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March 2026

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JOHNSON
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VIEW from the COUNTRY

Agribusiness is starting to preach some regenerative practices. This raises the question: Do ecological farmers need to demand pure motives prior to celebrating progress?

Consider how Pioneer is starting to provide a standard treatment containing boron, sulfur, potassium, manganese, cobalt, and molybdenum on all its seed. This is an implicit admission that trace minerals — not just NPK — matter. We may quibble about the exclusion of, say, zinc or copper in this particular mix, but the adoption of the practice is a step in the right direction.

Similarly, cover cropping is up — from 2.7 percent of all U.S. farmland in 2012 to 4.7 percent in 2022, and likely higher today, per the USDA Census of Agriculture. Big corporations like Nutrien have even begun to offer cover crop programs.

On top of this, precision nutrient management is enabling less fertilizer waste, large-scale companies are offering biological inputs, and USDA is entering the regenerative space. Everyone has an opinion on how effective the new \$700 million program will be, but the idea of such a thing was unthinkable a decade ago.

Again, should this be reason to rejoice, or simply cause for more concern?

It's natural for eco-farmers to raise a skeptical eyebrow at these developments.

We've seen too much greenwashing to be naïve. Big ag's instinct is still reductionistic: isolate the useful practice, package it as a product, and keep the farmer dependent. "Regenerative" becomes a label for inputs rather than a philosophy of stewardship. The big corporations will keep promoting cover crops and biology precisely as long as it makes them money — not necessarily because their driving motivation is now healthy soil and healthy food.

On the other hand, perhaps we shouldn't despise baby steps. If a grower starts using a cover crop mix because it helps with compaction, infiltration, weeds or erosion, that's one step away from the chemical treadmill. If he tries a biological because it works, he's now only one good season away from asking better questions: Why did it work? What does it reveal about the plant-soil system? What else have I been missing? It makes sense that practices flow from beliefs, but often — in real life — the opposite is true: changing a practice can precipitate a change in mindset.

One more important thing to remember is that these regenerative practices — whatever the motive — are likely to produce healthier food. That's our ultimate goal in farming, isn't it?

The Apostle Paul told the Philippians, "It is true that some preach Christ out of envy and rivalry, but others out of goodwill... The important thing is that in every way, whether from false motives or true, Christ is preached." Perhaps we need to remind ourselves, "It is true that some adopt regenerative agriculture simply out of desire for risk mitigation and increased profit... But the important thing is that in any case, whether from false motives or true, some regenerative practices are being adopted, and food is becoming healthier."

And because of this, we should rejoice.

And that's the view from the country.

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Why Do Regenerative Farmers Swim Upstream?

America's enthusiastic embrace of regenerative agriculture will only succeed if policy, investment and regulation shift to reward biological performance, nutritional quality and farmer innovation

BY CHARLES BENBROOK



Mark Lipson and his Molino Creek Farm partners have grown organic tomatoes outside Santa Cruz since 1983. Despite pest outbreaks, too much and too little rain, and fires, the farm remains in business and regenerative, although access to sufficient labor is a growing concern.

“Regenerative” agriculture has quickly emerged as a nearly universally embraced goal. This is generally a good thing — except that attaining the goal means different things to different people.

In her December 2025 announcement of the \$700 million NRCS re-

generative agriculture program, Secretary of Agriculture Rollins focused on practices and systems known to promote soil health. The repackaged program draws on the cost-share tools and baseline funding of existing USDA conservation programs. It's a reboot, not a new build.

Food companies are hoping for opportunities to partner with USDA in helping their growers become more regenerative. Multiple sources of investment capital are flowing into farmland in order to make it more “regenerative” and to stabilize the climate. Every year, pesticide-seed-biotech companies are bringing to market dozens of new corn, soybean and cotton varieties engineered to express multiple herbicide-tolerant traits and insect toxins. They believe that more and higher levels of toxins is the “modern ag” way to help farmers become regenerative.

Fortunately, more and more farmers are questioning their logic, their science and their motives.

Policy Is the Problem — and a Big Part of the Solution

Most of the serious problems plaguing row-crop farmers today have been brought about by the unintended consequences of incremental changes in farm programs and policies, public- and private-sector R&D priorities, and subsidy streams. Such changes were adopted in good faith to address pressing problems, but in the rush to reach consensus and implement new policies, little or no effort was invested in foreseeing and avoiding negative, long-run impacts like polluted water, dead soils, industrial consolidation, loss of market options and rising reliance on bailouts, lax regulation and tax subsidies.

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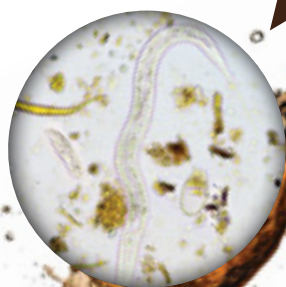
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A conventional corn field in New York State plagued by multiple herbicide-resistant weeds, despite several applications of different herbicides and planting Roundup Ready GMO seed. Farming systems that experience incrementally more serious problems with resistant pests are not regenerative.

our food system needs to change. Regenerative agriculture has emerged as the North Star to guide this. The semantic shift is more than a bit ironic, given that Bob Rodale was the first leader in the agricultural community to use the term “regenerative” in describing food and farming systems built to last.

When members of Congress and Hill staffers (including me) first heard Bob use the term regenerative in the early 1980s, there was no ambiguity about what he meant and the kind of agriculture he was promoting. The Rodale Institute now has 50 years of experience in studying the attributes of regenerative systems and how to help farmers make the journey.

But from the 1980s to the present, changes in farm policy and taxpayer support for agriculture have incrementally undercut farmer innovation on the road to regeneration. Fast forward to 2026 and a broad cross-section of agricultural leaders, inno-

vative companies and government institutions are promoting regenerative agriculture to address the systemic problems that have blossomed.

The “regenerative” chapter in the history of American agriculture and our food systems has begun as the “sustainable” chapter slips below the horizon. The odds of this chapter ending on a more positive note than the last will depend on whether our new North Star guides us in different directions on the farm and in the policy arena.

Timely action is badly needed. Many pioneers of regenerative farming are struggling to keep their operations afloat because cheaper, low-quality ag commodities are undercutting their ability to remain, or become, economically regenerative. This is especially hard to swallow when the cheaper, lower-quality, less-safe products are imported from countries that are investing heavily in capturing a larger slice of the

high-dollar U.S. food pie.

This is why our weak food-quality standards, minimal to non-existent testing of imports, and lax regulatory environment matters. It is why failure to prevent large companies from gaining excessive power over markets, politicians and policy has created an existential crisis playing out across rural America. And lastly, it is why public health in America is eroding faster than in any other advanced country.

Let’s hope the embrace of regenerative agriculture matters and that it leads to changes in policies, investment patterns and regulation that enable and support progress in diversifying agriculture, enhancing soil health, and improving the nutritional quality and safety of the U.S. food supply. That is precisely what the next farm bill must focus on.

For this to happen, general agreement must be reached on the metrics used to set baselines and goals, and to track progress. Rigorous testing and vetting of proposed solutions are essential, since no one really knows how to steer this massive ship toward calmer waters. Disciplined experimentation of alternative approaches is needed to figure out how to do so most cost effectively, while also dealing with an extensive list of long-ignored equity and fairness issues.

Practical Metrics to Stress Test Changes in Policy and Investment Patterns

For most types of farms and production systems, four leading indicators will effectively differentiate how regenerative a farming system is likely to be.

First, higher levels of organic matter in soil support larger pools of nitrogen cycling within the soil. This is a universally good thing on conventional, organic and GMO farms. It is also good for water quality, the climate and farm profit margins.

Regenerative farms depend primarily on biological sources of N produced on or near the farm. The larger the percent of total N from chemical fertilizers brought onto the farm, the less likely a farm will be

regenerative. Metrics capturing this percent, and related soil health dynamics, are relatively easy to measure and verify, and belong among the leading indicators of the degree to which a farm is regenerative.

Measuring and tracking changes in soil organic matter, on the other hand, is exceptionally difficult and ephemeral since so many biotic and abiotic factors will arise in all growing seasons, triggering short-term changes in organic matter levels and N pools cycling in the soil. Too often, results reflect when and how a sample was collected and tested, not actual changes in soil health.

Second, diverse plant species over space and time are a hallmark of regenerative farms. Diversity and living roots build and sustain soil health, supporting larger pools of circulating N to meet the next crop's needs. Soil absent growing plants wastes the farmer's most important valuable, but free asset — the solar energy landing on the ground.

Diversity delivers a trifecta of benefits — adequate surface biomass year-round, thereby largely preventing wind and water erosion; faster water intake into the soil and improved water quality off the farm; and diversification of an operation's income streams and enhanced economic resiliency. This core attribute of regenerative systems is also readily measured and verified.

Third, low or no routine reliance on off-farm toxins or pharmaceuticals.

Farmers managing mature and diverse regenerative systems do not rely heavily on pesticides for a host of reasons. Herbicide-resistant weeds are rarely a problem. Microbial biocontrol of soilborne insects and pathogens promotes plant health and lessens the need for pesticides that undermine biodiversity and that too often trigger even worse pest outbreaks.

The level of reliance on pesticides is an important indicator of the maturity of regenerative systems. It is also a performance attribute easily measured and translated into leading-indicator metrics. These are

among the reasons serious efforts to advance regenerative agriculture need to measure and track pesticide use and risk trends. Yet to this day, many stakeholders insist that the quest to promote regenerative agriculture should steer clear of talks to reduce pesticides.

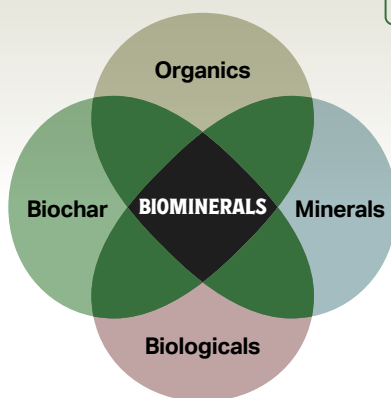
Fourth, the crops harvested off mature, well-managed regenerative farms are typically, year to year, more nutrient dense and tastier. The reasons are well known — in particular,

the dilution effect and heightened levels of plant polyphenols. But this is aggressively contested by supporters of the status quo.

Regenerative systems deliver enough N to meet crop needs, but not excessive levels, as is now routinely the case on most conventional farms. Avoiding extra N steers regenerative farms away from spikes in soil microbes that can churn through organic matter quickly, thereby undermining soil health and raising

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LEFT: Most Holstein cows on large-scale CAFOs require multiple hormone shots to rebreed, and few raise three or more calves. The Jersey cows on John Bansen's organic dairy in Oregon are largely grassfed, have six or more lactations, and produce much more nutritious milk. **RIGHT:** Pest damage is a major roadblock for regenerative agriculture in the southern U.S. and other hot, humid regions.

production costs.

Avoiding excessive levels of N also prevents the dilution of health-promoting phytonutrients in harvested crops. Such dilution occurs because plants convert extra N into sugars and starches. This is why conventionally grown fruit is often both bigger and sweeter than organic fruit but lacks the health-promoting nutrients per calorie. This is also why the flavor profile in produce harvested from mature regenerative systems shifts from overwhelming sweetness to complexity; it is what separates a good peach from a great one.

Crops and pastures on regenerative farms also must fend for themselves in the face of multiple biotic (pests, nutrient imbalances) and abiotic (weather, drought) stressors. They do so by expressing plant polyphenols and other biochemicals, many of which are antioxidants beneficial to both plants and mammals.

Nutrient profiling systems can be used to quantify leading-indicator metrics capturing changes in food nutritional quality. A full accounting of such benefits will require much

more testing and research, as well as concurrence on methods to translate improvements in macro and phytonutrient density into projected human and animal health outcomes.

Investing in the Ability of Regenerative Farms to Grow and Thrive

Applying the above four sets of metrics will be a solid first step in gauging whether a farming system is regenerative. But no one set of metrics and regenerative ag benchmarks will meet the needs of all farms and ranches. This is because of the diversity of:

- The crops and animal products that make up the U.S. food supply,
- The environments where farmers farm, and
- Unique region- and crop-specific biological challenges, impacts of policy, and market dynamics that can, alone or in combination, render a farm operation unsustainable for one or a combination of reasons.

Other metrics and benchmarks will be needed. These include soil bulk

density, aggregate stability, soil microbial diversity, impacts on pollinators, availability of a labor force with requisite skills and experience, and better ways to feed animals to keep them healthy and to improve the fatty acid profiles in meat, milk and eggs.

A quick look at a few of the contemporary forces and factors that can, and in many cases are, undermining regenerative farming systems will help drive home the need for a diverse set of metrics and performance benchmarks across the U.S. ag and food system landscape.

King Grove Farm in Eustis, Florida, produces some of the most wonderful, tasty and nutrient-dense blueberries on the planet. Years of experience and testing confirms that their organic system almost certainly meets all the soil health, pest management and nutritional quality benchmarks that characterize a regenerative farm. But King Grove Farm is struggling to stay in business because of the rapidly rising flood of lower-cost blueberries from Peru, Chile and Mexico that are mostly grown in hydroponic systems and are often labeled organic.

Three clusters of decisions made by policy makers and government agencies will either put farms like King Grove out of business, or limit them to niche, direct-marketing channels in order to survive:

1. Trade and tariff policy,
2. Absence of government data and verified methods to quantify and verify the superior nutritional quality and safety of King Grove berries, and
3. The decision by the USDA to allow organic crops to be grown in pots without soil, despite the emphasis on creating and sustaining soil health in the federal statute governing USDA's National Organic Program.

Regenerative corn-soybean farmers use production systems that reliably deliver multiple benefits, including enhanced soil health, improved water quality, safer and more nutrient-dense harvests, more resiliency in the face of climate extremes, and more. But since USDA policy holds that farming systems have no significant nor consistent impact on crop nutritional quality and safety, regenerative farmers struggle to secure premium prices for the central attribute that should make their crops more desirable.

Regenerative farms must follow more diverse rotations, including crops other than corn and soybeans, yet farm bills and USDA policy have gone “all in” for only a few large-acre commodity crops. These few crops benefit substantially from layers of subsidies and tax benefits, coupled with taxpayer-financed “risk management” tools. The total cost of all these subsidies and payments is rapidly rising in step with the collapsing biological and economic sustainability of many contemporary production systems.

Diverse rotations are also hard to justify in the absence of marketing infrastructure and demand for rotational crops and forages. The steady flow of tax dollars supporting corn and soybeans and biofuels — and not oats, buckwheat, forage crops and nutrient-dense human foods — is holding back adoption of more assur-

edly regenerative systems.

On the economic front, government policy and programs essentially block regenerative farms from securing a premium price in line with the enhanced nutritional quality and safety of their harvests, while also shielding other farms from the added costs they impose on society as a result of lax regulation and excessive reliance on chemicals and animal drugs.

It is no wonder so few operations have pieced together a way to af-

ford to farm regeneratively. Public subsidies and policy, and lax regulation, make their systems artificially and comparatively expensive, while shielding conventional systems from the external costs they pose on society and rural neighbors.

Largely because of especially difficult pest management challenges, there are only a few commercial scale organic vegetable farms in Florida. Some of them periodically lose an almost-ripe field of tomatoes, cucum-

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LETTERS

bers and other crops to late blight or another opportunistic pathogen. Sometimes swarms of white flies or other insects move from a heavily sprayed field to relative safety in a nearby organic field.

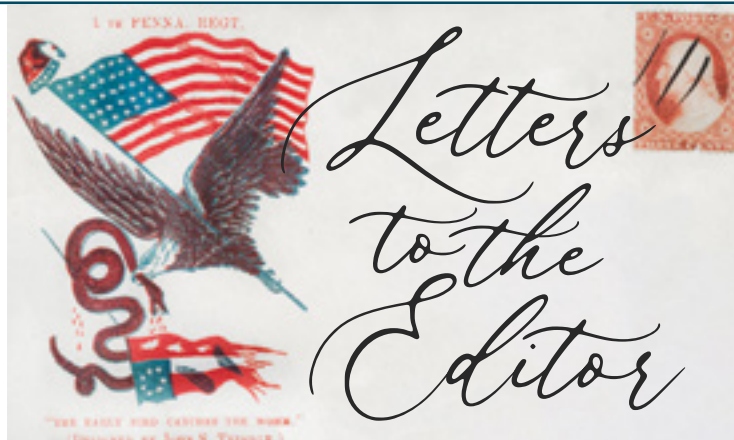
Lacking effective, organically approved biopesticides, even the most experienced organic vegetable farmers in Florida sometimes have to watch a field that would generate \$30,000 or more in sales per acre shrivel and die in just a few days. Such farms can remain regenerative if such losses are isolated and occur infrequently. But the need is acute for new safe, effective and affordable biopesticides that are acceptable under the rules governing organic certification.

Regrettably, few such products exist because investing in the science and infrastructure needed to bring biopesticides to market has never been a priority in the U.S. That has to change in order for healthy, nutrient-dense, U.S.-grown fruits and vegetables to be available at competitive and affordable prices, and in the volume needed to MAHA. Only a shift in federal ag R&D policies and priorities can bring this about.

To accelerate progress toward a healthier food supply, Secretary Rollins and the USDA need to invest more heavily in generating the data and analytical tools needed to quantify the linkages between soil health, food nutritional quality and safety, and public health outcomes.

For healthier and safer food to command premium prices and bring about food-system-wide change, USDA must back away from its current policy that asserts farming system choices do not have a meaningful impact on food nutritional quality and safety. USDA-funded research confirms that system choices do make a difference, and, brand by brand, the public needs to learn why and by how much. [ACRES](https://www.acresusa.com).

Charles Benbrook is an advocate for health-driven transformation in all things food and ag. He has served as an expert witness in recent litigation against Bayer/Monsanto.



Something appeared “off” to me about the image of a bull that accompanied Dan Glenn’s well-written article “Terminal or Maternal Sires?” in the November 2025 issue. Out of curiosity, I contacted Dan to inquire about the image and was disappointed to learn that the image is not a photo of a real bull but instead an AI-generated projection of what one of his yearling bulls will look like at maturity.

Using AI-generated imagery in this manner — with no disclaimer that the image is fabricated — strikes me as distasteful at best, and perhaps deceptive. This “bull bred to raise replacement heifers on grass” does not exist, and such artificial imagery does not belong on the pages of a natural-minded agricultural publication written to farmers who work in the real world.

A few pages prior to the offending image, Mark Shepard opined that “AI is everywhere. AI is destroying the farmer’s personal relationship with the land, the soil and the livestock.” I agree with Mark’s lamentations over AI — and technocracy at large — and encourage the editors of Acres USA to keep their publication unsullied by AI-generated content.

Yours truly in semi-Ludditism,
— **Matt Oursbourn**

Thanks for reaching out, Matt. I apologize for this — you’re absolutely right. I’m sorry I did not catch this. I offer no explanation other than to say that my eye for picking out potentially AI-generated images and text has improved a lot since we put this issue together last summer. It’s a fast-moving technology.

Our philosophy for this magazine on this topic is that HI (human intelligence) will always exert sovereignty over AI. While AI can be a powerful tool in assisting with some auxiliary editing tasks — researching topics, drafting headlines and subtitles, audio transcription, basic spelling and grammar checking, etc. — we will never employ it without robust human oversight. We will seek, to the best of our ability, to only publish articles that are human written. We will never manipulate photos to represent real events or situations and will let readers know when we do use it for an infographic or an explanatory figure.

Optimistically, I do think that the proliferation of AI images and text is going to convince people that they need to move back to established and reliable sources of content. We obviously want Acres U.S.A. to continue to be one of those trusted sources. We promise to be much more careful in the future.

Always humanly speaking,
— **The editor**



2026 Events



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Join us at these upcoming Acres U.S.A. events!

Tailor-Made Herd Intensive

📅 March 25-27, 2026 📍 Viroqua, WI

Spend three days with lifelong cattleman and regenerative livestock consultant Steve Campbell learning how to make your herd's genetic code fit your zip code.

American Regeneration

📅 May 1-2, 2026 📍 Bandera, TX

Gain insights from leading farmers, ranchers, homesteaders, and health & policy advocates, while enjoying a truly nourishing farm-to-table experience.

Farm Weird

📅 June 27, 2026 📍 Gaston, IN

An all-day field day at Jason Mauck's farm. Learn about wheat-soybean relay-cropping, stock cropping, alley cropping, hog production and more.

Viroqua On-Farm

📅 July 10, 2026 📍 Viroqua, WI

In-person event designed for graziers, ranchers, and regenerative livestock producers who want to deepen their understanding of holistic cattle care.

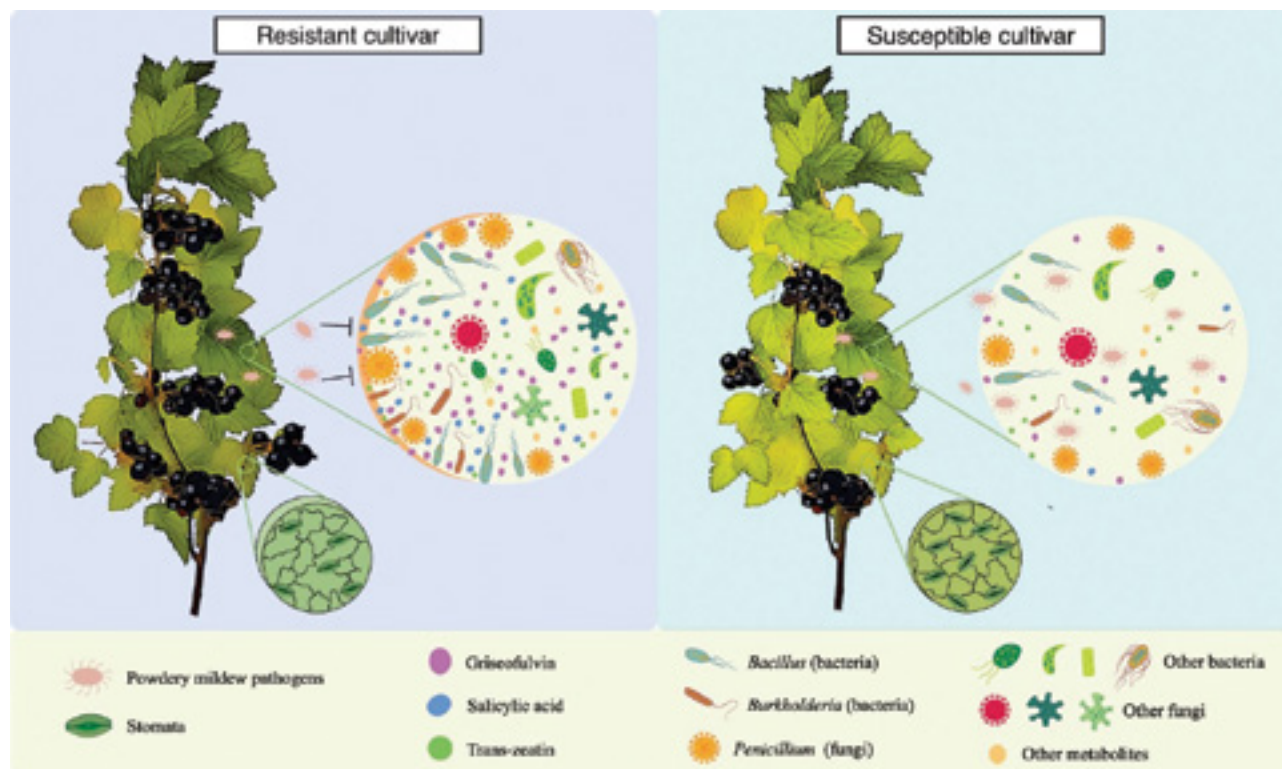
Eco-Ag Conference

📅 Dec 1-4, 2026 📍 Iowa City, IA

Acres U.S.A.'s premier annual event, bringing together farmers, agronomists and industry leaders to share practical, science-based solutions.

Eco-Update

News and Analysis on Developments in Agronomic Science



The mechanism of resistant cultivar enhances resistance to PM pathogens in the black currant phyllosphere.

Leaf Chemistry and Microbes Combine to Boost Disease Resistance in Black Currants

Powdery mildew is one of the most destructive fungal diseases affecting black currants, infecting leaves, stems and young fruits while reducing yield and fruit quality. Chemical pesticides provide short-term control but raise environmental and health concerns. Increasing evidence shows that plants rely not only on genetic defenses but also on interactions with microorganisms living on their surfaces and on metabolite-mediated signaling.

Researchers from Northeast Agricultural University recently completed a comprehensive analysis of phyllosphere metabolites and microbial communities in resistant and susceptible black currant cultivars. The study, published in *Horticulture Research*, used high-throughput sequencing and metabolomic profiling to uncover how resistant plants coordinate metabolic and microbial

responses following powdery mildew infection. The team demonstrated that specific metabolites promote the enrichment of beneficial microbial taxa and suppress fungal growth, offering new insights into natural disease resistance mechanisms.

The researchers compared a resistant cultivar ("16A") and a susceptible cultivar ("Bright leaf") to investigate how leaf structures, metabolites and phyllosphere microbiota respond to powdery mildew infection. Resistant plants exhibited thicker leaf tissues and fewer stomata, forming inherent physical barriers that reduced pathogen entry. Metabolomic analysis identified 534 differentially accumulated metabolites, with resistant plants showing elevated levels of salicylic acid, trans-zeatin and griseofulvin — metabolites previously linked to disease responses. Network analysis of microbial communities revealed significantly higher bacterial and fungal diversity in the resistant cultivar, along

with greater fungal network complexity. Keystone microbes associated with resistance included *Bacillus*, *Burkholderia* and *Penicillium*, all known for antagonistic or protective functions.

Correlation analyses showed that key metabolites strongly influenced beneficial microbial groups, acting as biochemical cues that recruit "disease resistance effectors" in both bacteria and fungi. Functional predictions further indicated enhanced pathways related to environmental adaptation and signal transduction in the resistant cultivar. Experimental validation demonstrated that spraying griseofulvin on susceptible plants reduced disease severity, with 150 mg/L griseofulvin showing the strongest inhibitory effect on fungal development and spore cycling. These findings collectively reveal an integrated, metabolite-driven microbiome strategy underlying disease resistance.

