated product information to PCO. It is required when requesting expedited review service (\$225 per product fee).

The **Export Certificate Request Form** may be submitted when requesting export certificate approval from PCO (i.e., EU COI, Japan TM-11, etc.). It is required when requesting an expedited export certificate review (\$150 per certificate fee).

Both forms provide guidance on the information that must be submitted with these requests and can also be used as a resource. To find these and other supplemental forms, visit our website and navigate to "My Certification" and view "Forms."

Materials Update

Jen Berkebile
Materials Program Manager



The PCO Materials Team is thinking spring, and we are hard at work reviewing all of the materials you have submitted for your 2022 season. If you are waiting to hear about any material reviews, don't hesitate to contact us at 814-422-0251 for an update.

Please note the following status changes for materials reviewed by PCO for use by certified operations:

ALLOWED

■ Livestock Materials

- **MRX Microbial / Enzyme Pak** by Balanced Biological Solutions is now Allowed for use as a Feed Additive/Supplement
- **HolisTec Super Hi Cal 911 Rescue Paste** by Animal Medic Inc. is now Allowed for use as a Livestock Medical Treatment – Digestive Disturbance
- **HolisTec Calf 911 Rescue Paste** by Animal Medic Inc. is now Allowed for use as a Livestock Medical Treatment – Digestive Disturbance

PROHIBITED – Operators must immediately discontinue use of these products unless otherwise noted.

■ Crop Materials

- **ProGest by American Farm Products** is now Prohibited for use as a Crop Production Aid – Compost / Manure Additives
- **Crop Supreme Fertilizer** by Daniel Stoltzfus is now Prohibited for use as a Fertilizer/Soil Amendment – Blended Fertilizers

■ Livestock Materials

- **Eco San/ Eco San Plus** by IBA, Inc. is now Prohibited for use as a Livestock Medical Treatment – Teat Dips / Udder Care

Standards & Policy Update

Kyla Smith
Certification Director



NOP PUBLISHES TWO NATIONAL LIST FINAL RULES

PROHIBITED

The USDA National Organic Program (NOP) published a final rule to **prohibit** the following inputs for use on organic operations – **effective March 30, 2022**:

■ Crop Materials – 1 year implementation period

- **Vitamin B1**

■ Livestock Materials – 1 year implementation period

- **Procaine**

Additionally, this rule removes the following materials from §205.606. Substances included on §205.606 are allowed to be used in organic products in a non-organic form so long as they are not available in organic form. Since these substances are removed this means that for these substances to be used in organic products that they **must** be organic.

■ Handling Materials – 2 year implementation period

- **Alginate acid**
- **Colors** (black current juice color, blueberry juice color, carrot juice color, cherry juice color, grape juice color, paprika color, pumpkin juice color, turmeric extract color)
- **Kelp**
- **Konjac flour**
- **Sweet potato starch**
- **Turkish bay leaves**
- **Whey protein concentrate**

If you are using these materials or products that contain these materials, please contact PCO at 814-422-0251 or by emailing your Certification Specialist.

This rule also renewed the allowance for:

- **Sucrose octanoate esters** for use in organic crops, and livestock production.
- **Oxytocin** for use in organic livestock production.

ALLOWED

The NOP published a second final rule to **allow** the following inputs for used on organic operations – **effective April 22, 2022**:

- **Fatty alcohols (C6, C8, C10 and/or C12) to §205.601(k)** – for sucker control in organic tobacco production
- **Potassium hypochlorite to §205.601(a)(2)(iv)** – for

use in water for irrigation purposes

Potassium hypochlorite is a chlorine-based sanitizer allowed for use in organic crop production for the purposes of cleaning irrigation equipment and treating irrigation water.

This final rule also **removes** the listing for dairy cultures from §205.605(a). However, this removal **will not affect the allowance** of dairy cultures in organic production and organic products as they will continue to be allowed under the microorganisms listing at §205.605(a).