"The study shows that resistant

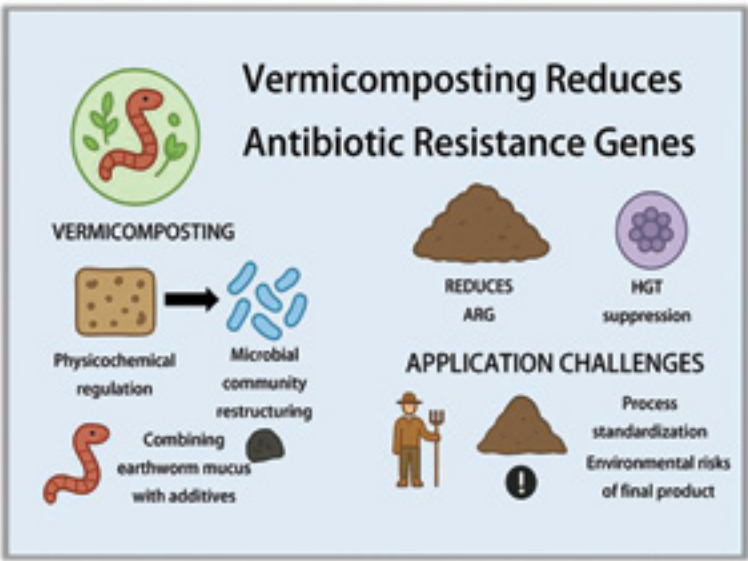
black currant cultivars do not rely on a single defense mechanism. Instead, they coordinate structural traits, metabolite production, and microbial recruitment to limit powdery mildew development,” the researchers explained. They emphasized that metabolites such as salicylic acid, trans-zeatin, and griseofulvin serve as critical regulators linking plant physiology with microbial community assembly.

Vermicompost May Be a Powerful Tool Against Antibiotic Resistance

The World Health Organization has named antimicrobial resistance one of the most serious threats to modern medicine, and livestock production is a major part of the problem. When animals receive antibiotics, resistance genes accumulate in their manure, and if that manure is spread on fields without proper treatment, those genes can move into soil, water, crops and eventually the human gut. Conventional composting helps, but its performance is unstable, and, in some cases, key resistance markers can even rebound during the composting process.

Vermicomposting uses earthworms and their associated microbes to transform raw manure into a stable, crumbly product known as vermicast. Under carefully controlled moisture, temperature and nutrient conditions, this mesophilic process not only recycles waste into fertilizer but also achieves multi-pathway reduction of antibiotic resistance genes. Studies summarized in the new review show that vermicomposting can reduce the total abundance of resistance genes by roughly 70 to 95 percent and mobile genetic elements by up to 68 percent, often outperforming traditional compost piles.

As earthworms burrow and feed, they increase porosity and aeration in the manure, maintaining oxygen rich conditions that suppress many anaerobic bacteria that often carry resistance genes and support faster breakdown of residual antibiotics. Inside the earthworm gut, mechan-



Mechanisms and challenges in reducing antibiotic resistance genes by vermicomposting

WHAT COULD POSSIBLY GO WRONG?!

Scientists Use Gamma Radiation to Quickly Toughen Nitrogen-Fixing Bacteria

Heatresilient biofertilizers could help crops cope with rising temperatures, but engineering them has been slow and uncertain. A new study from researchers at the National Institutes for Quantum Science and Technology (QST) in Japan — who have apparently never watched any of the Incredible Hulk extended universe movies — shows that pairing experimental evolution with controlled gammaray mutagenesis can accelerate the path to heattolerant nitrogenfixing bacteria, shortening development timelines and opening practical routes to more reliable, climate-ready microbial products for agriculture, food processing, pharmaceuticals, and biofuel production. The study was published in the journal *Mutation Research*.

The team focused on *Bradyrhizobium diazoefficiens* USDA110, a bacterium used to help soybean and other legumes capture nitrogen. While the wild-type grows

best at around 32–34°C and stalls at ~36°C, QST researchers raised culture temperatures stepwise from 34°C to 37°C over 76–83 days and irradiated populations ten times at specific doses, then selected the lines that continued to form robust colonies at 36°C.

A clear “sweet spot” emerged: around 40 Gy produced the greatest number of stable, heattolerant lines, whereas higher doses (80–120 Gy) initially yielded more tolerant lines but with smaller colonies and traits that faded when selection relaxed, consistent with an excess of deleterious mutations. In practical terms, the method lets researchers tune the mutation load to favor beneficial changes while preserving overall fitness.

Culture temperature	Wild type	Heat-tolerant mutant
36°C		
32°C		

Heat-tolerant mutant lines of rhizobia obtained by experimental evolution combined with repeated mutagenesis with gamma rays

ical grinding, digestive enzymes and a specialized microbiome further damage resistant bacteria and disturb both intracellular and extracellular DNA.

A key advantage lies in how earthworms restructure the microbial community. Their activity shifts the system away from fast-growing opportunistic bacteria that frequently host resistance genes toward more stable, functionally beneficial groups involved in decomposition and nitrogen fixation. At the same time, vermicomposting lowers the abundance of mobile genetic elements such as plasmids and integrons, which are the vehicles that shuttle resistance genes between bacteria through horizontal gene transfer.

Beyond the gut, earthworm epidermal mucus and coelomic fluid act as a biochemical interface in the composting mass. This mucus contains carbohydrates, proteins, lipids and bioactive molecules including antimicrobial peptides, lysozymes and DNases that can damage bacterial cell membranes, generate reactive oxygen species and directly degrade resistance genes. Laboratory studies cited in the review show that coelomic fluid can cut multidrug-resistant *E. coli* populations by several orders of magnitude within hours and can remove over 90 percent of extracellular resistance genes through DNA cutting activity.

Mucus also alters microbial behavior by interfering with bacterial communication systems and gene expression. In one mechanistic study, exposure to earthworm coelomic fluid led to thousands of bacterial genes being up or down regulated, disrupting pathways that bacteria rely on for coordination and conjugation. Network analyses indicate that after earthworm processing, the statistical links between resistance genes and their bacterial hosts weaken, suggesting that vermicomposting ecologically decouples resistance traits from the microbes that carry them.

Performance improves further when vermicomposting is combined

with functional materials such as biochar, zeolite or clay minerals. These additives can adsorb antibiotics and heavy metals, easing stress on earthworms and microbes while stabilizing pollutants and reducing the selective pressure that favors resistant bacteria. In trials summarized by the authors, pairing earthworms with biochar or mineral amendments increased earthworm growth, accelerated organic matter degradation, improved humification and raised removal rates for both resistance genes and heavy metal resistance markers.

Together, earthworm activity, mucus-derived biochemistry and tailored additives create a multi-level containment system that acts from molecules to whole ecosystems. The result is a more robust, stable reduction of antibiotic resistance genes than is typically achieved in conventional composting alone, while producing a high-quality organic fertilizer that can improve soil structure, water retention and plant nutrition.

Despite these advantages, the authors caution that significant challenges remain before vermicomposting can be deployed widely as an antibiotic resistance control strategy. Different earthworm species vary in their tolerance to antibiotics and environmental conditions, and key operating parameters such as stocking density, feedstock composition, temperature and moisture must be fine-tuned for each type of agricultural waste. Large scale systems must also address climate sensitivity, reactor design, automation and the logistics of maintaining healthy earthworm populations at industrial scale. [ACRES.](#)

Long-Term Pesticide Exposure Accelerates Aging and Shortens Lifespan in Fish

Long-term exposure to low levels of a common agricultural pesticide can accelerate physiological aging and shorten lifespan in fish — a finding from new research led by University of Notre Dame biologist Jason Rohr with potentially far-reaching implications for environmental

regulations and human health.

The study, published in *Science*, shows that chronic exposure to the insecticide chlorpyrifos at concentrations too low to cause immediate toxicity causes fish to age faster at the cellular level.

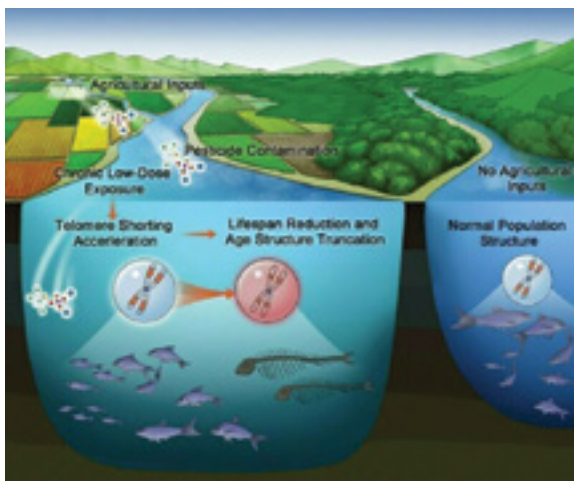
The research began with field studies in China, where collaborators examined thousands of fish collected over several years from lakes with differing levels of pesticide contamination. Rohr and colleagues observed that fish living in contaminated lakes lacked older individuals, while populations in relatively uncontaminated lakes included many older fish. This pattern suggested that fish were not failing to add to their populations, but rather were dying earlier in life.

“When we examined telomere length and deposition of lipofuscin in the livers of the fish, well-established biological markers of aging, we found that fish of the same chronological age were aging faster in the contaminated than clean lakes,” said Rohr.

Chemical analyses revealed that chlorpyrifos was the only compound found in the fish tissues that was consistently associated with signs of aging. These include shortened telomeres, which act like the plastic caps on shoelaces and decrease fraying in chromosomes, and lipofuscin deposition, a build-up of “junk” like old proteins and metals within long-lived cells.

However, to determine whether chlorpyrifos was the direct cause, researchers needed to conduct controlled laboratory experiments with concentrations matching those measured in the wild. In this laboratory experiment, chronic low-dose exposure to chlorpyrifos caused progressive telomere shortening, increased cellular aging and reduced survival, particularly in fish from the contaminated lakes that were already physiologically older.

“Although the laboratory results closely matched the field observations, it was possible that a missed high-dose exposure event in the field, rather than chronic low-dose exposures, caused the reduced lifes-



Chronic low-dose exposure to chlorpyrifos causes progressive telomere shortening, increased cellular aging and reduced survival.

pan,” said Rohr. To rule out this driver, Rohr and colleagues conducted another laboratory experiment demonstrating that short-term exposure to much higher doses caused rapid toxicity and death but did not accelerate aging through shortened telomeres and increased lipofuscin.

mechanisms are highly conserved across vertebrates, including humans,” Rohr said.

While the European Union has largely banned chlorpyrifos, it remains in use throughout China, parts of the United States and many other countries. However, the aging effects

This demonstrated that long-term accumulation of exposure to extremely common low concentrations — not brief high-dose spikes — was responsible for the observed aging.

The loss of older individuals can have serious ecological consequences, as older fish often contribute disproportionately to reproduction, genetic diversity and population stability. “These findings also raise broader concerns because telomere biology and aging

observed in this study occurred at concentrations below current U.S. freshwater safety standards.

“Our results challenge the assumption that chemicals are safe if they do not cause immediate harm,” Rohr said. “Low-level exposures can silently accumulate damage over time by accelerating biological aging, highlighting that chemical safety assessments must move beyond short-term toxicity tests to adequately protect environmental and human health.”

Forest Loss is Driving Mosquitoes’ Thirst for Human Blood

In addition to the recently recognized hydrological concerns stemming from loss of forests worldwide — particularly deforestation’s effect on the small water cycle — researchers have now discovered another alarming consequence.

Running along Brazil’s coastline, the Atlantic Forest supports an extraordinary range of life, including hundreds of species of birds, amphib-

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As forests and its associated wildlife disappears and human populations grow, mosquitos (sometimes carrying deadly pathogens) resort to human blood for sustenance.

ians, reptiles, mammals and fishes. Much of that richness has been lost. Human development has reduced the forest to roughly one third of its original size. As people move deeper into once-intact habitats, wildlife is pushed out, and mosquitoes that once fed on many different animals appear to be shifting their attention toward humans, according to a study published in *Frontiers in Ecology and Evolution*.

This is significant because mos-

quitoes spread viruses such as Yellow Fever, dengue, Zika, Mayaro, Sabiá and Chikungunya. These infections can pose serious health risks and may lead to long-term complications.

As deforestation continues and human settlements expand into forested areas, many plant and animal species disappear. Mosquitoes respond by altering where they live and how they find food, often moving closer to people.

But Do We Even Know Where the Forests Are?

For decades, global efforts to combat climate change and protect biodiversity have relied on a high-tech promise: that satellite-derived maps can tell us exactly where the world's forests are.

But a new study from the University of Notre Dame reveals that these digital baselines are often in sharp disagreement, creating confusion that threatens to undermine effective climate funding and international development efforts. Because these maps determine everything from carbon storage estimates to the enactment of conservation policies, even small discrepancies can have serious consequences for both people and the planet.

The study reveals major differences among the world's most widely used forest datasets. When comparing eight of the most popular datasets, the researchers found that their identification of forest locations concurred only 26 percent of the time.

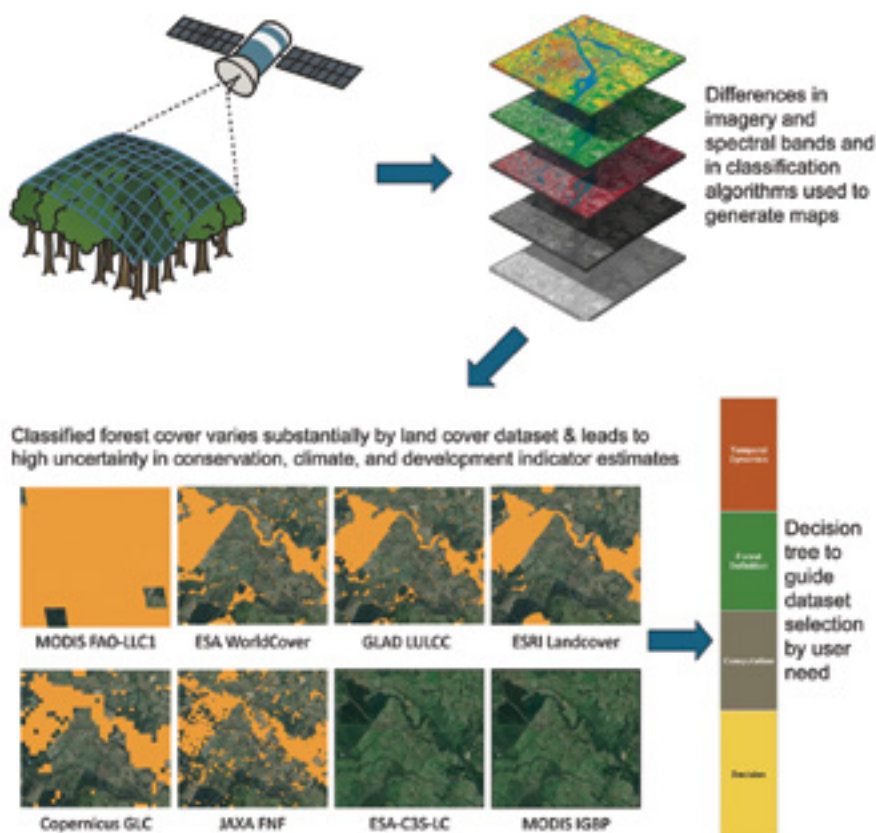
The problem stems from how different researchers define "forest" and the digital technology they use to view forests, said researcher Daniel C. Miller. "When land is viewed from the sky, it's difficult to know at a global scale whether something is a forest or not... Some might consider a small patch of trees to be a forest, but for others only a large, dense area of trees will count."

The study found that the discrepancy among datasets creates major uncertainty, sometimes by a factor of 10. For example, some maps might count a savanna interspersed with trees as forest based on a 10 percent canopy cover threshold, while others require 50 percent. These small definitional differences can flip millions of hectares from "forest" to "non-forest" in an instant.

The researchers used case studies from Brazil, India and Kenya to show how these digital maps affect human lives and global policy challenges. In India, for example, the estimated number of people living in poverty near forests fluctuated from 23 million to 252 million depending solely on which map was used.

Miller warned that if forest definitions continue to vary, countries could overestimate — or dangerously underestimate — their carbon sequestration potential. [ACRES.](#)

Different algorithms and data techniques produce widely varying conclusions about how much of the earth is forested.



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If you want to get more out of your fields and are tired of the increasing cost of NPK, keep reading because we have what you need to be more successful on your farm...

Here are the benefits of our nutrients:

- Higher-quality crops with more flavor & nutrition
- Increase yields and improve organic matter
- Stimulate nitrogen fixing organisms in the soil
- Save money over the cost of synthetic fertilizer
- Improve cell structure of produce for longer shelf life
- Improve soil moisture retention in dry climates
- Promote a healthy soil eco system with fewer problems
- Non leaching nutrients accumulate over time
- Build soil up year over year... everything improves

"At any given moment your soil is either getting better or it is getting worse, with Chicken Soup for the Soil® your soil will continue to improve." -Jim Zamzow, Founder of Dr. JimZ®



So, What Exactly Is Chicken Soup for the Soil®?

Chicken Soup for the Soil® is a carbon based, colloidal, liquid fertilizer that contains all the nutrients and trace minerals we have identified over the years as being beneficial for the soil and plants; it literally brings the biology in dead soil back to life, grows large dense crops, tasty fruits and vegetables, higher quality buds, lush pastures, hay fields, and delivers all the nutrition your plants need to meet their maximum genetic potential.

Rather than force feeding plants with mainstream chemical fertilizer we suggest improving your soil by properly feeding the microbes all the nutrients found in Chicken Soup for the Soil® (microbes need to digest the nutrients in the soil before the plant can effectively use them).

Chicken Soup for the Soil® is structured in a way that makes it easy for microbes to consume, create new life, & fuel plants with everything they need to meet their maximum potential.



Feeding the microbes will ultimately help you grow happy fruits, vegetables, grass, & hay that have more color, taste better, have fewer problems, a longer shelf life, and are nutritious to eat. This Stuff Works!

When used as a liquid fertilizer concentrate for pastures and hay fields Chicken Soup provides all the nutrients and trace minerals for the grass and hay to be beneficial for horse, cattle, and other farm animals.

What is in Chicken Soup for the Soil®?

Chicken Soup is a 4-2-0; however, we focus on nutrient balance rather than guaranteed analysis. There is an array of essential amino acids, multiple sources of minerals, trace minerals and micro trace minerals all in natural chelated forms. We have an array of organic acids from mineral extracts and have multiple sources of carbon. We have an assortment of sea plant extracts. We also use some of the compounds found in sea fog that come from the respiration of sea plants as well as other important plant components. All ingredients are reacted into a colloidal nutrient that is non leaching and easy for microbes to consume, digest, and feed the plants at a biological level. When you have a healthy soil ecosystem and happy plants everything improves!

"You can feed microbes anything organic and they will reproduce, but when you feed them Chicken Soup for the Soil® their population explodes." -Jim Zamzow



“Jim, you have turned my dryland ranch into an oasis...everything you told me was true, thanks!”

– Owen O. Junayo Ranch



"I talked to Chris L. from northern Indiana yesterday and he said last year on half of his pasture he applied Chicken Soup for the Soil®. This winter when he pulled soil tests his Chicken Soup side is 1% organic matter and 6 CEC. The other side is still 0.5% organic matter and 4 CEC. I thought you would find that interesting."
Testimonial sent by Jesse H.

"It is documented that for every 1% organic matter the soil will hold a minimum of 16,500 gallons of water per acre. So, if you increase your organic matter by 0.5% you increase the water holding capacity by 8,250 gallons per acre. Not Bad!" -Jim Zamzow

How to Apply Chicken Soup for The Soil®

Methods of Application - Spray - Drip - Pivots - Side Dress - Foliar - Compost Tea

Baseline Rates of Application

You will get out what you put in with the Chicken Soup... we recommend applying as much as you can without spending more than your farm budget allows; this will vary depending on individual crops, location, yields, and profits per acre. Chicken Soup is non-leaching and stays in the soil.

Examples

- Hay fields and pasture: 10+ gal per acre
- Corn fields: In-furrow 5+ gal per acre
- Corn fields: Side dress 20+ gal per acre
- Fruit & nut trees: 30 to 60+ gal per acre
- Potatoes: 25+ gal per acre
- Everything else: Use what budget allows



Can be used as a standalone solution or successfully paired with conventional NPK. We recommend diluting the Chicken Soup for the Soil® with at least 50% water in your spray tank.

For instance, a corn farmer could split the farm budget and use 50% on Chicken Soup and 50% on conventional methods. The Chicken Soup for the Soil® will help the synthetic chemicals work better than they would alone... this will improve the soil, crop quality, and increase yields without increasing budget.

Important to note: Farms who choose a mixed approach in the beginning typically find that they simply do not need to apply synthetic fertilizer anymore and will commonly drop them all together. After all, the secret to a good crop is a healthy soil. *The microbe sits at the table first...* When you supply nutrients at a biological level the plant is able to easily absorb the nutrients, and everything improves.

Chicken Soup for the Soil® fertilizer concentrate is the result of over 50 years of R & D and is the most complete fertilizer ever created! Nutrient clusters bind to organic matter and do not wash out of the soil. Nutrients are bioavailable and accumulate over time. Work on all soils. 100% NON-TOXIC. NON-LEACHING. Makes the best compost tea on earth (see instructions on the next page).

Stretch Product By Fermenting Compost Tea!

In a large tank or tote mix 1 part Chicken Soup with 10 parts water. Put a few pounds of high-quality topsoil from your farm in a paint strainer or cheese cloth and bob it in the tank like a tea bag. If the temperature is 70+ degrees, it takes about 4 days to ferment an amazing compost tea. Make sure to mix the solution with air 3 times per day throughout the fermenting process. This supplies oxygen to the microbes and mixes the solution. *Compost Tea Should Be Diluted With 10 Parts Water Before Application To Foliage.*



* Fermenting the compost tea is a good way to stretch the product for those willing to put in the work. A lot of customers apply Chicken Soup for the Soil® straight in the early spring while it is cold and then ferment the Compost tea once the weather warms up, this is a great combination.



Apply Compost Tea Foliar Spray

First ferment the Chicken Soup Compost Tea (by following the directions above)... Then mix the compost tea solution with an additional 10 parts water. This will cool the Chicken Soup down enough to be safely applied as an amazing foliar spray.

Using Chicken Soup Compost Tea™ as a foliar spray gives the plant a nice bump of nutrition and creates biological exclusion on the leaf. Bugs and disease do not like the microbes or the microbe waste that you are spraying on the leaf. Great for all types of crops; including fruit trees, row crops, hemp/cannabis, and garden veggies.

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Less Fertilizer, More Thought

Strategic reductions in phosphorus, potassium and nitrogen work best when driven by soil biology and sound agronomy

BY JEFFREY KLEYPAS

What are the biological implications of this manure application?



As I scroll through ag social media, I find a world is buzzing with strident thoughts: “liquid fertilizer is better than dry,” “anhydrous nitrogen is bad,” “the timing of the application is wrong,” and countless other critiques about how nutrients should be managed. Everyone seems to have a strong opinion, often tied to a product, a practice, or a trend.

At the end of the day, however, your farm has to make money, and nutrient management decisions have to be grounded in return on investment, not noise. From rethinking long-held assumptions about phosphorus and potassium, to being cautious with nitrogen reductions, to understanding the critical role of soil biology and carbon, managing macronutrients has become less about chasing silver bullets and more about building systems that consistently support yield and profitability.

Rethinking Phosphorus and Potassium

What was once a taboo idea — reducing or even eliminating phosphorus and potassium inputs — has now gained momentum in mainstream agriculture. The management of these two nutrients can have a very significant impact on bottom lines as fertilizer prices creep northward. Nearly all of my clients have the ability to eliminate these two inputs. Some consideration has to be made for soil type, the crop being raised, and the end goal on the farm, but on acres where Total Nutrient Digestion tests show adequate levels of phosphorus and potassium, reductions from 50 to 100 percent are very feasible.

However, what ultimately allows for this reduction is a fully functional soil biology system. This is where the water gets muddy in a hurry — with all of the different microbial stimulants and biological products on

the market. Making these nutrients accessible goes well beyond an individual product.

If you spend your money on a miracle drug, don't be surprised when it's not the cure and you see no response. Yes, some products may produce a positive change, but experience says that if you want a consistent response, you have to build a full program that supports biology.

I get very excited when growers see no difference in yield when they eliminate bulk fertilizer applications by focusing on a biological system. In today's world, this may mean an extra \$100 to the bottom line.

Nitrogen: A Different Standard

If I were to caution against reducing any nutrient, though, it would be nitrogen. This is a nutrient that, as a farm manager, you have to earn the right to reduce. I have experienced a handful of growers reducing nitrogen beyond 20 percent and having a yield reduction.

We can argue over nitrogen efficiency programs and their effectiveness, and you will find that many growers have mixed results. Many of these mixed results come from the timing of the application. As I continue to put years behind me, I am coming to the conclusion that the time for a nitrogen efficiency program may only be when nitrogen is applied at high levels well ahead of the planter. This is an area I look to learn more about through on-farm trials.

The Role of Carbon

One piece that cannot be ignored is carbon. I used to not pay much attention to carbon, but more and

more growers are coming back to me with higher yields where they had an abundance of carbon. I can count on one hand how many times in college we talked about carbon as being an essential input. Understanding how crops burn through this element is critical. The rise in inputs such as chicken litter, humic acid, and biochar is directly related to carbon. If you can't grow it, you have to apply it.

When looking to achieve nutrient reduction, the process and product selection can become a never-ending maze. From a long-term perspective, simply adding the right cover crop mix to your farm can do a lot of the heavy lifting and is something I recommend even to growers looking for a short-term fix. Having those living roots working with the microbial community is definitely a big part of the equation.

However, if your operation does not use cover crops, or you simply want a quicker response, there are some answers. A fall biological soil primer has been proven to supply many of the benefits of cover crops without worrying about managing living plants. It allows growers to eliminate phosphorus and potassium fertilizers in many cases.

There are many biological products on the market these days. Some even go so far as to promise specific levels of nutrient replacement or your money back. But living systems in the soil do not work on marketing promises. Experience has taught me that even the best microbial products are not successful in every single instance. This is where it is critical for growers investing money in these products to work with trusted advisors that understand the systems and how to fix them, even if a product seems to fail.

The biggest takeaway here is to not think of these products as the first thing you can eliminate from your budget. These products are parts of a bigger program, a shift in management that often results in lower input costs that maintain yield and/or increase profits.

The Total Picture

What we do at planting dictates so much of the success of the season. Upfront biology and plant support are vital to success. I've seen time and time again where a biological fertility system that minimizes stress and moves nutrients into the plant during times of stress is literally the difference between producing a harvest and having to bring out the shredder.

Everything I ask growers to do revolves around supporting biology, even when discussing foliar. In extreme dryland cases, it is not impossible to see stress reduction and nutrient access result in a 100 percent increase in yield, or a field having a more uniform yield that justifies harvest. Choose products because they are needed, not just because it is something that has always been done or recommended by the local supplier. A classic example of this is nitrogen management, where plants are stressed by an unneeded application that is backed up by sap data.

Supporting biology, applying the right nutrient at the right time in the right form, and not just pumping on more nitrogen is how I have repeatedly saved growers money on their total program while also experiencing significant yield increases. We can't change the markets with agronomy, but we can change the ROI. The best investment for your farm in 2026 is an agronomist that understands these relationships and how to navigate the myriad of new and existing products being marketed to every farmer.

Navigating the many companies, products, and systems all wanting a piece of your farm can be a daunting task. Focus on building functioning biological systems, and you will be able to reduce inputs, increase production and experience a successful growing season. Allow biology to pay you back in 2026. [ACRES.](#)

Jeffrey Kleypas, CCA, CPAG, is a consultant with Advancing Eco Agriculture.

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Tree health is the number one priority at Third Leaf Farm. Everyone told Kyle Rasch that it was impossible to grow unblemished organic apples in Michigan, so he set out to prove them wrong.