NOP PUBLISHES LONG AWAITED ORIGIN OF LIVESTOCK FINAL RULE

The NOP published the long-awaited Origin of Livestock final rule (tinyurl.com/2p8n62jh) which seeks to increase uniformity in origin of livestock production practices for organic dairy animals, and reduce variances between the approaches taken by certifying agents.

This rule specifies that:

- Organic milk and milk products must be from animals that have been under continuous organic management from the last third of gestation onward, with an exception for newly certified organic livestock operations.
- Operations may transition to organic production on a one-time basis, and once the transition is complete, the operation must not transition additional nonorganic animals to organic production or source transitioned animals.
- The transition must occur over a single 12-month period and all transitioning animals must end the transition at the same time.
- After the transition to organic production is complete, an operation is not allowed to transition additional nonorganic animals to organic milk production, and the certified operation may not source animals transitioned by other operations.
- After the transition, an operation replacing culled dairy animals and/or expanding its number of dairy animals must add dairy animals that have been under continuous organic management from the last third of gestation.
- Temporary variances will be available to allow the movement of transitioned animals between operations for specific reasons such as bankruptcy, insolvency, and intergenerational transfer. These variances are only for businesses that are “small,” as determined by the Small Business Administration (SBA) in the small business size regulations (13 CFR part 121) and will follow the already established temporary variance request process.

This rule becomes effective on June 6, 2022. Additionally, this final rule established a compliance date of April 5, 2023. All certified operations must comply with all provisions of this final rule by April 5, 2023. This means that a certified operation may

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"It takes edema out more quickly than anything else."

— Emily Pankratz

ALL BREEDS
14 CHAMPIONS

THE CHOICE OF CHAMPIONS



EMILY PANKRATZ, herd manager
Holtz Ridge Grass Farm, RUDOLPH, WISCONSIN
150 cows, Certified Organic, SCC 200,000
*Emily (left) at our Central Plains Dairy Expo booth
with her mother Peggy.*

"We started using Udder Comfort™ a couple months ago to get better milk quality results. We keep using it because it takes edema out of udders more quickly than anything else," says Emily Pankratz, herd manager for the 150-cow dairy at Holtz Ridge Grass Farm, Rudolph, Wisconsin, where she loves caring for the cows from calving through dryoff.

Emily stopped by our booth at Central Plains Dairy Expo after buying the donated gallon in the Dairy Forward auction. "Our protocol is to put it on after every milking (post-calving), until the cow or heifer is not high in the CMT anymore. This includes cows that may acquire mastitis or high SCC during lactation.

"What I like most about this product is how fast it works on edema. It helps blood flow and gets our heifers off to a quick start," Emily explains.

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New Members

*PCO Welcomes 1st Quarter
New Members!*

NEWLY CERTIFIED ORGANIC

Allen Hoover
Liberty, KY

Allen Sensenig
Fredericktown, OH

Amy Lou Frye
Sophia, NC

Anthony Weaver
Bernville, PA

Castle Co-Packers
Latrobe, PA

**Daniel Z & Mark S
Stoltzfus Farm LLC**
Rockville, IN

David and Ellen Nolt
Penn Yan, NY

David Hoover
Liberty, KY

David Stoltzfus
Sharpsburg, KY

Daryl Reiff
Mifflintown, PA

Duane Z. Shirk
Mifflinburg, PA

East Creek Farms, LLC
New Bremen, OH

Eli Petersheim
Fredericktown, OH

Ivan E. Lapp
Telford, PA

Jacob Weaver
Hutsonville, KY

John E. Blank
Dornsife, PA

Jonas E. Raber
Baltic, OH

Lawrence Weaver
North Bangor, NY

LS Wholesale LLC
Washington, D.C.

Milton Brubacker
Dunnville, KY

Paul Burkholder
Liberty, KY

Simon D. Mast
Fonda, NY

Stanley Zimmerman
Casey, KY

Steven Ray Weaver
Elkton, KY

Sunrise Poultry
Shiloh, OH

Sunset View Eggs
Fredericksburg, OH

Three Rivers Grown LLC
Sligo, PA

Tim Madeiros
Newburg, PA

Vernon Zimmerman
Dunnville, KY

Waylon Martin
Liberty, KY

BUSINESS MEMBERS

Alltech, Inc.
Nicholasville, KY

Hydrite Chemical Co.
Brookfield, WI

Keysource Solutions
Waverly, TN

Lancaster Ag Products
Bird In Hand, PA

Spade to Fork
Sheridan, OR

ADVOCATE MEMBERS

Chad Snader
Denver, PA




Gypsum Products
Soluble Calcium Sulfate

- Damp for broadcasting
- GripX2 Barn dry
- Bedding additives
- Compost additives
- Water Clarification

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Marketplace

CROPS

PCO Certified Organic baleage, 4x5, good quality, can deliver. \$50 first cut, \$60 second cut. 315-867-7414. Herkimer Co., NY.

Organic wrapped wet baleage, \$40 per bale. Please contact James and Donna at 570-746-1651. Bradford County.

Organic wheat straw, dry alfalfa, dried grass and wrapped baleage. 717-860-3504. Franklin County.

EQUIPMENT

Farm cultivators for sale. Four and six rows; John Deere and IH, ready to go to work (both rebuilt). Contact Carl Modica for prices. 814-267-5640. Somerset County.

SERVICES

Ag plastic recycling – I can use black and white bunker covers, bale wrap, plastic twine, clear stretch film, greenhouse covers, flats, and pots. Call for details. 717-658-9660. Franklin Co., PA.

Navigating the Organic Dairy Market

continued from page 5

identify a processor that has the capabilities to successfully create these products. The farm will also need to establish a market. This can be completed through networking for wholesale partnerships, building an online presence, and ultimately providing a value to a customer base that will drive repeat business.

CONCLUSION

The dairy market has had its instabilities throughout recent years. In response to fluctuation, dairy farmers must respond with innovation and creativity. Reputable organic dairy brands honoring their milk contracts with integrity is a great start. The shift in “how” farms raise their animals to improve their land and shrink their input dependence will ultimately lower their risk in organic dairy farming. Finally, consumers have increasingly demonstrated steady interest in dairy products and local food production to improve both their health and ensure product availability. The resilience of the organic dairy industry is continuously improving. The way a farm tells their story, connects with their consumers, and acquires prospective buyers will change the future of organic dairy in this country.

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Standards and Policy Update

continued from page 13

only add transitioned animals to their operation up to the compliance date of April 5, 2023. Any certified operation may source or sell transitioned animals in the period prior to the compliance date, but certified operations may not start new transitions that would not be completed by April 5, 2023.

FOR MORE INFORMATION

Visit the NOP’s Origin of Livestock webpage:
ams.usda.gov/rules-regulations/national-organic-program-origin-livestock

Or contact Kyla Smith, PCO Certification Director
kyla@paorganic.org, 814-422-0251 x216.

STAY CONNECTED, VISIT:
paorganic.org

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Are you a livestock producer that is uncertain about organic certification? Do you need assistance in charting a path forward with your local and organic supply chain? Rodale Institute is here to help. We have been actively working on building an organic meat and milk supply chain that meets the farmers where they are. Contact our livestock specialist, Ryan Siwinski, at ryan.siwinski@rodaleinstitute.org or call him directly at 484-209-2653.

Event Calendar

NOTE: With all in-person events, it is advised that participants follow current CDC and COVID-19 safety protocol and guidelines.