DOING THE IMPOSSIBLE

Third Leaf Farm in Michigan is showing that organic apple production is achievable — even in a humid environment

BY ANNELIESE ABBOTT

The Michigan state flower is the apple blossom, and there's a reason for that — Michigan loves its apples. Come fall, when the leaves start to turn and the days get crisp and chilly, families from all over the state head out to the nearest apple orchard to get their annual fill of apples, cider and doughnuts.

Commercial apple production is big in Michigan, too. The state is the third-largest apple producer in the U.S. in both number of farms and yield. Michigan's 1,400 apple farms produced 1.1 billion pounds of apples in 2025 — 10 percent of total

national production.

But whether people are picking their own apples at the local orchard or buying them in a plastic bag at Meijer, most Michigan apples aren't organic. In 2021, there were only 24 certified organic apple farms in the state of Michigan, producing 10.6 million pounds of organic apples. That's less than 1 percent of Michigan's apple production. In contrast, organic apples were 14 percent of total production in Washington, the leading apple-producing state.

Why is Michigan so far behind in organic apple production? There's a simple reason: Michigan apple grow-

ers and researchers alike have said for years that it's impossible to grow organic apples in Michigan. The climate's too humid, they say. Codling moth and apple scab are too much of a problem. You can't grow nice-looking apples without pesticides. Don't even try.

That's what everybody told Kyle Rasch. But instead of ruling out organic as an option, he took it as a challenge. Impossible, they say? Not for Kyle. At Third Leaf Farm in Greenville, just northeast of Grand Rapids, he's devoted his life to proving that it is, indeed, possible to grow beautiful organic apples in Michigan.

Rising to the Challenge

Apples are in Kyle Rasch's blood. He and his brothers, Eric and Devin, are third-generation growers. Kyle always planned to take over the family farm, but he wanted to see the world first. After graduating from college, he spent ten years working worldwide on organic farms (WWOOF) to see how people in other countries — including Australia, Italy, New Zealand, India, Nepal and Peru — accomplished that supposedly impossible feat of growing apples organically. When he came home, he started transitioning his family's apple farm to organic.

That was ten years ago. Today, Third Leaf Farm is certified organic by both USDA and the Rodale Institute's Regenerative Organic program. Kyle opted for Regenerative Organic's add-on certification to differentiate his apples from the industrial organic apple business in Washington. Plus, he really likes Regenerative Organic's emphasis on soil health. "We want to focus on superior nutrition," Kyle says. "We are really trying to work with nature every step of the way."

The key to successful organic apple production is health, and health starts with the soil. Before Kyle plants an orchard, he spends ten years preparing the soil with cover crops. In his established orchards, organic nutrient management is the keystone of his production system. The goal is to keep the apple trees so healthy that they are able to naturally resist pests and diseases while producing superior fruit.

Variety selection is important, too. Some apple cultivars, like McIntosh or Gala, are very susceptible to apple scab and are difficult to grow organically. Others, like Goldrush, Crimson Topaz, Liberty and Enterprise are bred for scab resistance and are better suited for organic production.

But there are tradeoffs — some of the cultivars bred primarily for scab resistance lack flavor. And consumers aren't familiar with them, having never seen a Liberty apple bagged up at the grocery store. So cultivar selection becomes a balancing act between



The three Rasch brothers — Devin, Eric and Kyle.

what works with organic production, what tastes good and what people have heard of and want to buy.

In general, apples with firmer, denser flesh — like Goldrush and Fuji — are more resistant to disease than softer apples, so Kyle tends toward those varieties. Cultivars like Golden Delicious or Honeycrisp are only partially scab tolerant, but he can usually get a good harvest from them. And then there are fun varieties like Kissabel, whose firm flesh has a rosy-red tinge and an aromatic flavor.

If a particular cultivar isn't working well, Kyle will prune the trees back and graft on scions from a different, better cultivar. This is a far faster way to establish a block of a new variety than ripping out the trees completely and starting new trees from scratch. The newly grafted trees are ready for production in just a few years.

Kyle sells most of his apples wholesale for processing, usually into organic applesauce. He also offers U-pick in the fall, and visitors from the greater Grand Rapids area can pick their own organic apples or buy pre-picked apples, pumpkins, squash and honey from E's Bee Sanctuary, which is run by Kyle's brother, Eric.

Organic apple production pairs great with beekeeping. Unlike most

commercial beekeepers, Eric keeps his bees in Michigan all year round, both at the orchard and in several outyards. He's working on breeding bees that are resistant to the *Varroa* mite, a parasite that is one of the factors in ongoing heavy winter colony losses across the beekeeping industry.

Of course, most of the neighboring orchards are not organic, and they routinely spray pesticides that are hazardous to honeybees. Eric's developed good relationships with his neighbors, and they try to spray at night when his bees aren't out on the flowers. "Being mindful of your local beekeeper is really important," he tells growers.

Health Starts with the Soil

How does Kyle manage the "impossible" feat of growing organic apples in Michigan? As he emphasizes, it's all about health — and health starts with nutrition. Instead of simply viewing diseases like apple scab as the enemy, Kyle asks, "Why is there apple scab on this variety?" Is the plant stressed? Is it deficient in a particular nutrient?

"Nutrients are the backbone of our program," Kyle emphasizes. In addition to doing soil tests, he relies heavily on sap tests, which tell him how mobile nutrients are in the



Wood chip mulch and metal vole guards help with new tree establishment.

plant. This involves taking one young and one old leaf from the same tree, packing them carefully in plastic bags, and sending them to a lab in the Netherlands for analysis. If nutrients are deficient in the middle of the season, Kyle will use foliar sprays, like fish emulsion, to get nutrients

directly into the leaves and bark.

Another major difference between organic and conventional apple production is that conventional growers typically spray herbicides at the base of the trees for weed control. In organic production, the emphasis is on maintaining a biodiverse understory.

In the spring and summer, “this orchard ends up turning into a massive wildflower field,” Kyle explains. He doesn’t plant anything except a basic orchard mix of bluegrass and clover, but other plants grow naturally to diversify the planting.

To keep the understory plants from overwhelming the trees, Kyle mows between the rows several times a year. The farm has a mower that swings between the trees, and where that can’t reach, there’s always the weed eater. “There are a lot of benefits to soil health — benefits to the ecology under the tree,” he says.

The main downside to keeping a living understory in the tree rows is when it’s time to plant new trees. The first year or two is the hardest. Ample applications of wood chip mulch help keep weeds back from the tiny trees, and metal vole guards help prevent rodent damage. But it’s still touch-and-go at first, which is why Kyle prefers to graft new scions onto already established trees whenever possible.

Eliminating herbicides requires slight modifications in rootstock selection, too. Kyle’s newer plantings



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are in a high-density trellis system, which typically uses a Bud 9 dwarfing rootstock. But because the roots have to compete more with other plants for nutrients and water, Kyle's found that the next size up — Bud 10 — is necessary to get the same size of trees as would grow on herbicide-sprayed Bud 9.

Like most commercial apple growers, Kyle's newer plantings use a high-density trellis system. This has both pros and cons in organic production. Since treated lumber is not allowed in organic production, Kyle has to substitute rot-resistant woods like cypress or cedar, or else use metal or concrete posts, all of which are more expensive. But the single-leader, simple-spindle pruning system helps maximize light interception, which reduces insect and disease pressure.

Challenges of the Perfect Apple

If he could, Kyle wouldn't spray anything except foliar nutrients. An ideal organic production system would keep the trees so healthy that they could fight off all diseases and pests without assistance. But in real-life conditions, especially in Michigan, there will always still be at least a small amount of disease and pest pressure.

"If we weren't trying to make an apple that looks perfect, this would be a lot easier," Kyle explains. Unfortunately, market demand for perfection is so high that even one codling moth hole or spot of apple scab will make an otherwise perfect apple unsaleable. "We are trying to get to where every apple is unblemished, and that's a stretch for organic in Michigan."

Rather than trying to kill pests and diseases, organic management focuses on resistance and deterrence. Products like LifeGard, a *Bacillus mycoides* extract, trigger disease resistance in trees so "they can help defend themselves." Kyle also uses a lot of microbial sprays, which "cover the trees with microbes to compete with disease microbes that we are trying to not have in the orchard."



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Goldrush is a great variety for organic production — it's both disease resistant and tasty.

The main deterrent Kyle uses is Surround, a kaolin clay slurry that coats the developing apples with a white film that physically protects them from pests. “It’s a nightmare to work with, but it does work a lot,” Kyle says. Other deterrents include

cinnamon and garlic extracts.

Kyle sometimes uses sulfur products to prevent apple scab but tries to minimize the use of copper because it accumulates in the soil. He uses organic bioinsecticides like DiPel (*Bacillus thuringiensis*) and Entrust (spi-

nosad) sparingly and only at night, because they are toxic to Eric’s honeybees and other pollinators.

Another useful deterrent for codling moth is pheromone disruption. Pheromone dispensers, hung near the tops of the trees, fill the air with so much female codling moth pheromone that the males get disoriented and exhaust themselves trying to find a female to mate with. Because the pheromone is specific to codling moth, it doesn’t impact any other species of insect.

Yes, it’s more work to manage for pests and diseases organically, and at times even Kyle gets frustrated — like this year, when almost half of his apples were unsalable because of one small blemish on otherwise good fruit. “Some years organic is like, why am I doing this?” he admits. But he perseveres, because he has tasted success — and it’s as sweet as a fresh-picked apple.

And it’s catching on. Coming out of the conventional apple industry himself, Kyle maintains good relationships with his neighbors. “I don’t see anyone as the enemy,” he says. “We are all working together to find more regenerative practices to grow something that makes more sense ecologically long term. No one wants to be out there spraying.”

Every year is a learning experience, and Kyle doesn’t consider himself to be all the way there yet. “I want to find more ways to partner with nature and create the most resilient communities here in the soil,” he says. Through that perseverance, he’s overcoming more challenges each year. And the delicious apples he grows at Third Leaf Farm are indisputable proof that it is, indeed, possible to grow organic apples in Michigan. [ACRES.](#)

Anneliese Abbott is an editor with Acres U.S.A. She is the author of *Malabar Farm: Louis Bromfield, Friends of the Land, and the Rise of Sustainable Agriculture*, and she runs the site [historyoforganic.com](#). She has a master’s degree in agroecology from the University of Wisconsin-Madison and farms with her family in Otsego, Michigan.

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Design It Right and Let Your Sprayer Collect Dust

By understanding population ecology, lifecycles and habitat, farmers can guide ecosystems toward balance instead of fighting endless outbreaks

BY MARK SHEPARD

By now, most of you reading this have realized that the cavalry isn't coming to save the day. The silver bullet — a shelf-stable, miracle-in-a-jug pest-and-disease cure that turns fields into advertising photos — doesn't exist. Anything that might seem like a "miracle cure" seems to throw side effects all over the place: paperwork, licensing, specialized equipment — and all of that costs money.

Those of us stubborn enough to have worked through the years to

create diverse and complex systems have stayed in the game. We're not the "poor, suffering farmers" that you see on the news. We've noticed something: ecosystems don't really have pest problems. They don't really have disease problems. They have *balance*. It's the increasingly sterile monocultures that have the problem.

Just ask any of the old-timers at Acres U.S.A. We may grow grains, dairy, produce or poultry — we're all different — but all of us have noticed pest and disease issues *declining* the

longer we practice ecological agriculture. In eco-agriculture systems, our job isn't to control nature but to learn how it works and then to relate with it, intensely and intentionally.

Think of two different approaches to maneuvering upstream through river rapids. One is the jet boat with twin 500s — engines roaring, smacking its way from wave to wave. Just think of the size of the equipment, the fuel, and the wear and tear on the machinery and, especially, the pilot. Farming that way kills.

The ecological pest and disease manager is more like an experienced kayaker: reading the current, understanding how the waves and eddies work, and using the force of the river itself to pull and push the boat upstream.

Both techniques will get you upstream. One requires a more thorough understanding of how the system works and is more of an interaction. The other is more about telling the system what to do and how to do it, based on what you want.

Ecological pest and disease management is less about killing things and more about designing your system so that you don't need to kill things in the first place. You design your system to mimic natural systems and let it solve its own problems all by itself. It's more about understanding population ecology, pest and disease lifecycles, habitat management, soil and plant nutrition, genetic resistance, and appropriate timing. Design the system ahead of time to prevent the problems up front so you don't have to solve them later. Get the pieces lined up and steer your system into the future — and your sprayer will begin to collect dust.

Here are some of the elements involved in ecological control.

Population Ecology: Pests Aren't "Bad" — They're Telling You Something

Plant a field of only broccoli or potatoes and you know who will show up. You've provided the perfect habitat for things that eat broccoli or pota-

toes. You have accidentally created a pest feedlot — a vast monocrop buffet, with very few predators to keep things in check.

The study of population ecology tells us two things:

1. Every organism reproduces as fast as its food supply and environment will allow.
2. Every population is controlled by something that eats it, infects it or competes with it.

When we plant a thousand acres of one highly palatable, genetically shallow crop, we have just pulled the pin on a population-ecology hand grenade. The pest doesn't show up because it's "mean." It shows up because we built a five-star restaurant with no bouncer.

The eco-farmer asks:

- What controls this pest or disease naturally in diverse ecosystems?
- How do we put those controls back?
- How can we block, deflect, distract, or repel it by designing natural controls into our system?

The pests and diseases that affect our crops have predators, parasites, pathogens, and competitors that attack them in turn. How can we design a system that allows them to perform that function?

Lifecycle Disruption: Hit Them When They're Vulnerable

Chemical control is a full broadside intended to overwhelm one's adversary. IPM (Integrated Pest Management) strives to fine-tune the timing so as to reduce the ammunition used — more like a "surgical strike." It's an improvement on the full-chemical method — but ecological thinking helps us to design systems that prevent the problem by understanding more about the system.

Every pest and pathogen has weak spots in its lifecycle:

- overwintering stages
- exposed egg or larval periods
- narrow timing of emergence
- host-switch moments
- mating swarms



A pollinator strip between fields in Montana

- soil-borne juvenile stages

When we see adult insects chewing leaves, or widespread foliar disease, we might actually be too late for simple control. Use the opportunity to ask: *When is this organism actually easiest to interrupt?* My life changed when I realized that planting my squash crop *earlier* in order to get have higher-priced, early-season availability was not worth the hassle of dealing with the vine borers and root maggots that appeared at that time. My later-planted squash was in its critical stage *after* the first big hatch. On top of that, the first big hatch didn't reproduce as vigorously because it didn't have the food source it needed.

Timing your crop planting may require switching varieties. I went from 110-day delicata and butternut to 75-day acorn squash. I planted early field peas to "hold the ground" as pests emerged, and I disked them in before late-planted green beans, beets or kale. I avoided early leafy greens to miss the flea-beetle hatch. Early planting of other crops can help you miss corn borers, earworms, potato leafhoppers and armyworms (along with an additional disk-harrowing to disrupt lifecycles).

Other examples of lifecycle disruption and timing happen in ecological systems:

- Poultry or hogs can run through orchards after harvest in the fall to break pest and insect cycles by eating dropped fruit, larvae and pupae. The benefits of this are

even more noticeable when you run your animals through in the spring, but there's the whole timing issue. Since I was certified organic, I had to rotate livestock out of the orchards in May in order to be able to legally harvest apples or chestnuts in October. Cherries, blueberries and hazelnuts had to have livestock excluded until after harvest.

- Properly timed grazing with enough animals takes out weed seed heads before maturity. I never imagined that cattle would overgraze thistles until I saw it with my own eyes.
- In irrigated regions, flooding or drying a paddock at the right time can knock back parasites.
- Mechanical disturbance (mowing, tilling) overwintering sites collapses next year's population before it starts. This is a double-edged sword, though. In the early 2000s, research from UW Madison found the highest number of ground beetles (a predatory insect) overwintering under the leaves of comfrey. Mowing overwintering sites can also knock back your beneficials.

If you're into the war analogy with pests and diseases, relax a little. We will never win this war. All that we have to do is to break the cycle enough to get a crop in, and then



This cornfield will receive at least some pest control via the beneficial predators who live in this oak.

we repeat the process so as to not let the pest population soar. Pest populations will probably never hit zero — they merely need to stay below economically damaging levels while the rest of the ecosystem gains strength.

Habitat Enhancement for the Real Workforce: Beneficial Organisms

Beneficial habitat isn't just a feel-good pollinator strip to satisfy your organic inspector or the people on the farm-tour bus. It is the structural design of your farm ecosystem. It is the almost invisible web of beneficial insects, birds, bats, reptiles and microbes that exists across the entire ecological farm or ranch.

The web of beneficials is your true “spray rig.” It's also cheaper than diesel. Think of all the bugs you might not want to see on your operation: earworms, potato beetles, root maggots, cutworms, thrips, leafhoppers, tomato hornworms, codling moth, sawflies, mites, aphids, and more — all of these pests have one thing in common: at some time during their life they are all food for other organisms. But here's the key: *they will only show up if they can live there.*

Our job is to keep predators fed and housed year-round so they will be available when our pests need removal. We can do this with habitat

enhancement.

- First and foremost, plant oak trees! (See my article on this in the September 2024 issue.) Oak trees host more insect species than any other tree in the Americas, and 99 percent of those species are host-specific and will not eat your crops. Oaks feed birds and other predators when there are no “pests” in your fields. When pests emerge, the birds will be there and ready to eat.
- Between fields, plant continuously flowering strips of natively adapted plants throughout the season as food and breeding grounds for parasitoid wasps and hoverflies. Throw in buckwheat every month or so; I've never seen more hoverflies than in buckwheat.
- Leave messy, undisturbed edges, with fallen chunks of bark or mushroom logs for ground beetles
- Build bat and owl perches and nest boxes. Hawk roosts help with gophers, ground squirrels, mice and rats.
- Create water sources scattered throughout the property! Farm ponds are vital for dragonfly and amphibian breeding.

Hedgerows, silvopasture, alley cropping, and multi-level perennial systems create permanent housing for beneficials. Instead of a naked corn-and-soy landscape where predators starve between outbreaks, strive to build year-round pest control.

Beneficials shouldn't need to be another input. All that they need is groceries and a roof. Provide both and they'll show up for work before you do.

Soil Mineral Balance: Nutrition Underlies the Plant Immune System

Plant health isn't just NPK and a prayer. It's the full mineral orchestra in natural slow-release form:

- calcium for cell-wall strength
- trace elements for enzyme systems
- magnesium for chlorophyll
- boron and zinc for reproductive health
- sulfur for protein formation

Insects and diseases recycle weak plants. They are the janitors — not the villains.

Balanced soil minerals, re-awakened soil biology and organic matter management (green, brown and blue carbon) shift the farm from pest *attraction* to pest *resistance*. I can hear Gary Zimmer now jumping up and down: “Balance your minerals! Activate your biology! Manage your decay cycle!” Tools include mineral amendments based on soil testing, compost and compost teas, liquid ferments, deep-rooted plants to re-mine minerals leached deep into the soil, managed grazing to recycle nutrients, healthy populations of soil life, and more.

Once mineral balance and overall soil health improves, pests stop being a crisis and start being a monitoring tool. Problems become our teachers.

ACRES.

Mark Shepard is a land designer and consultant and is the author of *Restoration Agriculture*, *Water for Any Farm* and the *Water for Any Farm Technical Manual*.



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NOT A DISTURBING TREND

Disturbance of all types — physical, biological and chemical — is gradually being reduced in American agriculture

**BY JAY
FUHRER**

Editor's note: This is the second in a series of five explanations of the principles of soil health, as described by Jay Fuhrer, who was one of the first to define these principles as a whole. Each article will include a description of the principle along with a profile of a farm that is successfully implementing it.

Driving through a landscape allows you to observe fields with and without soil disturbance. Physical disturbance or tillage is the easiest to see. Biological soil disturbance — limit-

ed photosynthetic time and limited plant diversity, along with chemical soil disturbance or pesticide use — is more difficult to see.

Let's look at a few terms we've used to describe how we manage soil over the years. These are listed in roughly chronological order, although there is of course much overlap.

TILLAGE. Tillage is as old as crop production and is well recorded in historical documents. Now fast forward to the present and ask yourself

a simple question: How much soil loss can you tolerate per acre or per bushel you produce? For myself, as a long-time conservationist, the answer is zero.

The reasons people give for tillage are lengthy, but they usually have little to do with managing wind and water erosion, water quality and quantity, building soil aggregates, or carbon. Early best management practices for erosion control consisted of strip cropping, contour cropping, windbreaks, terraces, diversions and



ABOVE: Diversity has returned to the farm.
LEFT: Cover crops have helped reduce the farm's biological disturbance component.

waterways, to name a few. These were attempts to slow soil degradation with narrow fields and structural practices — basically treating symptoms instead of the problem. For example, the government might install a waterway to heal water erosion, instead of helping farmers improve water infiltration in the drainage area. That said, this was the early start of natural resource conservation.

Biological disturbance was lower during this period, as we had more plant diversity, perennials and livestock on the landscape. Chemical disturbance was lower during this period, too, but was starting to increase. Overall soil degradation was significant during this era.

CONSERVATION TILLAGE. This agricultural term was commonly used for decades. Usually, this effort consisted of tillage implements that left more residue on the soil surface and used less plowing. Field size expanded and tractor speeds increased.

Biological disturbance increased due to a loss of plant diversity, perennials and livestock, resulting in less photosynthesis and less plant exudate diversity. Chemical disturbance increased also, with more fertilizer and pesticide use. However, it was a step in the right direction from the viewpoint of emphasizing the importance of conservation. Soil degradation slowed but continued.

NO-TILL. When no-till was introduced, we started to see a significant drop in erosion and related natural resource concerns. My first monitored soil organic matter gain was recorded in an early 1990s no-till cropping system. More farms soon followed. Thanks to the work of scientists like Dr. Dwayne Beck, the retired research manager at Dakota Lakes Research Farm in Pierre, South Dakota, we also started to understand that no-till systems are designed to work with diversified crop rotations.

While physical disturbance decreased in this time period, biological and chemical disturbance continued to increase. Simplified crop rotations

used chemical disturbance to offset limited plant diversity. Conservation was now a partner with the no-till planting concept. While imperfect, this was another step in the right direction.

SOIL HEALTH. In the soil health era, dynamic soil properties became important indicators — soil aggregates, infiltration, soil organic matter, water and nutrient holding capacity, and bulk density, to name a few. Plant

physiology helped further unravel the carbon cycle. Soil demonstrations like slake, the wind erosion model, and the rainfall simulator were commonplace.

Again, physical disturbance decreased, but biological disturbance also decreased with the use of cover crops, which returned photosynthesis activity and plant diversity. Chemical disturbance continued to increase, though. Conservation was now a partner with soil health.



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REGENERATION. Here today, greenhouse gases (carbon dioxide, methane, and nitrous oxide) are in the forefront. The soil health principles are used to rebuild our soils. Farmers and agronomists are starting to focus on carbon (the food) and are asking whether more carbon is coming into our system than is leaving it, understanding that an overall balance is needed to regenerate or rebuild a soil.

More emphasis is now placed on nutrient density, both in crop production and in grass-finishing meat. People are realizing that agriculture is an extraction business and are asking what we are willing to do to

offset nutrient export. Physical disturbance is decreasing, biological disturbance is improving, and even chemical disturbance is decreasing due to some amount of pesticide reduction. [ACRES](#).

Jay Fuhrer is a conservationist with the Burleigh County Soil Conservation District in North Dakota.

North Dakota farmers Jason Bosch and Jeremy Saeman have worked hard over time to incorporate the soil health principles.

FEATURED FARM

Saeman-Bosch Farm

Wing, North Dakota

Farm managers: Jeremy Saeman and Jason Bosch

The Saeman-Bosch Farm is located in northern Burleigh County, near Wing, North Dakota. The farm was originally operated by Jeremy Saeman's parents, Doris and the late James Saeman, who helpfully allowed Jeremy to experiment with new methods. Jason isn't opposed to new things, either; together they try things out on a small scale and then observe.

What does this mean for minimizing soil disturbance? Their physical disturbance has certainly lessened over time. They moved from full tillage with shank seeding openers to disc openers with minimum soil disturbance. The biological disturbance component has improved by adding additional photosynthetic time and plant diversity. The farm's plant diversity has increased and now includes oat, wheat, barley, soybean, sunflower, corn, flax, yellow pea, pinto bean, annual and biennial cover crops, and alfalfa/hay. They utilize all four crop types, from warm season grasses and broadleaves to cool season grasses and broadleaves.

The chemical disturbance component has improved by addressing pesticide use. They always had very minimal use of fungicides and insecticides, and in the last seven years they haven't used any. Herbicides are used prudently and are reduced when

conditions allow.

In addition to minimizing soil disturbance, the farm has worked hard over time to incorporate the remaining four soil health principles (armor, diversity, continual live plants, and livestock integration). Jeremy recently attended two Holistic Resource Management courses to further his goal of using the principles in a systems approach.

Over time, Jeremy and Jason have observed that wind and water erosion have been significantly reduced, bird populations have rebounded, and worm populations in the soil have increased. Expired CRP land they converted without tillage strongly supports soil life. Wildlife numbers have increased, and rotational grazing has allowed grass banking for early spring. In addition, Jeremy adds, "When we stopped tilling — no more rock picking!"

Jeremy and Jason intend to place more emphasis moving forward on biologicals, worm castings, and carbon, while continuing to reduce inputs. They agree it is important to continue installing water pipelines and tanks to allow for more livestock integration for both the grasslands and the cropland.