MAY

MAY 23

Center for Rural Affairs

Soil Health Learning Circles Soil Health Practices for Vegetable Producers

7:00–8:00 pm ET

cfra.org/soil-health-learning-circles-bilingual-online

MAY 26

Savanna Institute

Webinar

Making Riparian Forest Buffers Work for You

11:00am–12:00 pm ET

savannainstitute.org/events/webinars/2022-05-26/

MAY 30

Memorial Day

PCO Office will be closed

JUNE

JUNE 6

Center for Rural Affairs

Soil Health Learning Circles Perennials and Pollinators for Soil Health

7:00–8:00 pm ET

cfra.org/soil-health-learning-circles-bilingual-online

JUNE 9

NCAT-ATTRA Sustainable Agriculture
Webinar Series

Advanced Grazing for Regenerating Soil and Enhancing Animal Nutrition

6:00–7:30 pm ET

attra.ncat.org/events

JUNE 8

Rodale Institute

Webinar

How Do Farming Practices Impact Soil Health and Water Quality? Research Update of the Watershed Impact Trial (WIT)

2:00–3:00 pm ET

rodaleinstitute.org/education/webinars

JUNE 13

Center for Rural Affairs

Soil Health Learning Circles Cover Crops for Soil Health

7:00–8:00 pm ET

cfra.org/soil-health-learning-circles-bilingual-online

JUNE 15

Animal Welfare Impact on High- Quality Poultry Processing

Penn State Extension

State College, PA

12:00PM–4:30PM

<https://extension.psu.edu/animal-welfare-impact-on-high-quality-poultry-processing>

JUNE 15

Impact of Managing Animal Well- Being on Meat Quality

Penn State Extension

State College, PA

8:30 AM–1:30PM

<https://extension.psu.edu/impact-of-managing-animal-well-being-on-meat-quality>

JUNE 20

Juneteenth

PCO Office will be closed

JULY

JULY 4

Independence Day

PCO Office will be closed

JULY 13

Rodale Institute

Webinar

Incorporating Industrial Hemp Into Your Rotation

2:00–3:00 pm ET

rodaleinstitute.org/education/webinars

JULY 13–14

North American Manure Expo

Chambersburg, PA

Advertise in Organic Matters

Organic Matters is the quarterly newsletter of Pennsylvania Certified Organic, a non-profit organization serving growers, processors and handlers of organic products. Issues contain articles on the latest news and research in the organic industry, often highlighting our certified members. Approximately 1,500 copies of each publication are distributed directly to members and those requesting information about organic agriculture, and made available to the public at conferences, exhibits and educational programs in the Mid-Atlantic region.

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A Quality Source of Organically Acceptable Nitrogen!

EXPLORER[™] Liquid 10-0-0

EFFICIENT, PLANT-DERIVED ORGANIC NITROGEN

BENEFITS OF EXPLORER[™] LIQUID 10-0-0:

- Does not volatilize
- High carbon content makes excellent food source for soil biology
- Carbon based and contains plant derived amino acids
- Natural product with no negative environmental impact
- Beneficial use in conditions of biotic and abiotic stress conditions

Conversion Recommendations from HNI: Explorer 10-0-0

Excellent Conditions:

High Organic N (*with Manure*)

2 Quarts = 60 lbs. Nitrogen

Low Organic N (*without Manure*)

2 Quarts = 30 lbs. Nitrogen

Challenging Conditions:

High Organic N (*with Manure*)

3 Quarts = 60 lbs. Nitrogen

Low Organic N (*without Manure*)

3 Quarts = 30 lbs. Nitrogen

ANIMAL BASED NITROGEN VS. EXPLORER[™] LIQUID 10-0-0

	Animal- Based Nitrogen	Explorer [™] Liquid 10-0-0
Nitrogen Availability	Slow Release, requires bio-decomposition	100% - Immediately
Solubility	Not fully soluble	100%
Application Restrictions	Foliar Applications not recommended	None
Ease of Use	Smell, mixing procedure	None
Origin	Chicken/Fish/Manure	Non- GMO, soy protein hydrolysate
Effect of temperature on availability	Slower or no release in colder temperatures	None
Amino Acid Profile	Inconsistent to None	98.6%/60.9% Iq Amino Profile
Stability	Adulterated for insuring some stability	Complete and lifetime




Ferticell[®]

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