Jason Bosch
& Jeremy Saeman

SAEMAN - BOSCH FARM TIMELINE

Mid-1990s: Began using sweep openers

Late-1990s: Minimum till points

2006: Jeremy starts farming full time

2007: Partnered on a cover crop plot with the Burleigh County Soil Conservation District

2008: Jeremy attended a Phil Needham management session in Jamestown, North Dakota; started using a no-till drill and planter, and added biological amendments; rotational grazing system was installed, eventually increasing the herd from 120 to 400 mother cows, utilizing native rangeland, crop aftermath, and cover crops

2013: Jason starts farming full time; all acres seeded no-till

2014: Added humic acid as a soil amendment

2018: Began integrating forage cover crops, usually four- to eight-way mixes; last use of fungicides and insecticides; Jeremy joined the Burleigh County Soil Conservation District board of supervisors

2019: Attended two Holistic Resource Management courses

2020: Planted green with soybean and pinto beans into a standing cover crop, such as cereal rye; fertility management moved from anhydrous to slow-release nitrogen foliar applications with sugar

2023: Host site for Crops-Covers-Cows soil health event

2024: Plant diversity emphasis



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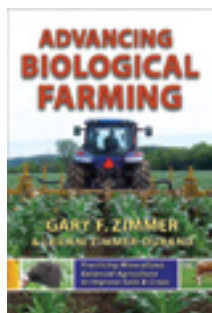
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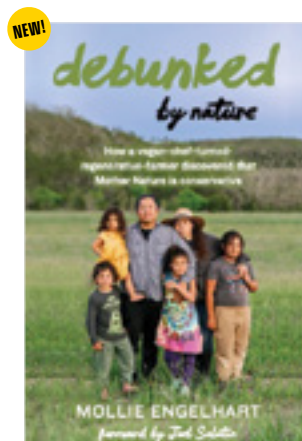
DISPONIBLE EN ESPAÑOL: *Avances en Agricultura Biológica* ★ #7787 | \$24

**Nourishment:
What Animals Can Teach
Us About Rediscovering
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Fred Provenza

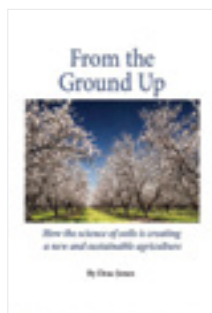
In *Nourishment: What Animals Can Teach Us About Rediscovering Our Nutritional Wisdom*, renowned animal behaviorist Fred Provenza presents his research on animal food choices, and his theory on how similar choices can improve human

health. Provenza focuses on the inherent nutritional wisdom of animals. He spent years studying animals and their nutritional choices - all the way down to the cellular level - and the resulting impact on their health. Then he calls into question human choices of food, and what we could be doing different-ly. #7530 | \$24.99

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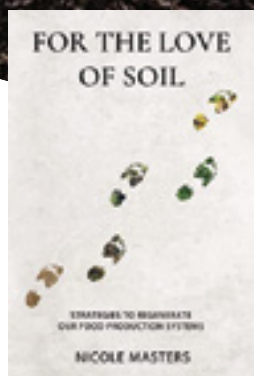
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Nicole Masters

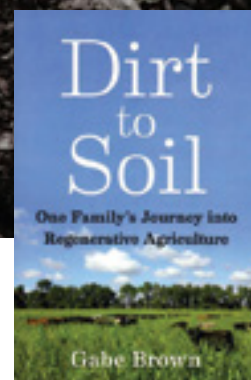
This is a land manager's roadmap to healthy soil and revitalized food systems. With decades of experience in regenerative soil systems and their management, agroecologist Nicole Masters delivers solutions to rewind the clock on this critical crisis. **#7583 | \$25**
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André Leu

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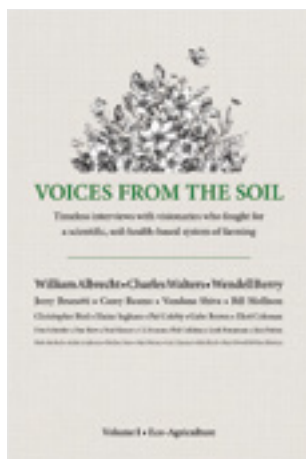
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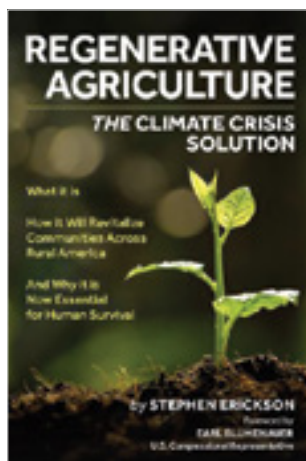


**Voices from the Soil** A*Acres U.S.A.*

Long overdue, this collection of timeless Acres U.S.A. interviews includes 25 diverse voices who sparked a movement still rapidly growing today around the world: organic, eco-agriculture. In 1976, when the first interview in this book was recorded, only a few lone voices in the agriculture industry could be heard teaching about soil health, holistic land and animal management, and this wild idea of organic farming. More than 45 years later, when the last interview in this book was recorded, the organic food industry had rocketed into the billions of dollars and a new progression of regenerative agriculture was starting to sweep the world. These pages include 25 free thinkers whose ideas and actions were fundamental in this continued evolution in favor of soil health and human health. **#7689 | \$40**

**Holistic Management, Third Edition: A Commonsense Revolution to Restore Our Environment***Allan Savory and Jody Butterfield*

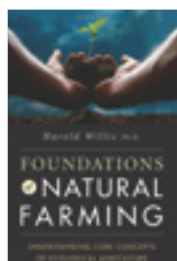
If we don't change the way we approach land management, irreparable harm from climate change could continue long after we replace fossil fuels with environmentally benign energy sources. This book updates Savory's paradigm-changing vision for reversing desertification, stemming the loss of biodiversity, eliminating fundamental causes of human impoverishment throughout the world, and climate change. **#7546 | \$49.99**

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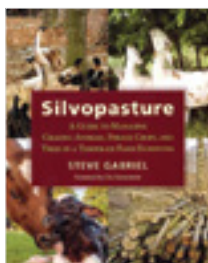


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Maureen Ash

Her marriage to a science geek with a good job meant a house on a lake and clean hands-until the farmer hidden inside him started scrabbling to escape. Holding the Lines is the story of a very ordinary woman's decision to find meaning in horses, hard work, love, and

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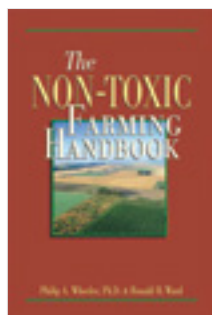
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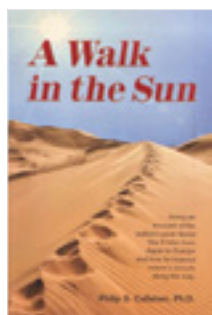


The Non-Toxic Farming Handbook ^A

*Philip A. Wheeler
& Ron Ward*

In this easy-to-understand handbook the authors successfully integrate the diverse techniques and technologies of classical organic farming, Albrecht-style soil fertility balancing, Reams-method soil and plant testing and analysis, and other alternative technologies applica-

ble to commercial-scale agriculture. Covers fertility inputs, in-the-field testing, foliar feeding, refractometers, tillage, live-stock nutrition, moon cycles and subtle energies, and more. **#6339 | \$15**

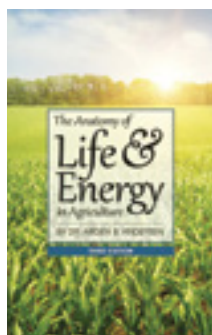


A Walk in the Sun ^A

Philip S. Callahan

This book explains why civilization frequently engineers itself into a convulsion. For those big lessons learned in small situations on *A Walk in the Sun* are, in fact, bigger than life and history, and ultimately must be seen as the tuning fork Callahan invoked when he made his breakthrough discoveries.

Discover with Callahan the secrets of nature as he hikes from the Orient to Europe and explores along the way in this fascinating travel diary. **#3043 | \$25**

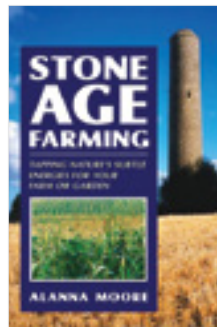


Anatomy of Life & Energy in Agriculture ^A

Arden Andersen

This manual is a compelling blend of sophisticated science and simple practices for farmers, agronomists, and agriculturalists alike. Andersen offers an insightful appreciation of farming that teaches readers how to transform agriculture into a process that is both robust and ecologically sound. In doing so, he envisions a successful method of farming for the 21st

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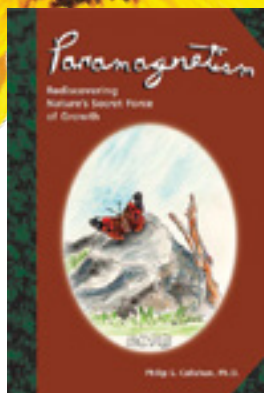
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The Energetic Goat ^A

Carrie Eastman

The Energetic Goat provides step-by-step instruction on the basic techniques, including common variations, as well as guidance on how to adapt other techniques to suit your personal preferences. Newcomers to alternative veterinary medicine will find the many photographs, diagrams, and sample case histories particularly useful, while veteran practitioners will discover new tricks and techniques to add to their repertoire. It also includes a timeline for transitioning your animals from conventional to holistic herd management, including tips on minerals, nutrition, and dealing with parasites. **#7389 | \$9.99**



Paramagnetism ^A *Philip S. Callahan*

The author believes an understanding of paramagnetism — and its practical integration into farming — can save agriculture worldwide. In this book, Callahan lays out a lifetime of research into low-frequency forces in nature and his discoveries regarding the force of paramagnetism and the amazing effects it has upon soils, plants and people. Ample illustrated by the author. **#6158 | \$25**



The Healing of Horses ^A *Carrie Eastman*

A guide for unique ways to determine the health of your horse, and holistic ways to prevent disease, treat minor injuries and ensure the highest quality of health for your horses. Eastman shares the techniques, methods and philosophies she has found most useful. **#7574 | \$30**



Exploring The Spectrum ^A *Philip S. Callahan*

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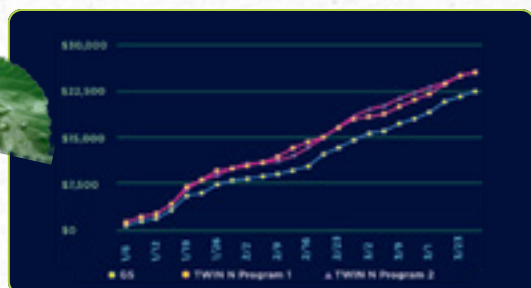


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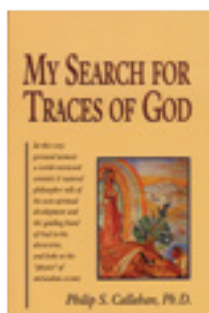


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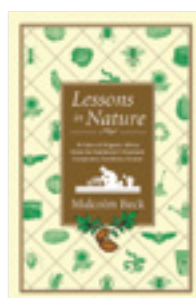


In the Shadow of Green Man

Reginaldo

Haslett-Marroquin

Join the wonderfully colorful and poetic Reginaldo Haslett-Marroquin, or Regi, as he weaves together stories from his upbringing in revolution-torn Guatemala, the vision of a regenerative form of farming which uplifts people, and the wandering fable of the Green Man. An immensely readable, enjoyable journey that informs as it entertains and enlightens. #7437 | \$20



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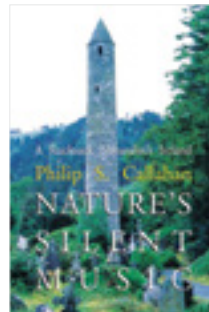


Food, Farming & Health ^A

Vandana Shiva

This book shows how health is a continuum from the soil, to the plants, to our bodies. Chemical farming is based on monocultures, which deprive us of the diversity we need for a balanced, healthy nutrition. Chemical farming depletes the soils of nutrition, producing plants that are nutritionally empty but full of toxic residues. When we eat chemically produced food we suffer from diseases related to nutrient deficiency and/or toxics. Understanding principles of Ayurvedic eating and healing does not have to feel foreign or odd.

#7487 | \$20



Nature's Silent Music ^A

Philip S. Callahan

In this book, Callahan shows how "civilized" insanity is turning Ireland away from her naturally harmonious, aesthetically pleasing, sound practices. Why remove a thatched roof to replace it with galvanized tin, only to increase the heating bill? With insightful wisdom, Callahan also examines the mysterious power of round towers, "magic spots," and healers such as Biddy Early. Callahan's study of hedgerows, booley people and Ireland's traditional form of agriculture can teach everyone the value of the land and why not to carelessly destroy it with toxic chemicals. #4051 | \$25



Tuning in to Nature ^A

Philip S. Callahan

Learn how plants and insects communicate through emissions in the infrared frequency range and why poisonous pesticides do not solve the real problems facing agriculture. In this breakthrough book Phil Callahan uncovers why certain insects are attracted only to certain plants, the role of pheromones work in nature, and how plants under stress literally signal insects to come devour them. #6493 | \$25

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Barefoot Biodynamics

Jeff Poppen
#7806 | \$20

The Barefoot Farmer: The Best of the Barefoot Farmer

Jeff Poppen
#7839 | \$20

The Best of the Barefoot Farmer, Volume II

Jeff Poppen
#7838 | \$20

Fifty Years of Biodynamic Farming: Essays From the Field

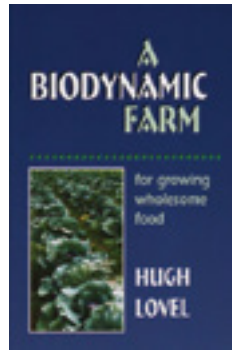
Henning Sehmsdorf
#7864 | \$26.55

What Is Biodynamics?

Rudolf Steiner
#7816 | \$20

Biodynamics for Beginners

Hugh J. Courtney
#7815 | \$29.95



A Biodynamic Farm ^A

Hugh Lovel

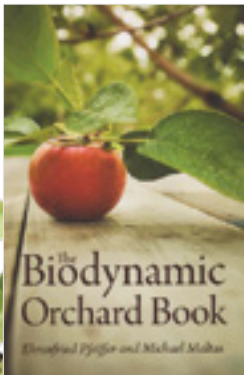
This book is a practical, how-to guide to understanding the definition of biodynamics, and practicing biodynamic techniques on your farm. You will learn about the role of individual biodynamic preparations, how to make your own biodynamic preparations, and details about the proper application and timing of biodynamic field treatments. #4168 | \$20



The Enlivened Rock Powders ^A

Harvey Lisle

Beginning with an explanation of the spiritual, cosmic side of rocks and drawing from his extensive knowledge of biodynamic techniques and dowsing, Lisle explains how to utilize these materials in agriculture. Peppered with in-depth quotations from other writings on the forces within rocks, this is destined to be the definitive work on the subject. #6103 | \$25



The Biodynamic Orchard Book

Ehrenfried E. Pfeiffer & Michael Maltas

Ehrenfried Pfeiffer, a pioneer of biodynamics in North America, discusses the principles of tree biology before describing the measures that can be taken to develop a pest-free orchard without the use of chemicals. He discusses soil preparation, the selection of trees for planting, issues of transplanting and pruning, the application of pastes, green cover crops, and pest control, before describing the key biodynamic preparations and how to spray them with greatest effectiveness. Michael Maltas ran fruit tree experiments on his biodynamic farm in Missouri for four years. The results are recorded in a highly practical annual spraying schedule for orchards, which is reproduced in this book. A month-by-month calendar gives information on specific methods and controls, based on Maltas's extensive experience. This is an invaluable book with practical advice on all aspects of planning and maintaining a healthy orchard. #7358 | \$19.99

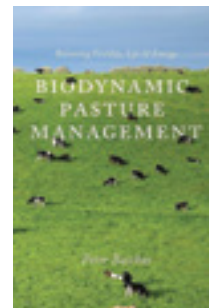


The North American Maria Thun Biodynamic Almanac: 2026

Titia Thun, Friedrich Thun and Bernard Jarman

The 2026 Maria Thun Biodynamic Almanac adapted for North American (EST) times. The original, and still the best, biodynamic sowing and planting calendar, trusted by farmers and gardeners for over 60 years. The simple, two-week-

to-view layout features detailed planting, tending and harvesting information to help both seasoned biodynamic farmers and beginner gardeners maximise the yield and vitality of crops and plants. #7877 | \$14.99



Biodynamic Pasture Management ^A

Peter Bacchus

New Zealand grazing consultant Peter Bacchus shares a lifetime of experience on applying biodynamics to pastures. His multi-pronged approach considers balance of fertility elements, organic matter levels, soil life, and particularly soil life forces. Through biodynamic preparations and other tools he seeks to produce

optimum grass quality and production for grazing animals. Also covered are biodynamic methods of pest and weed control. #7172 | \$25

Malabar Farm
Anneliese Abbott
#7714 | \$24.99

Resurrection of the Wild
Deborah Fleming
#7684 | \$19.95

Farming on the Wild Side
Nancy Hayden and John Hayden
#7569 | \$29.99

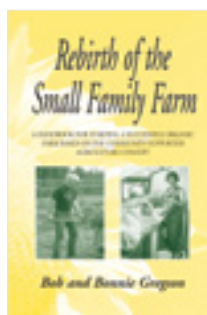
The Sheer Ecstasy of Being a Lunatic Farmer
Joel Salatin
#7018 | \$25

The New Organic Grower
Eliot Coleman
#7527 | \$29.99



2026 Stella Natura Biodynamic Planting Calendar

The Stella Natura calendar offers advice for when to sow seeds and cultivate garden and farm crops to enhance their roots, flowers, leaves or fruits. This is based on the Moon's passage through the constellations of the zodiac. Unfavorable times for sowing are also indicated, to help avoid those inexplicable crop failures.
#7866 | \$19.95



Rebirth of the Small Family Farm
Bonnie Gregson and Bob Gregson

This is a concise yet complete handbook for starting a successful organic farm based on the community supported agriculture concept. The model explained in the book is an updated version of the diverse market gardens/farms found throughout recorded history. Not just a theory book, it details specific tools, techniques and how-to information.
#6288 | \$8



Food Crash
Felix Zu Löwenstein

Production has become industrial: with pesticides, artificial fertilizers, genetic engineering. In his book *Food Crash*, the internationally respected organic farming expert Felix zu Löwenstein makes it clear that industrial agriculture based on the overuse of resources is not a solution but a dead end. It is not the lack of increased production but the wasteful use of food, the destruction of our natural resources, and a lack of justice that are leading to the collapse of the global food system.
#7804 | \$20

The Big Shift You Should Care About in 2026: Close the gap in missing production and health with harmonizing EMF & Stray Voltage protection for the farm

Today's world has a new and serious problem: high levels of artificial EMF and Stray Voltage from electrical substations, power lines, solar farms, cell towers, radar and satellites is polluting the very natural light energy required for photosynthesis, cellular energy, and immune strength. Farmers report fertility rates impacted by up to 40%, milk production in dairies by 25%, overall weaker animal and human health, and inhibiting soil microbiome development.

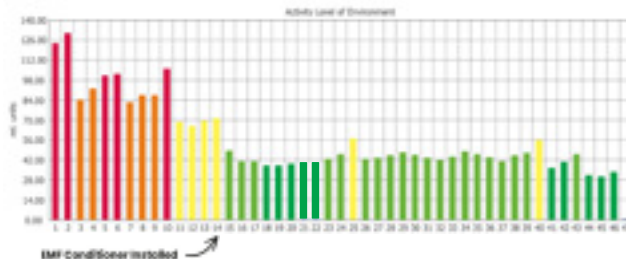
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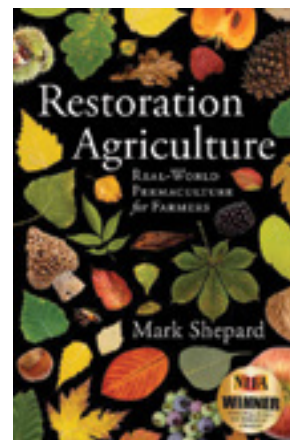
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Sepp Holzer's Permaculture

By Sepp Holzer

In this book, Sepp Holzer shares his skill and knowledge in growing profitable fruit trees, cultivating mushrooms and his success with pigs, poultry and building a kitchen garden on his doorstep. Holzer doesn't just cover how to create a holistic farm, but also shows how to make a living from it too. More than just a great permaculture guidebook, Holzer reveals the thinking processes he uses, based on principles found in nature, to create his productive systems – information that can be applied anywhere. **#7076 | \$29.99**

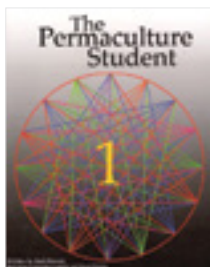


Restoration Agriculture ^A

Mark Shepard

Around the globe most people get their calories from “annual” agriculture — plants that grow fast for one season, produce lots of seeds, then die. Every single human society that has relied on annual crops for staple foods has collapsed. Restoration Agriculture explains how we can have all of the benefits of natural, perennial ecosystems and create agricultural systems that imitate nature in form and function while still providing for our food, building, fuel and many other needs — in your own backyard, farm or ranch. This book, based on real-world practices, presents an alternative to the agriculture system of eradication and offers exciting hope for our future. **#7170 | \$30**

DISPONIBLE EN ESPAÑOL:
AGRICULTURA REGENERATIVA ^A
#7799 | \$25



The Permaculture Student 1

Matt Powers

The Permaculture Student 1 condenses the certification requirements of a standard Permaculture Design Certification course into a reference manual that costs a fraction of an in-person or online permaculture design certification course. It is a reference manual rather than a traditional textbook of units and

assignments, so it is easier to use in designing. **#7727 | \$24.99**

+ The Permaculture Student 1 Workbook #728 | \$14.99



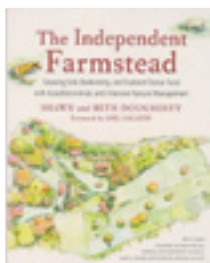
The Permaculture Student 2

Matt Powers

This book is full of photographs of real-life examples, instructive diagrams, engaging illustrations, inspiring and instructive quotes, and current references that connect, organize, and highlight the current leading examples of applied permaculture in numerous fields and situations. Readers get a clear idea of

how they can apply permaculture in their own way in their own lives. **#7729 | \$89.99**

+ The Permaculture Student 2 Workbook #7730 | \$34.99



The Independent Farmstead

Beth and Shawn Dougherty

As the Doughertys write, more and more people today are feeling “the desire for clean, affordable food, unmodified, unprocessed, and unmedicated and the security of local food sourcing for ourselves and our children.” *The Independent Farmstead* is a must-have resource for those who count themselves as

part of this movement: both new and prospective farmers and homesteaders, and those who are interested in switching to grass-based systems. **#7428 | \$39.99**

The Edible Ecosystem Solution

Zach Loeks

#7662 | \$39.99

The Woodchip Handbook

Ben Raskin

#7698 | \$24.99

The Bio-Integrated Farm

Shawn Jadrnicek & Stephanie Jadrnicek

#7424 | \$39.99

Building Your Permaculture Property

Michelle Avis, Rob Avis, and Takota Coen

#7661 | \$49.99

The Permaculture Handbook

Peter Bane

#7157 | \$39.95

Coppice Agroforestry

Mark Krawczyk

#7785 | \$59.99

The Resilient Farm and Homestead

Ben Falk

#7209 | \$39.99

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**Made From Scratch** ^A*Louise Placek*

A comprehensive guide that takes you step-by-step through the whole process of creating a successful organic container plant business. Appendices include example activity logs and forms, instructions for making a soil-texture analysis, even tips for creating a simple employee handbook! **#7534 | \$20**

**Saving Our Seeds:
The Practice & Philosophy***Bevin Cohen*

Seed activist Bevin Cohen takes a deep dive into the hows and whys of the modern seed saving movement. A great how-to guide, leading the reader step by step through the process of saving their seeds from 43 different

crops; from adzuki beans to wheat and everything in between. Seed savers of all levels will benefit from Bevin's easy to follow explanations on important techniques such as hand pollination, isolation, vernalization and even basic flower structure. **#7850 | \$25.95**

**Farming with Native
Beneficial Insects:
Ecological
Pest Control Solutions***The Xerces Society***#7348 | \$24.95****Growing Under Cover***Niki Jabbour***#7643 | \$24.99****The Organic
Composting Handbook***Dede Cummings***#7382 | \$14.99****The Garden Seed
Saving Guide:
Easy Heirloom
Seeds for the Home***Jill Henderson***#7587 | \$14.99****The Organic
Seed Grower***John Navazio***#7646 | \$39.95****The Future-Proof Farm***Steve Groff***#7742 | \$24.99****The Year-Round
Solar Greenhouse***Lindsey Schiller**and Marc Plinke***#7433 | \$29.99****The Organic
Medicinal Herb Farmer,
Revised Edition***Jeff and Melanie Carpenter***#7790 | \$39.95****Maple on Tap** ^A*Rich Finzer*

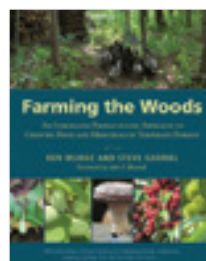
From author Rich Finzer, a Blue Ribbon-winning maple syrup producer with 20 years of experience, get the best advice and learn shortcuts and tricks that will save you from making rookie mistakes, save you money by telling which equipment you really need and save you valuable time during the boiling-down process. *Maple on Tap* includes step-by-step instructions with photos, as age-old skills are enhanced with modern technology. **#7169 | \$20**

**The New Seed-Starters
Handbook***Nancy Bubel*

For the most complete, up-to-date information on starting plants from seed, turn to *The New Seed-Starters Handbook*. Written by a gardener with 30 years of experience, this updated, easy-to-use reference explains everything you need to know to start seeds and raise healthy seedlings successfully. **#7680 | \$19.99**

**Preventing
Deer Damage** ^A*Robert G. Juhre*

Simple in its format, yet packed with information of many, many ways to prevent deer damage to your commercial crops or home garden. Explains how to use fencing and other barriers and visual and scent repellents. Also lists plants deer like and those they don't like. **#6329 | \$9.99**

**Farming the Woods***Ken Mudge & Steve Gabriel*

Learn how to fill forests with food by viewing agriculture from a remarkably different perspective: that a healthy forest can be maintained while growing a wide range of food, medicinal, and other non-timber products. *Farming the Woods* is an essential book for farmers and gardeners who have access to an established woodland, are looking for productive ways to manage it, and are interested in incorporating aspects of agroforestry, permaculture, forest gardening, and sustainable woodlot management into the concept of a whole-farm organism. **#7343 | \$39.95**

Seed to Seed*Suzanne Ashworth*

#6310 | \$24.99

The Living Soil Handbook*Jesse Frost*

#7681 | \$29.99

Homegrown Whole Grains*Sara Pitzer*

#6985 | \$14.95

American Hemp Farmer*Doug Fine*

#7603 | \$25

Small-Scale Grain Raising*Gene Logsdon*

#6972 | \$24.99

Lentil Underground*Liz Carlisle*

#7492 | \$19.99

Restoring Heritage Grains*Eli Rogosa*

#7422 | \$24.99

The Wholistic Healing Guide To Cannabis*Tammi Sweet*

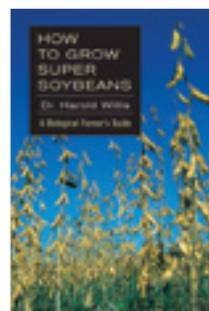
#7618 | \$24.99

Storey's Guide to Growing Organic Orchard Fruits*Danny L. Barney*

#7520 | \$39.99

**How to Grow Top Quality Corn** *Harold Willis*

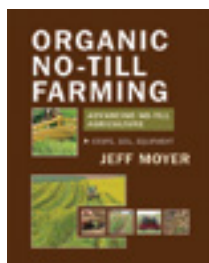
Learn which is better, hybrids or open-pollinated corn. How important is humus to high quality crops? Which fertilizer materials are harmful and which are beneficial? Practical hands-on knowledge that is hard to come by. **#114 | \$10**

**How to Grow Super Soybeans** *Harold Willis*

Do you know how to grow super soybeans? Learn how bacteria helps your crop grow better. Learn how to drought-proof your soil. Learn whether herbicides and pesticides are really necessary, and what place hydrogen peroxide has on your farm. Learn how to increase your profits. What you have here is 50 pages of real dynamite. **#3070 | \$10**

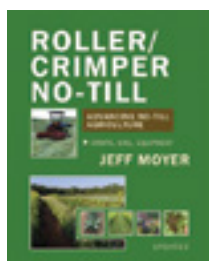
**How to Grow Great Alfalfa** *Harold Willis*

Essential information for anyone whose operation depends on growing forage grasses. Learn how to establish a healthy stand. Is high potassium necessary for high quality? How can you measure forage quality? Put just one idea from this booklet to work and it will pay for itself a thousandfold. **#113 | \$20**

**Organic No-Till Farming** *Jeff Moyer*

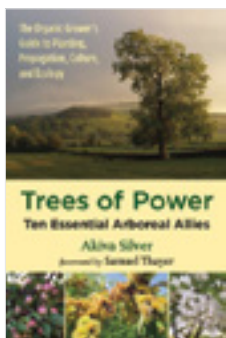
Organic No-Till Farming offers a map to an organic farming system that limits tillage, reduces labor, and improves soil structure. Based on the latest research by pioneering agriculturists, this book by Rodale Institute's CEO Jeff Moyer offers new technologies and tools based on sound biological principles, making it possible to reduce and even eliminate tillage. Field-tested over many seasons, these methods make cover crops into a source of fertility as well as a tool for weed management.

As traditional tillage turns into rotational tillage, natural soil biology is maximized and synthetic inputs are minimized. **#7069 | \$25**

**Roller/Crimper No-Till: Advancing No-Till Agriculture** *Jeff Moyer*

An expanded update of the groundbreaking work *Organic No-Till Farming*. Based on the latest research by pioneering agriculturists, this book arms you with new technologies and tools based on sound biological principles, making it possible to reduce and even eliminate tillage. **#7633 | \$25**





Trees of Power: Ten Essential Arboreal Allies

Akiva Silver

Trees of Power fills an urgent need for up-to-date information on some of our most important tree species, those that have multiple benefits for humans, animals, and nature. It also provides inspiration for new generations of tree stewards and caretakers who will not only benefit themselves, but leave a lasting legacy for future generations. **#7544 | \$24.95**



The Holistic Orchard

Michael Phillips

The Holistic Orchard provides all the basic information needed to create and maintain a living orchard with insights into design, choosing varieties, and a step-by-step instructional calendar for the entire orchard year. Phillips explores the connections between home orcharding and permaculture, the importance of native pollinators, using understory, shade-tolerant berry bushes, and provides safe, homegrown solutions to pest and disease challenges for numerous pome fruits, stone fruits and berries. A book to inspire beginners as well as provide the deeper answers looking for field-tested organic approaches. **#7116 | \$39.95**



The Intelligent Gardener

*Steve Soloman &
Erica Reinheimer*

#7181 | \$19.99

The Ecological Gardener

Matt Rees-Warren

#7659 | \$24.99

Roses Love Garlic

Louise Riotte

#6626 | \$14.99

Carrots Love Tomatoes

Louise Riotte

#6207 | \$14.99

The Celestial Garden

Jane Hawley

Stevens

#7803 | \$39.95

The Modern Homestead Garden

Gary Pilarchik

#7675 | \$24.99

The Grow System

Marjory Wildcraft

#7666 | \$29.99

Homegrown Berries

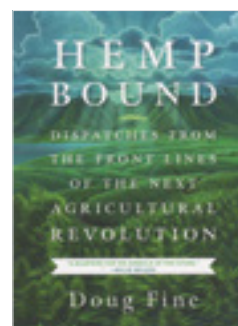
Timber Press

#7399 | \$19.95

The Apple Grower

Michael Phillips

#6338 | \$39.99



Hemp Bound

Doug Fine

The stat sheet on hemp sounds almost too good to be true: its fibers are among the planet's strongest, its seed oil the most nutritious, and its potential as an energy source vast and untapped. Its one downside? For nearly a century, it's been illegal to grow industrial cannabis in the United States. But as the prohibition on hemp's psychoactive cousin winds down, one of humanity's longest-utilized plants is about to be reincorporated into the American economy. Get ready for the newest billion-dollar industry. **#7312 | \$19.99**



No Dig Organic Home & Garden

*Charles Dowding
& Stephanie Hafferty*

The no dig approach works as well in small spaces as in large gardens. The authors' combined experience covers methods of growing, preparing and storing the plants you grow for many uses, and includes recipes and ideas for increasing self-reliance, saving

money, living sustainably, and enjoying the pleasure of growing your own food, year round. **#7465 | \$30**



Cold-Hardy Fruits and Nuts

*Allyson Levy
and Scott Serrano*

Cold-Hardy Fruits and Nuts is a one-stop compendium of the most productive, edible fruit-and nut-bearing crops that push the boundaries of what can survive winters in cold-temperate growing regions. Illustrated with more than 200 color photographs and covering 50 productive edible crops, this is the go-to guide for growers interest-

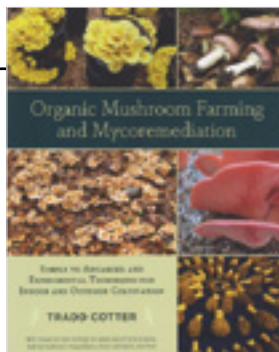
ed in creating diversity in their growing spaces. **#7726 | \$29.99**



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Organic Mushroom Farming and Mycoremediation

Tradd Cotter

In *Organic Mushroom Farming and Mycoremediation*, Cotter offers readers an in-depth exploration of best organic mushroom cultivation practices, for both indoor and outdoor growing of a wide variety of species. He also shares insight into his groundbreaking research on cultivating morels, “training” mycelium to respond to specific contaminants, and perpetuating spawn on cardboard without the use of electricity. Cotter covers lab techniques, including low-cost alternatives that make use of existing infrastructure and materials.

#7359 | \$39.95

Mycelium Running: How Mushrooms Can Help Save the World

Paul Stamets

#7722 | \$34.99

Mushrooming Without Fear

Alexander Schwab

#7670 | \$14.95

How to Forage for Mushrooms Without Dying

Frank Hyman

#7701 | \$19.99

Practical No-Till Farming: Organic Vegetable and Flower Growing

Andrew Mefferd

#7775 | \$34.99

How to Grow Food in Your Polytunnel

Mark Gatter and Andy McKee

#7077 | \$19.99

The Winter Market Gardener

Jean-Martin Fortier and Catherine Sylvestre

#7833 | \$39.99

Four-Season Harvest

Eliot Coleman

#4081 | \$24.99

The Greenhouse and Hoophouse Grower's Handbook

Andrew Mefferd

#7441 | \$34.95

The Suburban Micro-Farm

Amy Stross

#7520 | \$29.99

The Organic No-Till Farming Revolution: High-Production Methods for Small-Scale Farmers

Andrew Mefferd

#7549 | \$29.99

Microfarms

Jean-Martin Fortier and Aurélie Sécheret

#7832 | \$34.99

Growing Great Garlic

Ron L. Engeland

#4104 | \$16.95

Charles Dowding's No dig gardening Course 1: From Weeds to Vegetables Easily and Quickly

Charles Dowding

#7641 | \$29.99



The Market Gardener

Jean-Martin Fortier

The Market Gardener is a compendium of La Grelinette's proven horticultural techniques and innovative growing methods. Inspired by the French intensive tradition of maraichage and by iconic American vegetable grower Eliot Coleman, author and farmer Jean-Martin shows by example how to start a market garden and make it both very productive and profitable.

#7337 | \$24.95

No-Till Intensive Vegetable Culture

Bryan O'Hara

#7595 | \$29.95

Starting Seeds

Barbara W. Ellis

#7186 | \$10

The Whole Okra

Chris Smith

#7558 | \$29.95

The No-Till Organic Vegetable Farm

Daniel Mays

#7756 | \$24.99

The Winter Harvest Handbook

Eliot Coleman

#6949 | \$29.95

Plant Partners: Science-Based Companion Planting Strategies for the Vegetable Garden

Jessica Walliser

#7642 | \$24.99



The Ecological Farm

Helen Atthowe

The Ecological Farm is the go-to guide for ecological growing, with a unique focus on reduced tillage, minimizing farm and garden inputs, and pest control. This book guides readers on how to reduce or eliminate the use of outside inputs of fertilizer or pesticides—even those that are commonly used on certified organic orchards and market gardens.

#7791 | \$39.99



How To Grow World Record Tomatoes ^A

Charles H. Wilbur

In *How to Grow World Record Tomatoes* he tells his personal story and offers his philosophy and approach to gardening. He reveals for the first time how he grows record-breaking tomatoes and produce of every variety.

#6341 | \$30



The Myths of Safe Pesticides ^A

André Leu

The pesticide industry argues that human agriculture, and thereby the global population itself, cannot survive without using pesticides and herbicides, but Leu warns that human health is at great risk unless we break free of their toxic hold and turn to more natural methods of pest and weed regulation.

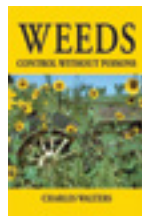
#7335 | \$15



Minerals, Nutrition and Plant Disease, Second Edition

Don Huber

The tremendous success of the first edition inspired the publication of an updated edition. *Mineral Nutrition and Plant Disease, Second Edition*, covers advances made in mineral nutrition and plant disease, showcasing the most recent scientific findings in much greater detail than in the previous edition. **#7761 | \$200**



Weeds: Control Without Poisons ^A

Charles Walters

Specifics on a hundred weeds, why they grow, what soil conditions spur them on or stop them, what they say about your soil, and how to control them without the obscene presence of poisons. All cross-referenced by scientific and various common names, and a pictorial glossary.

#4005 | \$25

The Naturally Bug-Free Garden: Controlling Pest Insects without Chemicals

Anna Hess

#7474 | \$19.99

Organic Soil-Fertility and Weed Management

Steve Gilman

#7080 | \$19.99

The Vegetable Garden Pest Handbook

Susan Mulvihill

#7673 | \$24.99

Toxic Legacy: How The Weedkiller Glyphosate is Destroying Our Health and the Environment

Stephanie Seneff

#7783 | \$24.99



When Weeds Talk

Jay L. McCaman

This is the 2nd edition of the book formerly titled *Weeds and Why They Grow*. Acres U.S.A. has long shown that weed control lies in fertility management. Every weed grows in a somewhat narrow window of allowable soil conditions. For the first time, hundreds of weeds of commercial importance are detailed along with the chemical analysis of accompanying soils. **#6149 | \$40**

Protecting Pollinators: How to Save the Creatures That Feed Our World

Jodi Helmer

#7551 | \$39.99



A New Farm Language ^A

W. Joe Lewis

During his 40-year career, Lewis discovered how plants use "SOS" signals to recruit beneficial insects to their defense. In his new book, Lewis looks back on his charmed childhood and distinguished scientific career while tracing our industrialized country's increasing alienation from nature. Lewis believes we can reconnect with nature through learning to speak a new language of co-existence and cooperation — both in our agriculture and our everyday lives. This coming-of-age tale will inspire anyone interested in agriculture, talking plants and smart insects. **#7650 | \$25**



Poisoning Our Children ^A

André Leu

The chemical-based conventional agriculture industry claims that the synthesized concoctions they sell as pesticides, herbicides, and insecticides are safe when used as directed, but does the scientific evidence truly support their assertions? When pesticide residues are found in 77 percent of all foods in the United States, it's important to know the truth. Organic agriculturist André Leu has weeded through a wealth of respected scientific journals to present peer-reviewed evidence proving that the claims of chemical companies and pesticide regulators are not all they seem. **#7485 | \$25**





Pick-Your-Own Farming: Free Yourself from Farmers Markets and Join the Agritourism Revolution ^A

Megan Neubauer

"I searched high and low for resources on how to run a pick-your-own when we started, but there's just nothing out there, which is why I wrote the book," said Megan. "I hope it will help other farmers see the potential in agritourism not only for profitability, but to push the entire local food movement forward by educating the public about regenerative agriculture through the power of fun, immersive experiences on farms."

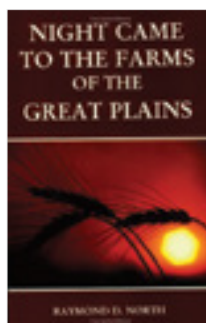
#7796 | \$25



Honor System Marketing ^A

Jeff McPherson

Drawing on years of personal experience and interviews with dozens of fellow farmers, business owners and customers, he shows how you can make the honor system work to your advantage. *Honor System Marketing* tells how to adapt honor marketing to fit your own needs and capacities. McPherson details how to avoid common pitfalls, manage finances, and maintain a sense of optimism. This book shows how honor system marketing can become an essential tool for doing business and reviving our spirit of trust in humanity. #7070 | \$20



Night Came to the Farms of the Great Plains ^A

Raymond D. North

This book is a preview of what is being created from almost six decades of Washington tinkering with the foodbelt. This is the story of debt, agency mendacity and violations of the law by land banks and Farmers Home Administration so blatant they beggar the imagination. Documents with personal stories the plight of the American farmer. #4016 | \$5

Ready Farmer One

Nina Galle

#7740 | \$49.99

Wholesale Success

Edited by Jim Slama and Atina Diffley

#7766 | \$85

Homemade For Sale: How to Set Up and Market a Food Business

Lisa Kivirist & John Ivanko

#7782 | \$24.99

Direct Market Success

Edited by Jim Slama and Atina Diffley

#7767 | \$85

Land, Livestock & Life

Allan Nation

#7464 | \$35.00

The Farmer's Office, 2nd Edition

Julia Shanks

#7431 | \$39.99

Rebuilding the Foodshed

Philip Ackerman-Leist

#7821 | \$25

Making Your Small Farm Profitable

Ron Macher

#6463 | \$24.99

Start Your Farm

Forrest Pritchard

#7506 | \$19.95

Creating a Family Business, from Contemplation to Maturity

Allan Nation

#7495 | \$34.99

Marketing Grassfed Products Profitably

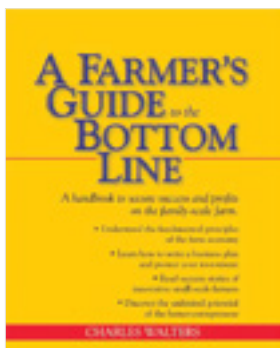
Carolyn Nation

#7075 | \$29.99

Bet the Farm

Beth Hoffman

#7700 | \$29.99



A Farmer's Guide to the Bottom Line ^A

Charles Walters

This book is the culmination of Acres U.S.A. founder Charles Walters' lifetime of experience. This book provides how-to information on each step from planning to implementation of business practices for the eco-friendly farm and includes examples of people who are making a living, and a profit, by demanding a fair price for their labor. #6535 | \$20

MARCH BOOK SALE!

40% off Acres U.S.A. published books! ^A

20% off all other books!



**My Farmer, My Customer:
Building Business & Community
Through Farming Healthy Food**

Marty Travis

This book belongs in the hands of anyone who eats and wants to understand what it takes to produce healthy food. Through new ideas and a different perspective, Marty shares a winning formula for success in modern family farming. **#7572 | \$25**



Farming Without Losing Your Hat

Paul Dorrance

In this honest, practical advice book, Paul Dorrance shares how to set up a successful farming business, based on real-world experience. Write your visions and goals at the end of each chapter to create a personalized plan and record where it all began. **#7690 | \$30**

Family Friendly Farming

Joel Salatin

#6500 | \$18

Good to Great

Jim Collins

#7820 | \$25

A Small Farm Future

Chris Smaje

#7626 | \$25

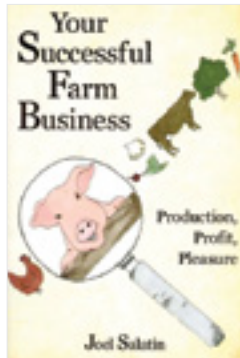
Healthy Land, Happy Families and Profitable Businesses

David Pratt

#7640 | \$34.99



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**Your Successful Farm Business:
Production, Profit, Pleasure**

Joel Salatin

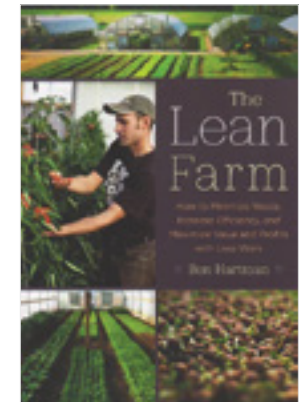
Twenty years ago Joel Salatin wrote *You Can Farm*, which has launched thousands of farm entrepreneurs around the world. With another 20 years of experience under his belt, bringing him to the half-century mark as a full-time farmer, he decided to build on that foundation with a sequel, a graduate level curriculum. **#7455 | \$29.99**



You Can Farm

Joel Salatin

While this book can be helpful to all farmers, it targets those visionaries who are entertaining notions of living, loving and learning on a piece of land. Anyone willing to dance with such a dream should be able to realistically measure its assets and liabilities; its fantasies and realities. Joel Salatin of Polyface Farm wisely and honestly shares with his reader the qualities necessary to embark on a farming career, and offers inspiration. **#6336 | \$30**



The Lean Farm

Ben Hartman

By explaining the lean system for identifying and eliminating waste and introducing efficiency in every aspect of the farm operation, *The Lean Farm* makes the case that small-scale farming can be an attractive career option for young people who are interested in growing food for their community. **#7407 | \$29.99**

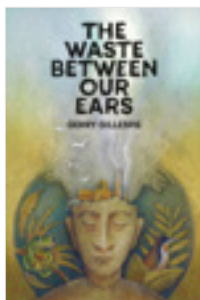
+ The Lean Farm Guide to Growing Vegetables

#6807 | \$34.99

+ The Lean Micro Farm

#7798 | \$34.95

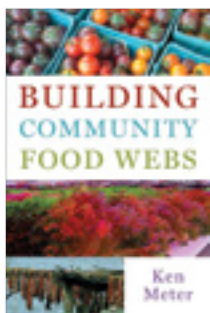




The Waste Between Our Ears ^A

Gerry Gillespie

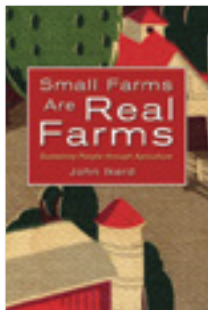
This book is about how the reduction of waste is being achieved in some parts of the world and how we could do it globally if we could only think differently. We need to change our minds about waste, because the only place waste exists is between our ears. Waste is a concept derived from lazy thinking and twisted economics. We need to reconnect our organic waste to local soils and our wasted resources to local jobs. **#7582 | \$25**



Building Community Food Webs

Ken Meter

Our current food system has decimated rural communities and confined the choices of urban consumers. But a healthier and more equitable food system is possible. In *Building Community Food Webs*, Ken Meter shows how grassroots food and farming leaders across the U.S. are tackling these challenges by constructing civic networks. **#7723 | \$49.99**



Small Farms Are Real Farms ^A

John Ikerd

Farming, at its core a biological process, has been transformed into an industrial process, thus demolishing the economic and cultural values. Along the way, small farms have been ridiculed and dismissed as inconsequential — but now the seeds of a rural renaissance are being planted.

In this collection of essays by one of America's most eloquent and influential proponents of sustainable agriculture, the multifaceted case for small farms is built using logic and facts. **#6853 | \$20**

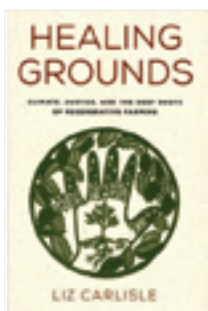


The Farm Bill: A Citizen's Guide

Daniel Imhoff and Christina Badaracco

The Farm Bill is one of the most important pieces of legislation the American president signs. Negotiated every five to seven years, it has tremendous implications for food production, nutrition assistance, habitat conservation, inter-

national trade, and much more. Yet at nearly 1,000 pages, it is difficult to understand for policymakers, let alone citizens. In this primer, Dan Imhoff and Christina Badaracco translate all the "legalese" and political jargon into an accessible, graphics-rich book. **#7545 | \$39.99**

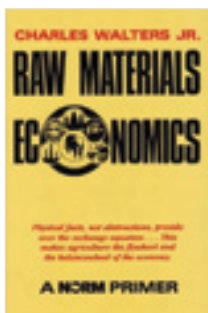


Healing Grounds

Liz Carlisle

In *Healing Grounds*, Liz Carlisle tells the stories of Indigenous, Black, Latinx, and Asian American farmers who are reviving their ancestors' methods of growing food—techniques long suppressed by the industrial food system. These farmers are restoring native prairies, nurturing beneficial fungi, and enriching soil health. This, Carlisle shows, is the

true regenerative agriculture — not merely a set of technical tricks for storing CO2 in the ground, but a holistic approach that values diversity in both plants and people. **#7735 | \$29.99**



Raw Materials Economics ^A

Charles Walters

Raw Materials Economics is a codification of NORM (National Organization for Raw Materials) thinking. Charts, tables and a special summary by the late Vince Rossiter make *Raw Materials Economics* a history of the past and a blue print for the future. If you've wanted to gain a better understanding of raw materials economics, this book

is a great way to begin. **#4025 | \$25**

Wilding: Returning Nature to our Farm

Isabella Tree

#7592 | \$19.99

Eager: The Surprising, Secret Life of Beavers and Why They Matter

Ben Goldfarb

#7554 | \$19.99

Burn: Using Fire to Cool the Earth

Albert Bates and Kathleen Draper

#7541 | \$19.99

Water In Plain Sight: Hope for a Thirsty World

Judith D. Schwartz

#7556 | \$19.99

Tools for Grassroots Activists

Nora Gallagher & Lisa Myers

#7768 | \$24.99

The Monsanto Papers

Carey Gillam

#7657 | \$34.99



Unforgiven ^A

Charles Walters

By fairly monetizing raw materials, an economy is diverse, balanced, and free of debt. In *Unforgiven*, Walters presents not only the causes and effects of our continuing rural and urban decay, but also a way to stop it — the construction of an economy operating in tune with the laws of physics. **#6546 | \$20**

Homestead Tsunami*Joel Salatin*

#7808 | \$30

The Backyard Homestead Planner*Ann Larkin Hansen*

#7501 | \$24.99

Mini Farming Self-Sufficiency on 1/4 Acres*Brett L. Markham*

#7682 | \$19.99

Big Team Farms: Growing Farms Differently*Sarah K Mock*

#7754 | \$18.99

The Woodland Homestead*Brett McLeod*

#7409 | \$19.99

Fields of Farmers*Joel Salatin*

#7234 | \$15

**Saving the Guinea Hogs: The Recovery of the American Homestead Breed**
Cathy R. Payne

Saving the Guinea Hogs, a narrative nonfiction book, is the first definitive history of the Guinea Hog breed. Rich in historically accurate information, it is easy to read and full of colorful characters. It is a comprehensive overview of the people who raised Guinea Hogs from 1940 to 1995, told in their own words and enlightening stories. These first-person stories reveal the subjects' deep fondness for and attachment to the amiable Guinea Hogs. #7557 | \$24.99

Folks, This Ain't Normal*Joel Salatin*

#7087 | \$20

Everything I Want to Do Is Illegal*Joel Salatin*

#6849 | \$24.99

Whole Farm Management: From Start-Up to Sustainability*Garry Stephenson*

#7589 | \$26.95

Good Husbandry*Kristin Kimball*

#7606 | \$24.99

American Family Farmland: Preserving Values and Creating Wealth*Johnny Klemme*

#7876 | \$17.99

Polyface Micro*Joel Salatin*

#7840 | \$35

**Farm (And Other F Words): The Rise and Fall of the Small Family Farm**
Sarah K Mock

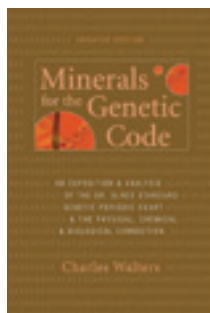
In *Farm (and Other F Words)*, Sarah K Mock dismantles misconceptions about American farms and discovers what makes small family farms work, or why they don't. While exploring the intersection of farming and wealth, Mock offers an alternative perspective on American agricultural history, and outlines a path to a more equitable food system moving forward. #7727 | \$17.99

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**Minerals for the Genetic Code** ^A*Charles Walters*

Dr. Richard Olree believes that the key to the biological role of all trace minerals has been available to science for decades, but nobody realized it. This innovative book reveals a unique roadmap overlaying the body's deepest genetic need for specific minerals, classical chiropractic conditions, acupuncture meridians, and deficiency and disease indicators. **#6808 | \$25**

**Beyond Labels***Sina McCullough and Joel Salatin*

If you are overwhelmed by conflicting diet advice, or you don't know where to start or who to trust, *Beyond Labels* will help you figure out what to put on your plate. Joel Salatin, a farmer who is blazing the trail for regenerative farm practices, and Sina McCullough, a Ph.D. in Nutrition who actually understands unpronounceable carbon chains, bring you on a journey from generally unhealthy food and farming to an ultimately healing place. **#7615 | \$29.99**

Mistletoe and the Emerging Future of Integrative Oncology*Steven Johnson and Natasha Winters***#7708 | \$34.95****Pottenger's Cats: A Study In Nutrition***Francis M. Pottenger***#7773 | \$14.99****Preventing and Reversing Arthritis Naturally***Raquel Martin & Karen J. Romano***#6545 | \$19.99****Gut and Physiology Syndrome***Dr. Natasha Campbell-McBride***#7632 | \$39.99****Gut & Psychology Syndrome, 2nd Edition***Dr. Natasha Campbell-McBride***#7420 | \$29.99****The Story of Food in the Human Past***Robyn E. Cutright***#7804 | \$39.99****The Choice is Clear** ^A*Dr. Allen E. Banik*

The most readable booklet on water ever published. It gives the reasons for using distilled water for drinking and cooking. It reveals that you can consume some 450 pounds of inorganic minerals from some tap and well water in your life-time. Learn what is really in your water and why it is important to your health and longevity. Distilled water is the answer to remove all impurities. **#917 | \$20**

DISPONIBLE EN ESPAÑOL:
La Elección Es Clara
#7809 | \$20

**Backyard Medicine***Julie Bruton-Seal & Matthew Seal*

This book looks at 120 natural healing remedies for everyday ailments like muscle tension, cough, insomnia, acne, sore throat, aches and pains -- all gathered from familiar wild plants such as plantain, raspberries, stinging nettle, and red clover and created at home. **#7012 | \$25**

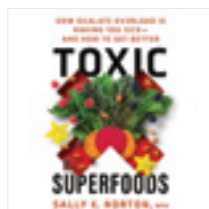
What's Making Our Children Sick?*Michelle Perro and Vincanne Adams***#7713 | \$24.99****Sacred Cow: The Case for (Better) Meat***Diana Rodgers and Robb Wolf***#7621 | \$29.99****The Power Behind Your Eyes***Robert-Michael Kaplan***#6228 | \$19.99****Invasive Plant Medicine: The Ecological Benefits & Healing Abilities of Invasives***Timothy Lee Scott***#7214 | \$19.99****The Truth About COVID-19***Dr. Joseph Mercola and Ronnie Cummins***#7813 | \$17.95****Sustainable Medicine***Dr. Sarah Myhill***#7525 | \$19.99****Food from the Radical Center: Healing Our Land and Communities***Gary Paul Nabhan***#7562 | \$39.99****The Artisan Herbalist: Making Teas, Tinctures, and Oils at Home***Bevin Cohen***#7848 | \$29.99**

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published books! ^A**

**20% off all
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Toxic Superfoods: How Oxalate Overload is Making You Sick—and How to Get Better

Sally K Norton

Toxic Superfoods is a masterful contribution to the literature on nutrition. Here you will find a sweeping examination of oxalates from all angles—

medical, scientific, historical, dietary, and cultural. You'll learn why oxalate toxicity has remained invisible in medical and nutritional practice, and discover a simple and practical program to get relief from the myriad conditions that oxalate toxicity can create and aggravate. **#7760 | \$17.99**

The Nutrient-Dense Kitchen

Mickey Trescott

#7726 | \$39.95

The Beginner's Guide to Dehydrating Food 2nd Edition

Teresa Marrone

#7536 | \$24.99

Heal Your Gut Cookbook

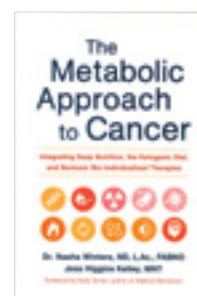
Hilary Boynton & Mary Brackett

#7356 | \$29.99

No Dig Cookbook

Catherine Balaam and Charles Dowding

#7780 | \$24.99



The Metabolic Approach to Cancer

Dr. Nasha Winters and Jess Higgins Kelley

Naturopathic, integrative oncologist and cancer survivor Dr. Nasha Winters and nutrition therapist Jess Higgins Kelley identify the ten key elements of a person's terrain as they relate to the cancer process, and they prescribe a heavily researched, tested, and nontoxic metabolic therapeutic approach. The Optimal Terrain Ten Protocol will empower both patients and physicians to slow cancer's endemic spread and live optimized lives. **#7444 | \$29.95**



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Holly Bellebuono

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Herbal Antibiotics, 2nd Edition

Stephen Harrod Buhner

#7171 | \$24.99

Herbal Antivirals, 2nd Edition

Stephen Harrod Buhner

#7693 | \$24.99

Home Cheese Making 4th Edition

Ricki Carroll

#7535 | \$24.95

Fermented Vegetables

Kirsten K. Shockey & Christopher Shockey

#7363 | \$24.99

Our Fermented Lives

Julia Skinner

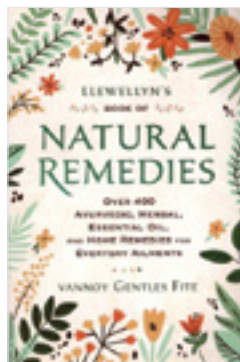
#7748 | \$29.99



Be Inspired Cookbook

Ros Rees

The recipes in this book are grain free, gluten free, dairy free and refined sugar free, in other words paleo friendly. These recipes are easy to prepare, have minimal ingredients, many of them have been converted from my everyday recipes, so all the guesswork has been done for you. Your friends and family will not know the difference. #7719 | \$49.99



Llewellyn's Book of Natural Remedies

Vannoy Gentles Fite

Author Vannoy Gentles Fite shares effective remedies for more than a hundred ailments, exploring contemporary and traditional techniques using common, everyday ingredients. The recipes are easy to locate based on your specific needs, and they include materials you can typically find in your home. #7600 | \$24.99



Diabetes And Me

Chase Schmitt

Written by a very talented 8-year-old, *Diabetes and Me* is the story of a boy who was diagnosed with Type 1 Diabetes and his journey through treatment and management. Chase Schmitt wrote this book to help other kids who have been newly diagnosed to help them better know what it's like to live with the disease. #7498 | \$25



Wild Fermentation

Sandor Ellix Katz

This updated and revised edition, now with full color photos throughout, is sure to introduce a whole new generation to the flavors and health benefits of fermented foods. It features many brand-new recipes, including Strawberry Kvass, African Sorghum Beer, and Infinite Buckwheat Bread and updates and refines original recipes reflecting the author's ever-deepening knowledge of global food traditions that has influenced four-star chefs and home cooks alike. #6605 | \$29.99



The Artisan Herbalist: Making Teas, Tinctures, and Oils at Home

Bevin Cohen

From urban apartments to wild countryside, *The Artisan Herbalist* is an easy-to-use guide that teaches you how to identify, grow, harvest, forage, and craft herbal allies into an assortment of useful health and wellness products. Whether you live in the city, suburbs, or countryside, take back control of your health and begin your journey toward independent self-care as a budding artisan herbalist. #7848 | \$29.99



**Dirt Hog** *Kelly Klover*

In today's market, range-rear-swine provides the family with a key venture for diversification and cash flow—perhaps no other large animal enterprise offers as fast a turnaround on investment. Range-produced pork is now sought out by the informed consumer concerned with the issues of production and willing to pay a premium to get it. This comprehensive manual on raising hogs the natural way includes sections on housing and fencing, selection and breeding, herd maintenance, feeds and feeding, marketing and more. **#6844 | \$25**



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**The Marvelous Pigness of Pigs***Joel Salatin*

Now in his first book written for a faith audience, Salatin offers a deeply personal argument for earth stewardship, and calls for fellow Christians to join him in looking to the Bible for a foodscape in line with spiritual truth. Salatin urges Christians to rethink America's allegiance to cheap corporate food that destroys creation in its production, impoverishes third world countries, and supports oligarchical interests. **#7425 | \$19.99**

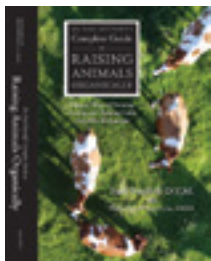
Storey's Guide to Raising Pigs, 4th Edition*Kelly Klover***#7539 | \$24.99****Happy Pigs Taste Better: A Complete Guide to Organic and Humane Pasture-Based Pork Production***Alice Percy*

Happy Pigs Taste Better offers a comprehensive look at raising organic, pasture-fed, gourmet meat and provides an overview of marketing and distribution for those looking to turn their hog farming operation into a lucrative business. **#7553 | \$29.95**

Raising Pastured Rabbits for Meat*Nichki Carangelo***#7581 | \$24.95****Storey's Guide To Raising Rabbits 5th Edition***Bob Bennett***#7503 | \$24.95****Keeping Bees with a Smile***Fedor Lazutin*

Keeping Bees with a Smile, Fedor Lazutin, one of Europe's most successful natural beekeepers, shares the bee-friendly approach to apiculture that is fun, healthful, rewarding, and accessible to all. This new edition includes dozens of color photographs, new hive management techniques, and an updated version of "Lazutin hive" plans. **#7653 | \$34.99**

Top-Bar Beekeeping*Les Crowder & Heather Harrell***#7153 | \$24.99****Advanced Top Bar Beekeeping***Christy Hememnway***#7454 | \$17****Raising Honeybee Queens***Giles Fert***#7598 | \$34.99****Raising Resilient Bees***Eric and Joy McEwen***#7792 | \$34.99****100 Plants to Feed the Bees***The Xerces Society***#7493 | \$20****Keeping Bees in Horizontal Hives***Georges de Layens***#7443 | \$49.95****The Lives of Bees: The Untold Story of the Honey Bee in the Wild***Thomas D. Seeley***#7565 | \$34.99****The Beekeeper's Problem Solver***James E. Tew***#7674 | \$24.99****Natural Beekeeping***Ross Conrad***#7596 | \$34.99****Bees***Rudolf Steiner***#7818 | \$25****The World of Bees***Rudolf Steiner***#7817 | \$20****Dancing With Bees: A Journey Back to Nature***Brigit Strawberry Howard***#7884 | \$19.99**



Dr. Paul Dettloff's Complete Guide to Raising Animals Organically ^A

Paul Dettloff

Dr. Paul Dettloff hands over a literal lifetime of learning and observation on how to raise livestock in healthier, more productive, and more humane ways. He teaches how to move from the current conventional veterinary practice of chasing symptoms toward a holistic, sustainable practice that seeks the cause behind the symptoms and values the lives of animals as well as the humans who consume their products. **#7537 | \$25**

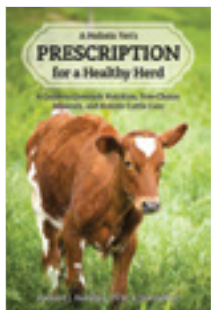


Homeopathy in Organic Livestock Production ^A

Glen Dupree

Homeopathy in Organic Livestock Production contains an extensive discussion of the most common maladies that will help readers recognize symptom complexes and take logical steps so you can move from patient to remedy, regardless of the species, ailment or the type of farm involved – even if a diagnosis is not

known. A valuable resource for organic farmers, the book also contains the most common homeopathic remedies and their specific uses for livestock. **#6992 | \$20**



A Holistic Vet's Prescription for a Healthy Herd ^A

Richard J. Holliday and Jim Helfter

Learn to heal your cattle by treating the cause and not the symptoms. Inside this book you'll find studies on animal nutrition as well as a veterinarian's real-life experiences with nutritionally wise livestock. Doc takes on some of his most frequently asked questions

regarding animal health to provide the reader with a clear idea of some organic and holistic solutions to common cattle care issue. **#7365 | \$20**

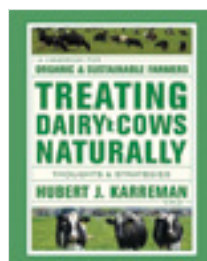


Alternative Treatments for Ruminant Animals ^A

Paul Dettloff

Copiously illustrated chapters “break down” the animal into its interrelated biological systems: digestive, reproductive, respiratory, circulatory, musculoskeletal and more. Also includes a chapter on nosodes, with vaccination programs for dairy cattle, sheep and goats. An information-packed manual

from a renowned vet and educator. **#6654 | \$25**



Treating Dairy Cows Naturally ^A

Hubert J. Karreman

With much thought and research, Dr. Karreman builds a foundation from which to view dairy cows as animals that occupy a unique agro-ecological niche in our world. He covers practical aspects of biologics, botanical medicines, homeopathic remedies, acupuncture and conventional medicine. **#6672 | \$40**

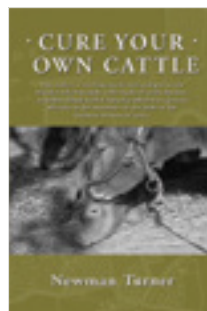


The Barn Guide to Treating Dairy Cows Naturally ^A

Hubert J. Karreman

A hands-on barn and field guide designed for quick and easy use, presenting a thorough examination of animals in the barn, listing symptoms with pictures, possible conclusions, and giving a concise set of treatments. The companion guide to *Treating Dairy Cows*

Naturally, this book includes an easy-to-follow visual and hands-on physical exam section, features nearly 100 case studies organized by symptoms, and offers valuable field-tested natural treatments. **#7065 | \$25**

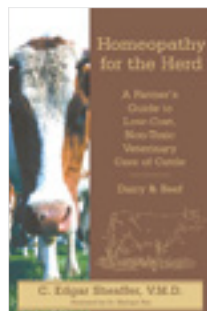


Cure Your Own Cattle ^A

Newman Turner

In this concise monograph, Newman Turner sought to “bring within the reach of the farmer a solution to his disease problems in a way in which drug and chemical treatments have never before achieved.” This book is his proclamation that freedom from animal diseases may be attained by the proper utilization of nature's provisions. While the

subject of natural veterinary care has grown and matured, Turner's clear and simple systems and advice remind farmers of the true fundamentals that consistently work. **#6912 | \$20**



Homeopathy for the Herd ^A

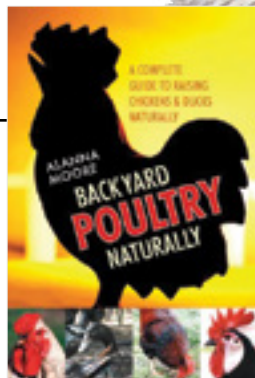
C. Edgar Sheaffer

This information-packed book will tell you what you need to know to get started in the use of homeopathic medicines with cows. Using case studies and practical examples from both dairy and beef operations, Dr. Sheaffer covers such topics as: creating a holistic operation; organics and homeopathy; prescribing; mastitis and fertility-related

problems; and the Materia Medica, keynotes and nosodes. Also includes a convenient section that lists specific conditions and remedies. **#6580 | \$25**

**Natural Goat Care** *Pat Coleby*

Goats thrive on fully organic natural care. As natural browsers, they have higher mineral requirements than other domestic animals, so diet is a critical element to maintaining optimal livestock health. In *Natural Goat Care*, consultant Pat Coleby shows how to solve health problems both with natural herbs and medicines and the ultimate cure, bringing the soil into healthy balance. Topics include: correct housing and farming methods; choosing the right livestock; diagnosing health problems; nutritional requirements and feeding practices; vitamins and herbal, homeopathic and natural remedies; psychological needs of goats; breeds & breeding techniques. **#6491 | \$25**

+ Natural Horse Care  **#6492 | \$25****+ Natural Sheep Care**  **#6734 | \$25****+ Natural Cattle Care**  **#6490 | \$25****The Chicken Health Handbook
2nd Edition***Gail Damerow***#7677 | \$24.99****Holistic Goat Care***Gianacis Caldwell***#7468 | \$39.99****Backyard Poultry Naturally** *Alanna Moore*

From housing to feeding, from selection to breeding, this book covers everything the backyard farmer needs to know about poultry husbandry — including preventative and curative herbal medicines and homeopathics. The author takes a permaculture point of view in raising poultry, creating a diverse base of plant life for the birds to choose from, all cohesively fitting into the landscape and overall farm. Complete enough for the beginner, yet the experienced poultry farmers will find the book packed with techniques and ideas found nowhere else. **#6452 | \$25**

**Beyond the Chicken** *Kelly Klover*

In *Beyond the Chicken*, author and lifelong poultry keeper Kelly Klover turns his attention to alternative poultry ventures. The recent interest in heritage breeds of chicken has created a unique opportunity for small farmers to reintroduce consumers to other types of poultry. From geese and quail to peahens and turkeys, Klover discusses the pros and cons of each and how best to fit an alternative poultry venture into

your farming operation. **#7309 | \$25**

**Talking Chicken** *Kelly Klover*

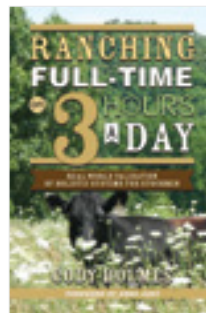
A resurgence of interest in heritage poultry breeds has invigorated poultry raising on family farms and backyards across the country. This book, written by poultry expert Kelly Klover, offers valuable insight into rare, heritage and heirloom breed selection, chick raising, breeding and marketing so you can start your own fully sustainable heritage chicken flock and raise eggs or meat for your family or small farm business. **#7067 | \$20**

**Free-Range
Chicken Gardens***Jessi Bloom***#7139 | \$19.99****Pastured
Poultry Profits***Joel Salatin***#4187 | \$30****The Small-Scale
Poultry Flock***Harvey Ussery***#7088 | \$39.95****MARCH
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other books!**

**Herdsmanship** ^A*Newman Turner*

In this book, Turner explains that livestock illness is a result of bad farming practices and that real livestock health begins with true natural farming disciplines such as composting, biodiverse pastures with deep-rooted forages and herbs, and sub-soiling, as well as the avoidance of supposed panaceas that ignore or marginalize these fundamentals such as vaccines,

pesticides, antibiotics and artificial fertilizers. **#6910 | \$25**

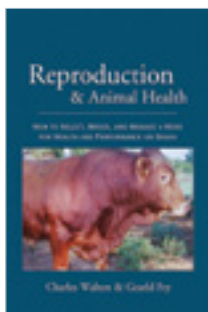
**Ranching Full-Time on Three Hours A Day** ^A*Cody Holmes*

In this book, Cody Holmes will teach you how to make your ranch profitable while working just three hours a day. You will learn about: Using diversity to find stability and security. Taking a whole-ranch approach to management. Letting cattle improve

your soil. Maintaining a better quality of life while cattle ranching. And more! **#7071 | \$25**

**Herd Bull Fertility** ^A*James E. Drayson*

James Drayson has spent a lifetime researching and teaching about cattle breeding and fertility, with 35 years of experience in measuring bulls from a fertility standpoint. He followed 1,500 bulls from birth to death and recorded findings that are unequaled by any other researcher. *Herd Bull Fertility* will teach you how to recognize whether a bull is fertile even before the semen test. This manual, generously illustrated with photographs and diagrams, is a must for the cattle grower choosing a bull for his breeding program. **#6582 | \$40**

**Reproduction and Animal Health** ^A*Charles Walters & Gearld Fry*

This book represents the combined experience and wisdom of two leaders in sustainable cattle production. The result is an insightful book that is practical in the extreme, yet eminently readable. In this book you will learn: how to "read" an animal, what linear

measurement is, why linear measurement selects ideal breeding stock, the nuances of bull fertility, the strengths of classic cattle breeds, the role of pastured, and the mineral diet's role in health. **#6595 | \$25**

**Grass, the Forgiveness of Nature** ^A*Charles Walters*

What is the most important plant in the world? In terms of nutritive content, function within the ecosystem, and even medicinal properties, the answer to this question may very well be grass. In this wide-ranging survey of grass forages and pastureland, Charles Walters makes the case that grass is

not just for cows and horses — that in fact it is the most nutritious food produced by nature, as well as the ultimate soil conditioner. **#6806 | \$25.00**

No Risk Ranching*Greg Judy***#6547 | \$29.99****The Art and Science of Grazing***Sarah Flack***#7429 | \$39.95****Management-Intensive Grazing***Jim Gerrish***#6712 | \$39.99****Salad Bar Beef***Joel Salatin***#6196 | \$29.99****Pasture Profits with Stocker Cattle***Allan Nation***#4189 | \$24.95****The Turnaround: A Rancher's Story***David Pratt***#7639 | \$25.00****How To Not Go Broke Ranching***Walt Davis***#7608 | \$39.99****Grass-Fed Beef for a Post-Pandemic World***Ridge Shinn and Lynne Pledger***#7756 | \$24.99****Kick the Hay Habit***Jim Gerrish***#6999 | \$29.99****Hoofprints on the Land***Ilse Kohler-Rollerson***#7772 | \$22.95****Comeback Farms***Greg Judy***#6916 | \$24.99****Grass-Fed Cattle***Julius Ruechel***#6826 | \$24.99****Paddock Shift: Changing Views on Grassland Farming***Allan Nation***#7463 | \$24.99****Defending Beef 2nd Edition***Nicolette Hahn Niman***#7685 | \$19.99****The Use Of Stored Forages With Stocker & Grass-Finished Cattle***Anibal**Pordomingo***#7596 | \$19.99****Grassfed to Finish***Allan Nation***#6807 | \$34.99**

**The Miracle of Milk** ^A*Barnarr Macfadden*

"Milk is the greatest of all diet cures," writes Macfadden in the first line of his book. He continues with "It will undoubtedly give you more life while you live and it may add many years to your life." Originally published in 1923, this book touts the health benefits of milk and outlines the milk diet, which when properly used, Macfadden says is capable of bringing about miraculous changes. **#6677 | \$25**

Butchering Poultry, Rabbit, Lamb, Goat, and Pork*Adam Danforth***#7318 | \$25****Butchering Chickens: A Guide to Humane Small-Scale Processing***Adam Danforth***#7605 | \$19.99****The Mobile Poultry Slaughterhouse***Ali Berlow***#7189 | \$14.99****Butchering Beef***Adam Danforth*

Using detailed, step-by-step photography of every stage of the process, Adam Danforth shows you exactly how to humanely slaughter and butcher cattle for beef. He also covers food safety, freezing and packaging, and tools and equipment.

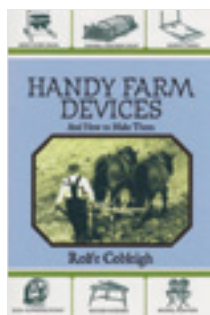
This comprehensive reference is the only guide you need to successfully, safely, and humanely slaughter and butcher your own animal. **#7317 | \$29.99**

NEW MERCH!**\$25****#GreenHat****#Blue1****The Home Creamery***Kathy Farrell-Kingsley***#7037 | \$19.99****One-Cow Revolution: Achieving Food Independence with a Grass-Fed Family Cow***Shawn and**Beth Dougherty***#7875 | \$24.95****Keeping A Family Cow***Joann S. Grohman***#7842 | \$25****The Small-Scale Dairy***Gianacis Caldwell***#7843 | \$34.95****Organic Dairy Farming***Jody Padgham***#7696 | \$14.95****The Art & Science of Shepherd** ^A*Michel Meuret and Fred Provenza*

Through academic study and analysis and in-depth interviews with master shepherds readers will be amazed by the deep connection between the nutritional need for animals to feed, the powers of observation used by the shepherds to effective-

ly care for and manage large herds, and how the traditional moving of the animals is more fitting to many landscapes than even the most progressive rotational grazing and moveable fencing systems. The compilation carries enough weight to dazzle the most ardent student and enough real-world know-how to equip the 21st-century herdsman with new insights and philosophies. **#7308 | \$20**

Capturing Sunlight*Woody Lane***#7683 | \$29.99****The Calendar of the Year-Round Grazer***Steve Kenyon***#7604 | \$25****Quality Pasture: How to Create It, Manage It, & Profit From It 2nd Edition***Allan Nation, 2nd edition revised by Jim Gerrish***#7597 | \$29.99****MARCH BOOK SALE!****40% off Acres U.S.A. published books!****20% off all other books!**

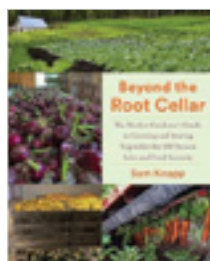


Handy Farm Devices & How to Make Them

Rolfe Cobleigh

A wealth of labor- and money-saving devices fill this book: spill-proof chicken waterers, a portable chicken coop, a lightweight orchard ladder, a small truss bridge, an easy fence-post and stump-puller, gates that don't sag, gates that lift over snowdrifts, a handy wood splitter — even a bicycle-powered

washing machine! **#6401 | \$29.99**



Beyond the Root Cellar

Sam Knapp

Beyond the Root Cellar is a compilation of insights, advice, and instruction, drawing on Sam's experience and that of many other storage farmers Sam has met along the way. It is, Sam says, the book he wishes he had when he embarked on his own winter storage business, and that he hopes

will pave the way for growers both new and established who are interested in storage farming. **#7812 | \$45**



Polyface Designs

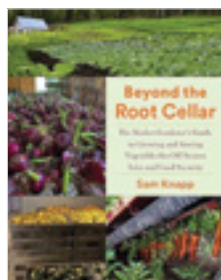
*Joel Salatin and
Chris Slattery*

Have you wondered how to build the Polyface broiler shelter, or the dolly to move it, or an Eggmobile, Gobble-dygo or Shademobile? For folks getting started, folks adding enterprises, or folks wanting a cheaper bootstrap way to build portable livestock infrastructure, *Polyface Designs* has all the diagrams and do-it-yourself building specifications.

#7809 | \$90



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Beyond the Root Cellar

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Build Your Own Farm Tools

Josh Volk

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Jim Gerrish

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Mike & Nancy Bubel

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*Dorn Cox with
Courtney White*

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D.C. Beard

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Fences, Gates & Bridges and How to Build Them

George A. Martin

#6404 | \$14.99

How to Build Your Own Greenhouse

Roger Marshall

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Homemade Contrivances

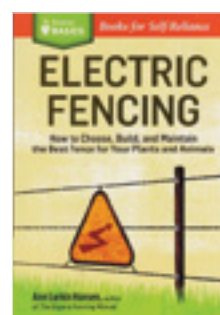
Historical Reprint

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Chicken Coops

Judy Pangman

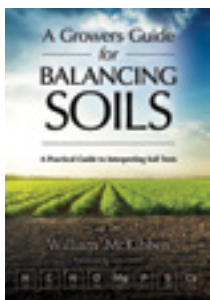
#6831 | \$19.99



Electric Fencing: How to Choose, Build, and Maintain the Best Fence for Your Plants and Animals

Ann Larkin Hansen

This practical guide covers everything you need to know about the types of electric fencing available, how to choose the type that is right for your needs, how electric fencing works, how to put an electric fencing system together and how to use portable electric fencing for rotational grazing. Whether you need to keep livestock and horses in or keep predators out, you'll find the information you need in this comprehensive handbook. **#7284 | \$9.99**



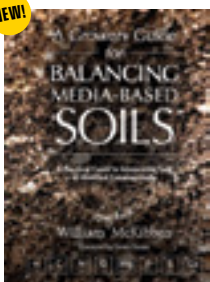
A Growers Guide for Balancing Soils ^A

William McKibben

Whether you're a serious home gardener or a full-time farmer, this will help you expand your understanding of the science behind plant nutrition. William McKibben will walk you through a data-driven, time-tested process that starts with soil analysis. He outlines a common-sense approach for how to

get there. For both organic and conventional farmers, it's a problem-solver's handbook for building soil health. Includes a foreword by Dr. Don Huber. **#7625 | \$25**

NEW!



A Growers Guide for Balancing Media-Based Soils ^A

William McKibben

Since growing media have much lower densities and lack the cation exchange capacity of mineral soils, a different approach to interpreting soil test results is necessary. Based on years of interpreting test results and making adjusted fertilizer recommendations for

growers, Bill "Crop Doc" McKibben explains how to read the results from a standard soil test and apply them to growing media. **#7870 | \$20**



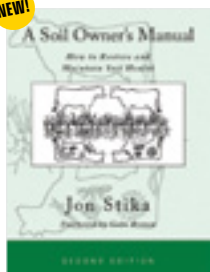
Cover Crops 101

Keith Berns and Kate Smith

You've heard about cover crops... but where do you start? We want to be frank with you—cover crops can be challenging to manage. But with the right plan, and careful management, we know that cover crops can benefit your farm. We wrote this book to help you get started on a journey, not just of implementing cover crops, but of regenerating your soil.

#7455 | \$14.99

NEW!



A Soil Owner's Manual, 2nd edition: How to Restore and Maintain Soil Health ^A

John Stika

Most agricultural and garden soils today are generally dysfunctional. Not knowing anything different, we accept deteriorated soils without realizing what their full potential could be. The principles and practices taught in this book will em-

power you to restore it—allowing you to produce high-quality crops while reducing your dependency on expensive inputs.

#7874 | \$20

The Complete Guide To Restoring Your Soil

Dale Strickler

#7702 | \$24.95

The Soil Will Save Us

Kristin Ohlson

#7679 | \$24.99

The Drought Resilient Farm

Dale Strickler

#7500 | \$24.99

Whitewash: The Story of a Weed Killer, Cancer, and the Corruption of Science

Carey Gillam

#7491 | \$34.99

Drought: Managing For It, Surviving & Profiting From It

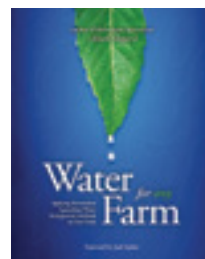
Anibal Pordomingo

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Crop Rotation & Cover Cropping

Seth Kroeck

#7095 | \$15.95

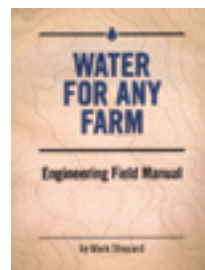


Water for Any Farm ^A

Mark Shepard

Written as a companion to the bestseller, *Restoration Agriculture*, this book will help farmers capture water in areas they want to, and avoid having water flow immediately to the low point. The result? Less water expense, healthier crops and livestock, and less erosion ... just to name a few.

#7573 | \$30.00

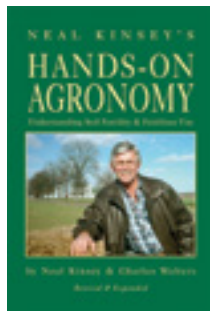


Water for Any Farm: Engineering Field Manual ^A

Mark Shepard

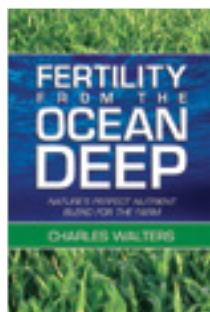
A book with so much detail, it took three years to create. Including dozens of detailed illustration to help you solve real-life problems on your farm, bestselling author Mark Shepard offers landowners a guide to implementing a Master Line System of farm water management. **#7762 | \$69.99**



**Hands-On Agronomy** ^A

*Neal Kinsey
& Charles Walters*

An ecologically balanced soil system is essential for maintaining healthy crops. This is a comprehensive manual on effective soil fertility management. The function of micronutrients, earthworms, soil drainage, tilth, soil structure, and organic matter is explained in thorough detail. **#4120 | \$40**

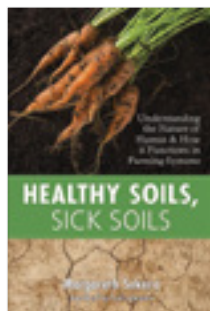
**Fertility From the Ocean Deep** ^A

Charles Walters

Walters demonstrates that sea-solids fertilizers produce stress-resistant plants and food with naturally extended shelf life and vastly increased nutrient levels. *Fertility from the Ocean Deep* is a must-read for everyone interested in the cutting edge of agriculture. **#6735 | \$25**

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**Healthy Soils, Sick Soils** ^A

Margareth Sekera

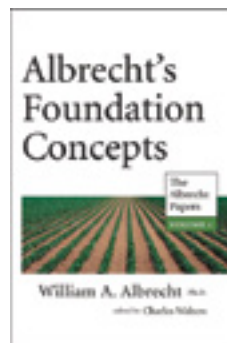
Now available in English for the first time! Starting with the basic concepts of "tilth" and "soil structure" and moving along to the symptoms of unhealthy soil and the behavior of plants on non-friable fields, Sekera investigates the complex interrelationships in the soil as well as the practical measures to preserve and improve soil tilth. **#7415 | \$25**

**Bread From Stones** ^A

Julius Hensel

This book was the first work to attack Von Liebig's salt fertilizer thesis, and it stands as valid today as when first written over 100 years ago. Translated from the German writings of Julius Hensel, the book was designed to introduce the people of the U.S. to the idea that plants require healthy food in order to flourish, just as a human being does.

It describes a then new and rational system for fertilization which has become science today — fertilizing with stone dust. **#4024 | \$25**

THE ALBRECHT COLLECTION**Albrecht's Foundation Concepts, Vol. I** ^A

William A. Albrecht

This valuable collection of essays reveals the insights of a brilliant soil scientist who was ahead of his time. In this volume, readers will find a carefully organized and convincing explanation of the relationship between plants and animals. **#1007 | \$25**

Albrecht's Soil Fertility & Animal Health, Vol. II ^A

#1008 | \$25

Albrecht's Hidden Lessons, Vol. III ^A

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Albrecht's Enduring Vision, Vol. IV ^A

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Albrecht on Calcium, Vol. V ^A

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Albrecht on Pastures, Vol. VI ^A

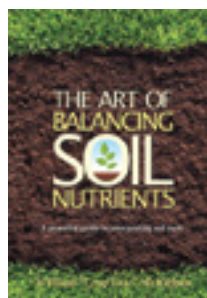
#7072 | \$25

Albrecht on Soil Balancing, Vol. VII ^A

#6734 | \$25

Albrecht on Soil Fertility & Human and Animal Health, Vol. VIII ^A

#7168 | \$25

**The Art of Balancing Soil Nutrients** ^A

William McKibben

A practical guide to interpreting soil test results to understand what nutrients are available to plants and learn how to more effectively grow crops, turfgrass and other plants. **#7115 | \$25**



Compost, Vermicompost & Compost Tea
Grace Gershuny
#7097 | \$24.99

The Compost Toilet Handbook
Joseph Jenkins
#7664 | \$40

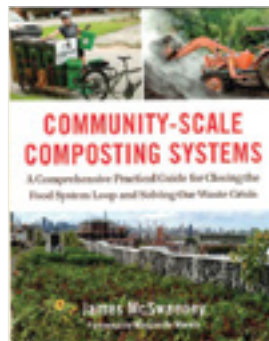
The Worm Farmer's Handbook
Rhonda Sherman
#7529 | \$29.95

Holy Shit
Gene Logsdon
#7048 | \$19.99

The Worm Book
Loren Nancarrow & Janet Hogan Taylor
#7657 | \$14.99

The Secret Life of Compost 
Malcolm Beck
with Charles Walters

We don't need to poison the earth in order to grow better food, and what is harmful to the environment when improperly disposed of often can be turned back to the soil in a beneficial way through composting — if you know how. Beck shares his insight into the processes of decay that can transform everything from lawn trimmings to sewer sludge into life-giving earth. #6232 | \$25



Community-Scale Composting Systems: A Comprehensive Practical Guide for Closing the Food System Loop and Solving Our Waste Crisis
James McSweeney

The main scope of the book is dedicated to compost system options and design, from basic sizing and layout to advanced techniques such as aerated static pile composting. Management techniques and operational considerations are also covered, including testing, feedstock characteristics, compost recipe development, and system-specific best management practices. #7543 | \$49.99



Compost Revolution 
Helmut Schimmel
(Translated by Paul Lehmann)
Composting has long been the backbone of a more nature-friendly, healthy form of gardening and farming. Compost Revolution brings a true revolution of thought to this vital subject. The author brilliantly combines classic and cutting-edge research with real-world experience

in gardens and horticultural applications. Farmers and growers of all scales will benefit from learning about the original "organic farmer" ... the earthworm. #7484 | \$25



Dung Beetles 
Charles Walters

Charles Walters digs deep into modern science and ancient history, traditional folklore and the best practical advice to resurrect the lowly dung beetle, exposing farmers and ranchers — and anyone with a desire to work more closely with nature — to this amazing creature. Meet the world's leading scientists and farmer/researchers who have dedicated

years to understanding the roles, actions and value of dung beetles in bringing a grazing operation into compliance with nature's laws, and then harvest the profits. #6852 | \$25



Fletcher Sims' Compost 

Charles Walters

Fletcher Sims has certainly earned his title as the "Dean of Composting." Interspersed with practical anecdotes from decades of personal experience, this book contains Sims' lessons on large-scale

composting, including how to manage compost ingredients, compost ratios, the benefits of compost vs. fertilizer, and more. #4151 | \$30



Compost Teas for the Organic Grower
Eric Fisher

Everything you need to know about feeding your garden, orchard, or smallholding with homemade and chemical-free "teas"—packed with recipes for creating nutrient-rich, healthy soil,

to give you healthy plants and ecosystems. #7564 | \$19.95

Soil Science for Gardeners*Robert Pavlis*

#7671 | \$24.99

Grow Your Soil!*Diane Miessler*

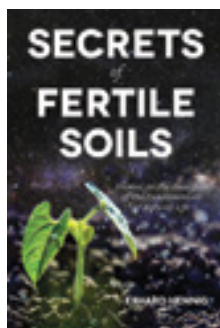
#7612 | \$16.95

Mycorrhizal Planet*Michael Phillips*

#7442 | \$35

Regenerative Soil Microscopy: The Science and Methods*Matt Powers*

#7811 | \$80

**Secrets of Fertile Soils** ^A*Erhard Henning*

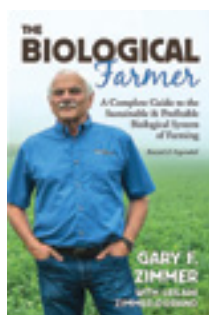
This stimulating book provides a highly practical window into the complex, interdependent relationships between soil, plants, animals, and human beings, including special insight into the fascinating life cycle of healthy soils and the imminent dangers we face should their existence become threatened. Translated from its original German, this book will help farmers everywhere understand humus better.

#7414 | \$25

**Building Soils Naturally** ^A*Phil Nauta*

Plants in optimum health thrive abundantly, have harvests with amazing taste, and are able to fight off predators. When they don't there's often something lacking: proper nutrition, missing beneficial microorganism companions, or they are short of the energy needed to reach their full nutrient-dense potential. The solution is to "start with the soil." But healthy soil doesn't just happen. The solution is in *Building Soils Naturally*, where gardeners will find a hands-on plan of how to create productive, living soil.

#7138 | \$25

**The Biological Farmer,****2nd Edition** ^A*Gary F. Zimmer**& Leilani Zimmer Durand*

Completely revised, rewritten and greatly updated! The biological farming system developed by Gary Zimmer doesn't manipulate soil life; it creates the conditions where soil life flourishes. His system feeds soil microbes, balances soil minerals, promotes

tillage with a purpose, and relies on cover crops and diverse rotations. #6438 | \$30

**The Modern Grower's Guide to Terra Preta** ^A*Caroline Pfützner*

Terra preta, or black earth of the Amazon, is considered the most fertile soil in the world. This ultra-rich, living material literally builds a permanent humus layer on the land. The results of working with this substance are healthy plants and a rich harvest — without outside fertilizer inputs. #7566 | \$25

**Food Power from the Sea** ^A*Lee Fryer and Dick Simmons*

This book explains how we can produce our food by using seaweed and fish-based inputs rather than wasteful and unsustainable chemical fertilizers. Fryer and Simmons tell how growers can harness the sea's energy to extend growing seasons, increase yields, protect crops from insects and disease, and more. #6655 | \$20

**Humosphere: Humus, a Substance or a Living System?** ^A*Herwig Pommersche*

In this breakthrough work — now available in English for the first time — the independent German-Norwegian explorer of soil life, graduate permaculture designer and graduate engineer Herwig Pommersche shares his lifetime of research into humus. He found we have an inadequate understanding of the mechanisms by which plants absorb and process their nutrients. #7513 | \$25

Teaming With Microbes*Wayne Lewis and Jeff Lowenfels*

#6816 | \$24.95

Teaming With Bacteria*Jeff Lowenfels*

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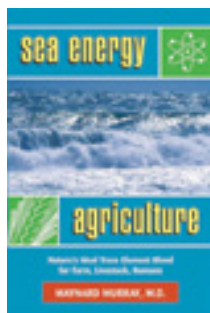
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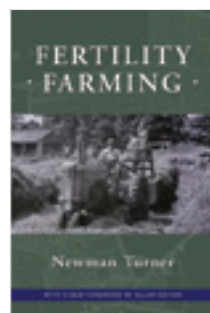
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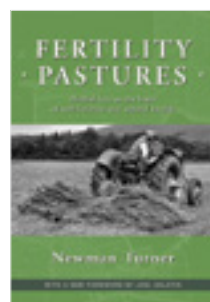
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Newman Turner

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Donald Schriefer

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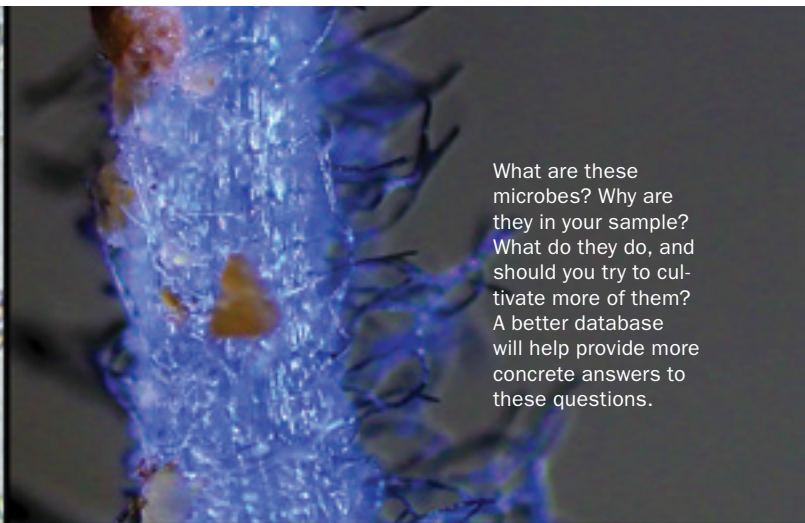
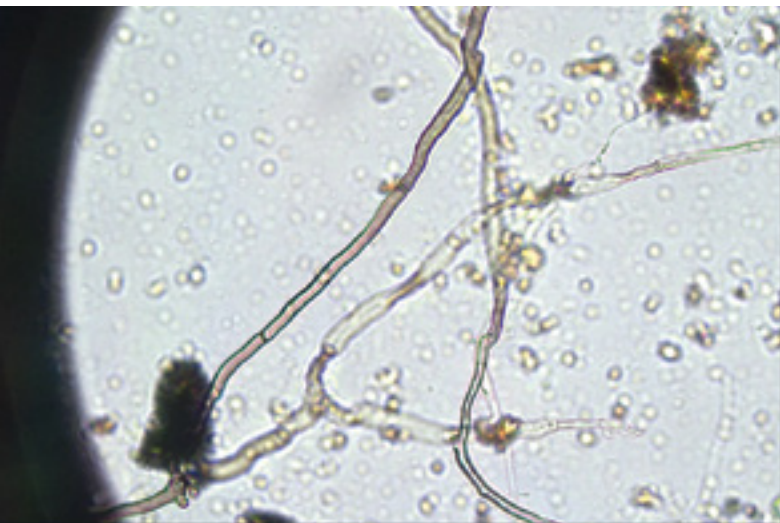
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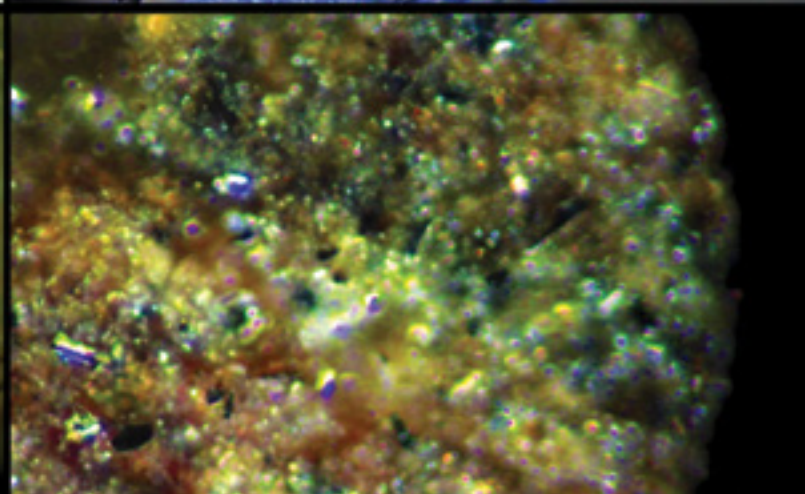
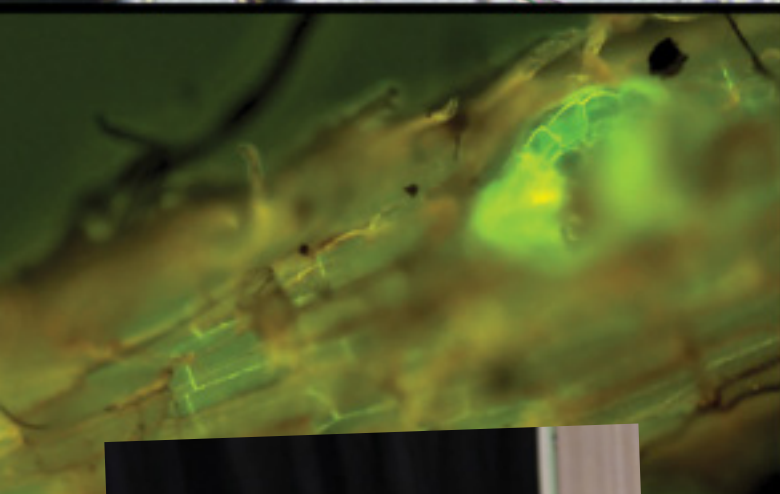
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What are these microbes? Why are they in your sample? What do they do, and should you try to cultivate more of them? A better database will help provide more concrete answers to these questions.



Matt Powers at the 2025 Acres U.S.A. Eco-Ag conference

Ground Truth

The R-Soil database promises community-level quorum sensing for soil

BY MATT POWERS

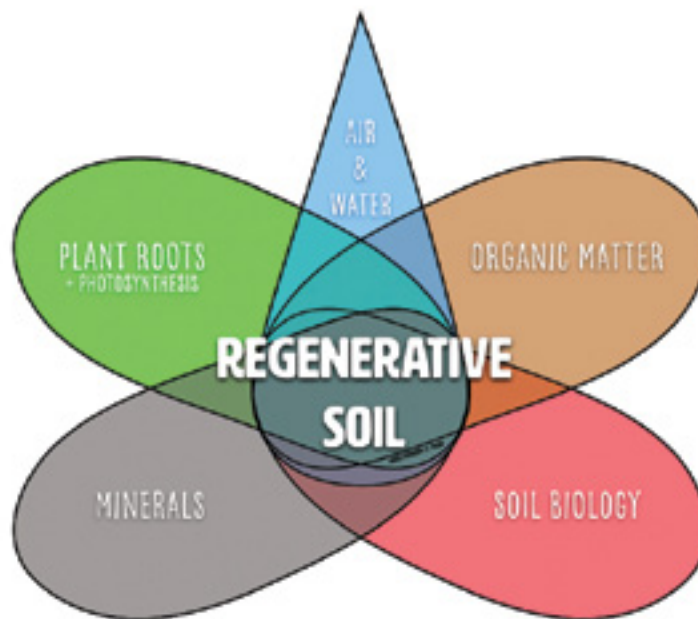
Farmers struggle in so many ways today because they are driving mostly blind. Going down the road with a dirty windshield feels dangerous; why would we do that with our business or with the food we feed our families? It feels like there's no glass cleaner in the car and we've all had to make do — even researchers are stuck with limited windows into what's going on in the soil.

That's why I felt compelled to create the R-Soil Database. It aims to provide a way to holistically understand what's going on in soil and plant tests and to tie that to practices and inputs.

Farmers often test a limited range of aspects — not all five that must be examined for a holistic understanding of soil. They'll make decisions based on incomplete information, and we all know how that goes: it's a gamble. Primarily, what's done is mineral testing (usually M3 or Albrecht), pH, CEC, and sometimes Brix; sometimes plant sap analysis or tissue analysis; and sometimes PLFA.

But all too often, farmers don't even compare their test results outside their own farms. They may compare results to previous seasons, which is essential, but what would happen if they could compare results to other farmers growing the same crops?

What if we could compare across all the regenerative aspects of soil: minerals, biology, organic matter, air & water, and plant roots & photosynthesis? What if we could compare soil minerals to plant sap analysis — not just your soil season to season, but compared to other growers focused on the same crops you grow? What



The five aspects that must be examined for a holistic understanding of soil

if you could look at actual microscope images and video to compare soils or composts? What if you could compare your roots to other examples of roots and mycorrhizal fungi? What if you could share your results publicly? What if we tested before, during, and after, so farmers could see the cradle-to-grave effects of their choices, micro to macro? That means testing the compost we are thinking about adding. That means testing the manure before we buy it. Testing the biofertilizers we are using — practicing good quality control and documenting the process for our records and reference.

Why the R-Soil Database Exists

I want farmers to be able to see how much money the exemplars in this space are saving by ditching NPK reliance, building their soil structure and mineral coherence, and feeding the microbial life that powers the entire system by design. I want them to see it, and then to feel the burn — to know they could be saving so much, working so much more efficiently, and making the farm so much more

attractive to the next generation as a business and a lifestyle.

My vision is to help not just farmers, but gardeners, ranchers, landscapers and everyone else who works with soil — to help them see the nuance between applications and methods so they can discern for themselves good, better and best. I envision a viral feedback loop developing and leading to rapid change in practice. For example, we'll know how influential moon cycles are after a few years of tracking. Further, we'll see how biodynamic farming, natural farming, effective microbes, and so many of these amazing methods and solutions compare in different soils, with different plants, and in different combinations with different equipment. We'll also see massive innovation and development as these new insights emerge.

From Testing to Shared Insight

Farmers can look at a total digestion soil test, or even just an M3 soil test, and see what is missing on their plant sap analysis report. There's a reason it's not being incorporated into the



The R-Soil database aims to show the connections between inputs/practices and outcomes.

plant properly — it could be pH, Eh, mineral, or biologically related. Using test results, we can deduce where the gap, toxicity or antagonism is to be found. For composters who use microscopes, this will provide the long-anticipated microbial database they've been waiting for. For consultants, this will be where they can showcase their work — before and after — and develop an online résumé and portfolio of their work in the soil, with sites and farmers.

We are currently in pre-beta testing and final building for the website. I'm collaborating with John Kempf and others to take things to a higher level of insight and service for everyone using the database. It's going to allow clarity in spaces that were once confusing to so many people. I initially thought of it as a space for microscopists focused on soil and compost, since that didn't exist, and we all get buried under a mountain of images and videos quite quickly when we start documenting our work in soil microscopy. I had to make it happen to organize my own work, and I knew others would benefit. From there, vetting soil and compost microscopy meant including mineral testing (total digestion, M3, Albrecht, etc.) as well as other biological assessments (PLFA, Microbiometer, eventually DNA), plus

pH, Eh, CEC, Brix, and root assessments for mycorrhizal fungi.

Once this is done, almost everyone will end up with a basic understanding of what soil life is and should look like, and what we are doing with the microscope — how it's not that complicated, and how many myths and misconceptions around soil and compost microscopy are easily dispelled with experience and understanding. It will certainly pull some mystery out of this space. In exchange, this community will become recognizable as a valuable asset because we will all be able to see before-and-after results, both in terms of actual produce and the soil, down to the minerals and biology.

Connecting Soil, Food and Health

I'm confident we'll soon have food nutrition metrics as well from a portable sensor. Medical doctors, health practitioners, dietitians and nutritionists will be able to interpret test results and make health recommendations in relation to specific foods and nutritional levels. The regenerative agriculture community will be able to fully connect to those communities: health, longevity and even biohacking. They all rely on regenerative soil, and now we can prove it.

We are on the cusp of a revolution in regenerative food production and medicine, including ranching. Researchers are testing grassfed versus CAFO meat, and vitamin levels are sometimes more than 60 percent higher in grassfed — despite CAFO animals being supplemented with those same vitamins. Shockingly, grassfed animals have up to 600 percent more antioxidants. It's not just one ranch accomplishing this — it's a trend. An extensive Utah State University study by Stephan Van Vliet, which Dr. Allen Williams discussed in depth at an Eco-Ag 2024 keynote, shows the data are there.

When the R-Soil Database is up and running, soil consultants around the world will be able to upload test results, and these trends will be recognizable to the entire community in real time. The people are in place. The solutions are here. The need is real. The demand is real (just look at Azure Standard's growth). The savings are real.

The movement is gaining steam and recognition. Are you ready to verify your work is working in an entirely new way? [ACRES](#).

Matt Powers is an author, educator, citizen scientist and entrepreneur. Learn more at regenerativesoilscience.com.



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CLOCKWISE FROM TOP:
A good bald udder.
Good wedge shape.
This cow has a healthy
glandular system.

B4 YOU BUY

Cows with big bellies, big butts,
bare backs and bald udders will,
on average, produce better-quality calves

BY STEVE CAMPBELL

I was recently talking to a group of land stewards that were touring the ranch in Australia where I was a guest. The end of the tour found the group across the fence from a herd of 2,000 cows with calves. The landowners asked me if I would spend a few minutes going over a few of the concepts that we had been talking about the previous two days.

I did not have much time; however, I wanted to touch on phenotype and hormonal activity and how they positively or negatively impacted fertility in the herd.

Starting off with phenotype (or shape) was easy, with so many examples just across the fence. A “wedge” shaped cow is the most fertile for many reasons. Starting with the shoulders (small part of the wedge), she

should be shorter here on the top-side than at the hook bones. Why? Because sex hormones shut off long-bone growth. The earlier in life and the more estrogen a heifer calf is producing, the more she should look like she is walking downhill while traveling on level ground. From the side view, this would create the top part of the wedge.

On the bottom side, the heart girth (taken around the smallest circumference behind the front leg) should be equal to the topline (measured from pin bone to poll). To give the cow (or heifer) a wedge look, her flank circumference needs to be larger than the girth measurement by a minimum of two inches, but a plus-four-inch, -six-inch or -eight-inch flank is even better. Kenneth Redman of Sydney, Montana, found in his analysis that old cows typically had larger flanks than the herd average, meaning that they could “digest enough for three” even during the poor, dry years. This larger flank gives the look of an ever-increasing wedge toward the rear of the cow, from a side view.

Moving to the back of the cow, she needs to have a rump at least two and a half inches wider than it is long. The length is measured from the back of the pin bones to the front of the hook bones. The width is measured at the widest part of the rump area (usually the stifle muscle on each side). Michael McDonald of Nebraska found that the best indicator of fertility in a cow or heifer was how much wider the rump was than its length. Kenneth Redman found that old cows that had given ten calves in a row had a wider rump than the average cow in the herd. With this wide rump, a view from the top of the cow is going to also give us a wedge-shaped look.

At that point, the group had an idea of the shape of a replacement heifer that is in the ballpark with her phenotype. Next, my explanation turned to hormonal activity and

butterfat. That short leg up front was created by high production of estrogen. Two other places we would see early estrogen expression is in hairs standing up in the adrenal whorl and the stifle muscle developing early. In most cases, higher hormonal activity is expressed in an early-shedding animal with a uniform haircoat. If your heifers all shed late and have hair sticking every which direction, it is time to take a serious look at the feed and mineral quality you provide.

Bare backs allude to early shedding. Dr. Jan Bonsma said that if he could use only one of all of the indicators he knew for selecting which animal he would eat that year, he would select the animal that shed its winter haircoat the earliest. That animal had the best glandular function in her environment and would be the most healthful for him to eat.

We can use this to our advantage if we start observing what we look at. That early-shedding heifer will typically have fewer flies than her herd-mates. She will maintain body condition easier/better. One of the big keys to heifers and cows getting pregnant is the ability to gain weight between calving and breeding. That bred replacement heifer must be able to eat enough for two. Late-shedding first-calf heifers typically are the ones who breed back late or come up open in the fall. Part of this is glandular function, but in a number of cases it is related to a phenotype that hinders the heifer's ability to gain weight during lactation before joining her with the bull.

Butterfat in the heifer can be observed in a number of ways — even on the day she is born. These include (not in order of importance) 1) an adrenal hair whorl located in the shoulder blade area or further forward; 2) extra teats; 3) an area around the teats that has shorter, nappy, lighter hair color than the rest of her body (this is a precursor to a bald udder later in life); 4) the correct outline of her escutcheon showing high butterfat when she is milking; 5) the presence of vertical folds in the hide; and 6) a small-diameter cannon bone and a pointed poll. In the mature cow, a bald udder is the number one indicator of butterfat. The more of the previously enumerated characteristics we see, the more likely we are to have a high-butterfat-producing cow.

I summarized my talk by saying, “you need a cow with a big belly, a wide butt, a bald udder and a bare back.”

Any one animal might “prove” these comments incorrect. However, one hundred cows with all of these traits will give you more and better-quality calves than one hundred cows that have few or none of these traits. ACRES.

Steve Campbell is a lifelong cattleman and regenerative livestock consultant based in Idaho. Contact him at tailormadecattle.com.



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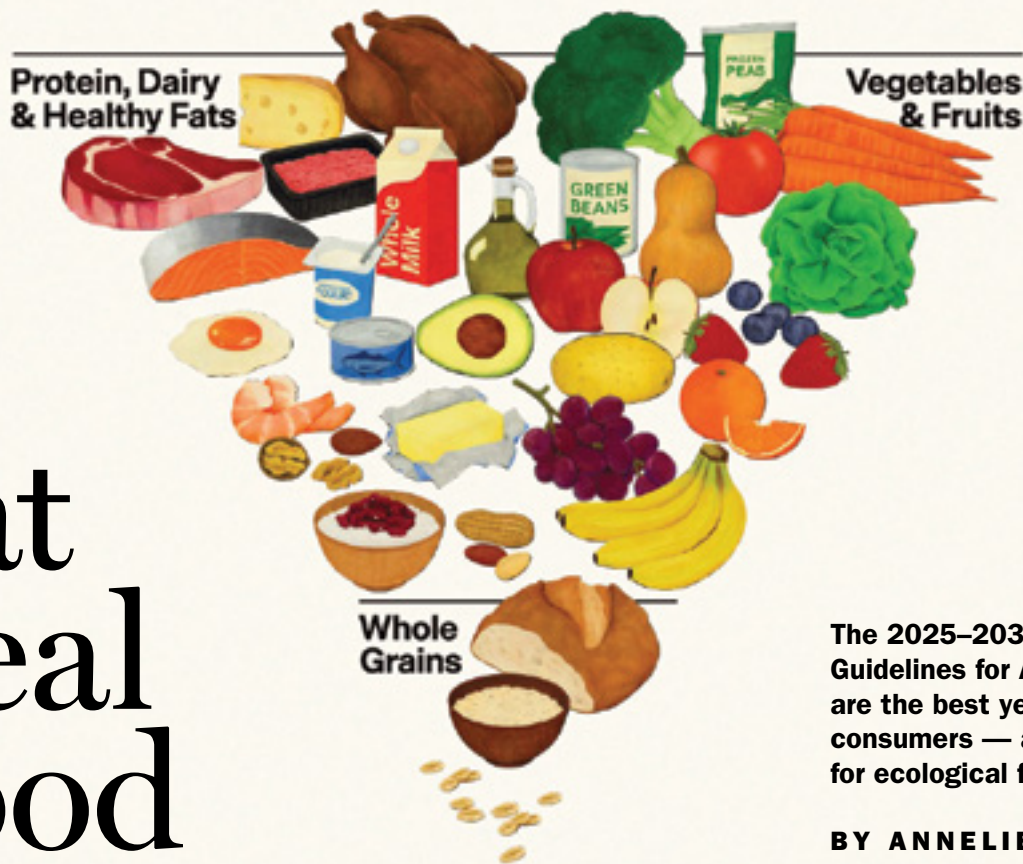
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Eat Real Food



The new dietary guidelines promote animal proteins, fruits and vegetables, and whole grains as the three bases of a healthy diet.

The 2025–2030 Dietary Guidelines for Americans are the best yet for American consumers — and, possibly, for ecological farmers

BY ANNELIESE ABBOTT

“The message is simple: Eat real food.”

That’s how USDA’s 2025–2030 Dietary Guidelines for Americans, just released this January, begins.

“To Make America Healthy Again, we must return to the basics. American households must prioritize diets built on whole, nutrient-dense foods — protein, dairy, vegetables, fruits, healthy fats, and whole grains.”

Accompanying this statement is — in my opinion — the best graphic USDA has ever made for dietary guidelines. The most recent iteration it replaces, MyPlate, was boring. So was MyPyramid, that short-lived colorful abstraction from the 2000s. The 1995 food pyramid looked cool, with all its little drawings of food, but was highly criticized for its hierarchical implications.

The Eat Real Food graphic is a triangle (not an inverted pyramid, as some critics call it) emphasizing just three food categories: protein, dairy, and healthy fats; vegetables and fruits; and whole grains. Each category is illustrated by tasty-looking drawings, all of which — except perhaps for the canned green beans — represent fresh, whole foods.

Most importantly, for the first time ever, the new dietary guidelines say that there is no place for highly processed foods in a healthy diet. This is what organic farmers have been saying ever since the 1930s, but for over a century, the USDA has said that all foods — including white bread, white sugar and processed foods — can be part of a healthy diet in moderation. They’ve never said to completely avoid highly processed foods.

Until now.

History of the Guidelines

As nutritionist Marion Nestle explains in her 2002 book *Food Politics*, USDA has been issuing recommendations on what Americans should eat for over a hundred years. The 1917 USDA pamphlet *How to Select Foods* grouped essential foods into five groups: fruits and vegetables, meats and other protein-rich foods, cereals and other starchy foods, sweets, and fatty foods. Yes, that’s right — USDA actually recommended that people eat sugar every day.

In the 1920s and 1930s, nutritionists discovered the importance of vitamins and minerals for preventing deficiency diseases like pellagra, beriberi and scurvy. Since the vitamins were discovered before they could be synthesized and sold as supplements, nutritionists recommended that people get their vitamins and minerals

from “protective foods.” These fell into three categories: whole grains (essential sources of B vitamins); green leafy and yellow-orange vegetables and fruits (vitamins C and A); and butter, whole milk, eggs and animal organ meats like liver (vitamin A).

By the 1930s, USDA incorporated protective foods into their guidelines but still included sugar as a separate food group and kept white flour at the center of the “cereal” category. Leaders of the early organic movement went much further, seeing no place for white flour or sugar in any healthy diet and recommending only whole grains.

The number of food groups changed over the years, eventually settling down to four or five — meat, dairy, fruits, vegetables and grains. Since 1980, a new version of the dietary guidelines has been released every five years. Because these guidelines serve as the basis for school lunch, WIC, and other government-funded food purchasing programs, every sector of the food industry lobbies to ensure that they can fit their product somewhere into the guidelines as “healthy.”

That’s why, despite always seeking

input from nutrition experts, the guidelines have never truly reflected what the best possible diet would look like. The 2025–2030 guidelines don’t, either. But they’ve taken several major steps toward that goal.

Avoid Highly Processed Foods

“Avoid highly processed packaged, prepared, ready-to-eat, or other foods that are salty or sweet, such as chips, cookies, and candy,” the new guidelines state. Next, they warn to “avoid sugar-sweetened beverages, such as sodas.” They say that “no amount of added sugars or non-nutritive sweeteners is recommended or considered part of a healthy or nutritious diet.” And they specifically note that “no amount of added sugars is recommended” for children. No more candy for kids.

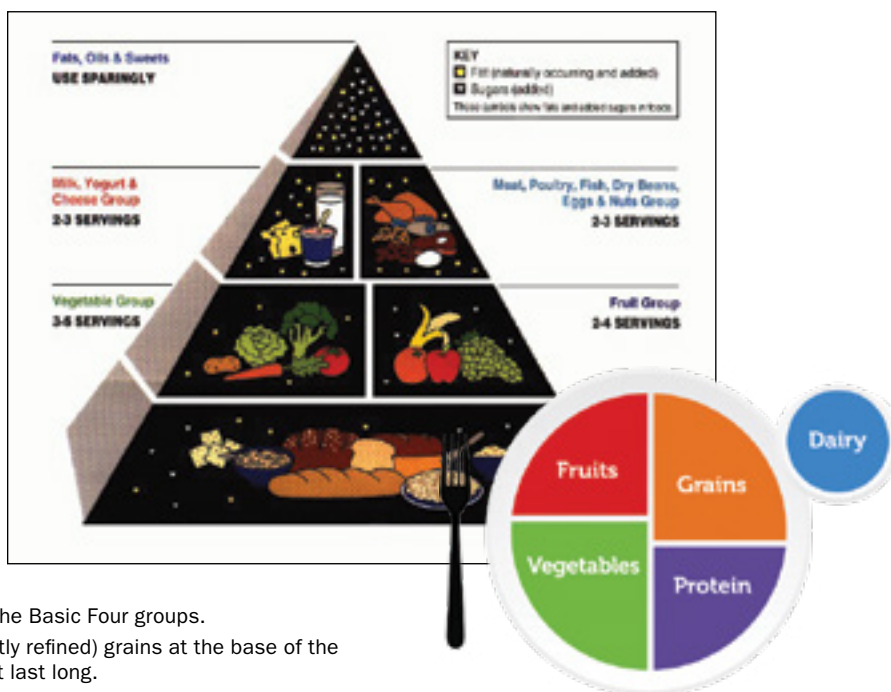
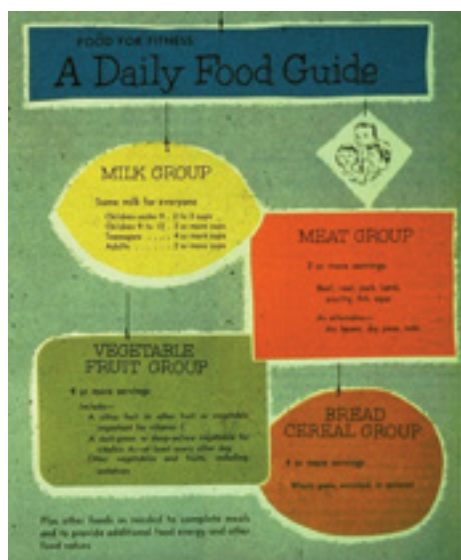
This is unprecedented.

Previous guidelines never straight-out endorsed highly processed foods, but they always said that they could be part of an otherwise healthy diet. And they usually said to limit added sugars to 10 percent of total calories, which can still be quite a lot. Historically, USDA has never taken a strong stance against added sugars. But this is exactly what the organic movement

has been urging since the 1930s.

Another huge change is the recommendation to “Focus on Whole Grains.” Up through the last iteration of Dietary Guidelines (2020–2025), the USDA still only recommended that half your grains be whole. The new guidelines say to “prioritize fiber-rich whole grains” and “significantly reduce the consumption of highly processed, refined carbohydrates, such as white bread, ready-to-eat or packaged breakfast options, flour tortillas, and crackers.” That cuts out most of the “grains” pictured on the bottom of the 1995 food pyramid.

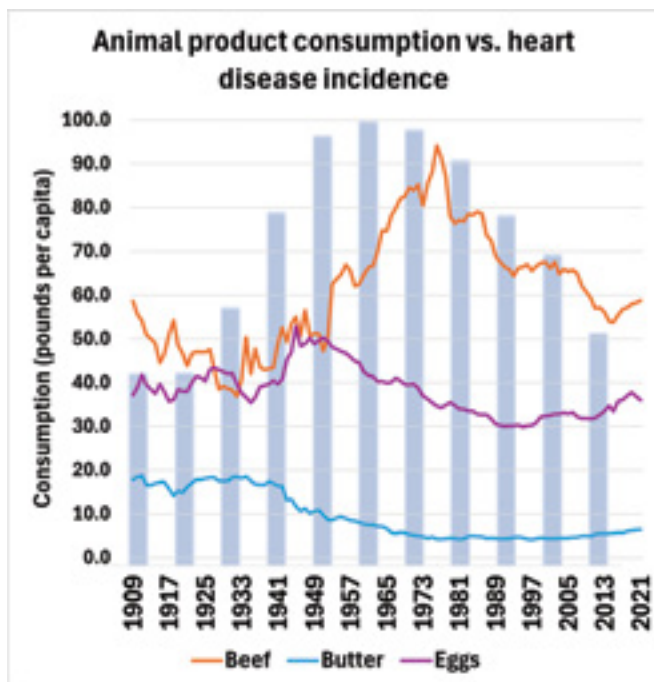
Again, this is huge. Nutritionists have known since the 1920s that refined grains — white flour, white rice and de-germinated cornmeal — were major contributors to deficiency disease. Whole grains, in contrast, are protective foods. But starting in the 1940s, USDA took the stance that enriched white flour was healthy, even though enrichment only restores a handful of the nutrients removed in processing. This is the first time *ever* that an official USDA publication has recommended that *all* grains in a healthy diet be whole.



LEFT TO RIGHT: In the 1950s, USDA divided foods into the Basic Four groups.

The 1995 Food Pyramid was criticized for putting (mostly refined) grains at the base of the dietary pyramid. The abstract MyPyramid graphic didn’t last long.

The just-replaced MyPlate graphic was fairly similar to the old Basic Four food groups.



There is no correlation between historic mortality from heart disease (bars) and per capita consumption of fat-containing animal products (lines).

Overemphasis on Meat and Dairy?

Interestingly, most media reports have ignored the new guidelines' unprecedented endorsement of whole grains. They're more concerned about the heavy emphasis on protein, especially animal-based protein. The new guidelines say to eat more protein than necessary, and the prominent steak on the new food triangle definitely shows the influence of the beef lobby.

Despite the meat-heavy emphasis, there is a section for vegetarians and vegans, with the sound advice to "consume a variety of whole foods" and "significantly limit highly processed vegan or vegetarian foods that can include added fats, sugars, and salt." It's a good reminder that many vegan foods (especially fake meat products) are highly processed. A healthy vegan diet will avoid those and emphasize minimally processed beans, nuts and seeds instead.

The most controversial part of the new guidelines is that they reverse USDA's decades-old recommendation to eat low- or nonfat dairy products. The recommendations now encourage full-fat but unsweetened dairy products. The accompanying "Whole Milk for Healthy Kids Act" allows

schools to offer whole milk in lunch programs instead of just 1 percent or skim. Butter, for the first time ever, is prominently featured right at the middle of the triangle, rubbing shoulders with an avocado and olive oil.

Old-school nutritionists, who still think saturated fat is a major cause of heart disease, lament this change. But the data linking saturated fat to heart disease has come under increasing scrutiny in recent years, and there has never actually been a correlation between per capita butter, beef, cheese, egg or milk consumption and heart disease. While historians are still debating the cause of the mid-century spike in heart attacks, there's little evidence that eating beef or butter had anything to do with it.

Confusingly, the new guidelines still recommend keeping saturated fat intake below 10 percent of total calories, which would be difficult to do when consuming as much full-fat dairy and meat as the guidelines recommend. It's unclear why this outdated recommendation wasn't removed.

Strangely, the other main criticism of the new guidelines is that the document is too short. It's only 10 pages long; the 2020–2025 guidelines had 164 obfuscating pages that made it

difficult to quickly figure out what the actual recommendations were. The big difference is that the new guidelines are targeted directly at consumers, not dietitians. Nobody needs a degree in nutrition to understand what "eat real food" means.

Best Yet

What should eco-farmers make of the new guidelines? As Joel Salatin pointed out in a January 9 blog post, production methods aren't mentioned. The guidelines don't, for example, even mention that grassfed beef and dairy have a healthier fatty acid profile than conventional products. They don't put as much emphasis on vegetables as they could, nor do they recommend that people choose organic produce. But to be fair, no dietary guidelines have *ever* said anything about production methods.

Overall — aside from the obvious beef and dairy lobby influences — the new guidelines are a huge breakthrough in acknowledging the importance of whole, natural, minimally processed foods. They are the first ever to recommend that people consume only whole grains, no highly processed foods, and no added sugars (especially for children). They're the closest thing to what organic farmers of the 1940s were recommending that USDA has ever put out.

Are the guidelines perfect? No. Are they the best yet? Yes. And if people actually listen to them and start eating more unprocessed, whole foods, it will only be one more small step to get them eating grassfed animal products, organic produce and regeneratively grown whole grains.

ACRES.

Anneliese Abbott is an editor with Acres U.S.A. She is the author of *Malabar Farm: Louis Bromfield, Friends of the Land, and the Rise of Sustainable Agriculture*, and she runs the site historyoforganic.com. She has a master's degree in agroecology from the University of Wisconsin-Madison and farms with her family in Otsego, Michigan.

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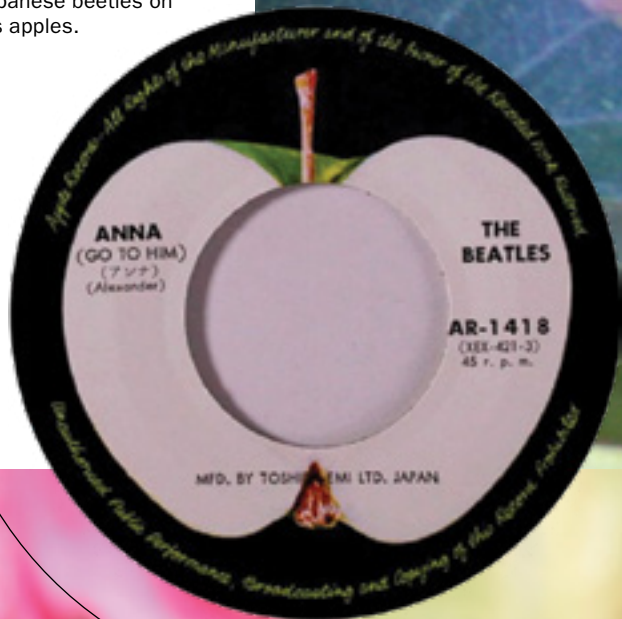


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BEEBLE MANIA

Agronomist Kish Johnson shares how a focus on the plant health pyramid eliminated Japanese beetle pressure on his home orchard

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Acres U.S.A. I know you're an agronomist and the director of Advancing Eco Agriculture's international development initiatives, but I wanted to talk with you about your home orchard; could you start by describing it a bit?

Kish Johnson. Sure. The orchard is probably about an acre of semi-standard and standards, which is more aesthetically enjoyable for me than having everything on trellis, like in a modern commercial orchard. And that's generally manageable; it works out to about 50 trees or so.

I have a lot of heritage Virginia and English varieties. It turns out that Thomas Jefferson was interested in a lot of the English varieties I grew up with in England — Cox's orange pippin, etc. The hope is to go toward boutique cider production at some point.

Acres U.S.A. And you planted this five or six years ago?

Johnson. Exactly.

Acres U.S.A. All apples or other fruits as well?

Johnson. It's about 97 percent apple, with just a couple of pear varieties and peach and plum. I'm debating whether to continue with peach. Here in central Virginia we're getting more double frosts with high heat in between, and it just nukes early leaves and blossoms.

Acres U.S.A. Where exactly in central Virginia are you?

Johnson. In between Lynchburg and Appomattox. I had been in Pennsylvania managing more intensive orchard production — semi dwarfs, some trellised — and two things happened. Number one, being so close to the Amish community around Lancaster, land prices were getting ridiculous. I couldn't find land to scale up. And then my wife's mother passed away unexpectedly, and we were trying to find a way to live closer to family so we could help out.

We found an amazing deal here in Virginia — 120 acres for next to nothing. It was an estate sale, but the people had had livestock and were actually doing pretty decent rotational grazing. Even though it had been in cotton and tobacco, it had some of the best fields in the area — just from having a once- or twice-weekly rotation.

It's classic Virginia heavy red clay. The soils weren't too bad, but they were absolutely dead biologically.

Acres U.S.A. So, did you do the wise thing and not plant immediately — instead doing a year or two of cover crops — or, like me, did you feel like you had to get trees in the ground right away?

Johnson. I was definitely eager to get the trees in, but I had a year or so where I did a few things. I

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We haven't really found the limit of manganese, in terms of what is excessive. Manganese plays a big role in water hydrolysis, as well as in the regulation between calcium and potassium.

planted in the second year, but yeah, I made some mistakes. I put way too much Sea-90 on, so I had to flush all the sodium out. That being said, I did make big efforts to plant the orchard with a strong biological focus, using biological inoculants and providing “food and housing” to the biology in the planting hole.

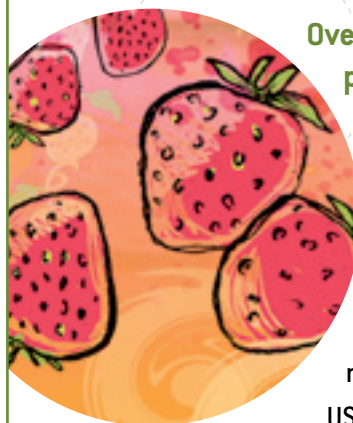
Acres U.S.A. Did you have Japanese beetle damage starting early on? And in terms of dealing with them — the easy answer is that you just get your Brix up to 15 and you'll never have any insect damage, right? But obviously that's easier said than done.

Johnson. Yeah, and I have some skepticism around Brix. It can be an oversimplification. We know, for example, that unless you're really consistent and can understand the root causes of high Brix levels, you can easily see high Brix from a state of catabolism — when the tree is actually extremely stressed. That can be a reason why it's pushing out more and more sugars. “I've got to find a way to create the next generation or to support myself,” it thinks. The leaves can have high Brix because the tree is stressing out or even potentially dying, depending on those stresses.

The first year after I planted wasn't too bad, so I definitely relaxed a little. But then going into the second season, it was the classic experience of “Wow, I'm getting defoliated big time.” And of course they were younger trees, so there was a greater vulnerability there. Pretty early on I saw the devastating impact of having that kind of defoliation. And nobody's got the time to go out and

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knock each beetle off into a bucket of water. That's a losing battle.

Acres U.S.A. So what did you do? What has been effective? I assume you did some sap testing?

Johnson. Yes, sap testing was a good component, but even without that I was already committed to a pretty robust fertility program. My backstory is that I'd been connected

really looking to balance the chemistry and to have that long-term goal of building a robust microbiome. That's where the real magic is — when you've got that active biology working in your favor for the orchard.

So, I'd already come up with a pretty robust fertility regime, but what really spiked my interest is the idea that we haven't really found

the limit of manganese, in terms of what is excessive. In my climate here in central Virginia, where the summers are hot, manganese plays a big role in water hydrolysis, as well as in the regulation between calcium and potassium. So I was throwing out manganese and micros pretty heavy. My manganese rate was about two gallons to the acre of our Rebound manganese. I was really curious to see if there was an upper limit for it.

Acres U.S.A. What would that translate to for a powdered manganese sulfate — to dissolve it and put it into a foliar? I know it's chelated differently.

Johnson. And that's the hard thing. I mean, if you're using manganese sulfate, you're heading in the right direction. But even with our Rebound manganese, it was one of the products that took a little bit longer to get right, especially on the foliar side. I wasn't looking at my soils — I wasn't wasting time trying to get manganese to the trees through the root system. There's plenty of manganese here in our regular Virginia clay soils, and we need to change the oxidation state by getting the biology going to start seeing that soil manganese released, but my focus early on was on foliar and trying to get manganese inside the plant.

I was also working hard on level two of the plant health pyramid — trying to work on protein synthesis. I'd had a little bit of aphid pressure, but that was quickly disappearing. By year three, all of a sudden I wasn't seeing Japanese beetles anymore at all on the apples. I had a couple of control trees and could see the beetles on those, so I knew it wasn't just a fluke. But I wasn't ready to say anything about it — I wanted at least a couple seasons of consistency to be sure it wasn't just anecdotal — to have some level of clinical trial to it. And now I've had three years with no Japanese beetles.

Acres U.S.A. Do you have boron in your soil naturally? Or do you think it was the foliar applications of that as well that did the trick?



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Johnson. Sulfur and boron are leachable nutrients, so even if you've got them in your soil matrix, it's probably leaching — at least further down in the soil profile, if not completely out. My main soil strategy was lots of gypsum — 250 pounds or so per acre. It's not until recently that I've split that up. I was putting it all out at once, as opposed to putting it out around different critical points of influence.

It's only been in this last season that I started doing a little bit more magnesium and boron in the soil application. But yes — everything else has been foliar. Holocal — our calcium product — has a little bit of boron, or the older version did, and then I was using Rebound boron. And that's definitely helped, especially around the time of cell division. Calcium's just a stubborn thing to actually get where it needs to go — both into the tree and then also within the tree. That's where boron is really helpful — helping calcium be more mobile.

Acres U.S.A. But manganese has been the one unexpected element that has been more helpful than others, you think?

Johnson. Yeah. Like I said, I was really curious about its upper limits — a good zone. Manganese is so important with its role in photosynthesis, water hydrolysis and regulating calcium — technically, it down-regulates potassium, which makes more room for calcium as the two can be antagonistic.

Acres U.S.A. And do you use any microbi-als in foliar products as well, to try to help the phyllosphere?

Johnson. Candidly, I've been really inconsistent with foliar biology. For me it was just a practicality — I was already spending quite a significant amount on my soil biology inoculations. If any of the biology was going out, it was more focused on soil.

But I would say that the main thing I've done that's specifically contributed to Japanese beetles not being an issue has been focusing on micronutrients. I use lots of seaweed; it's kind of a 1990s technology, but it works. There's a lot of great data that shows that seaweed helps with systemic stress resistance.

And then I've just been working my way up the plant health pyramid. Every fall, when possible, I've done our soil primer. I actually put out OP-8 because I was concerned that I was getting a lot of glyphosate drift. But where I've seen the responses really kick in has been working on those foliar applications, especially with a strong focus on mitigating stress. We know that Japanese beetles come out during higher temperatures, which are already stressful times. Making sure you stay on top of water management and micronutrients is really important. **ACRES.**



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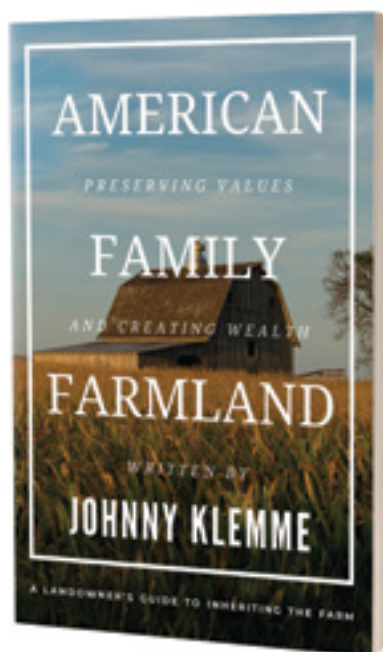
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American Family Farmland: Preserving Values and Creating Wealth

by Johnny Klemme



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page 75. Complete list of
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Sometimes family farms are passed down to the next generation without a hitch.

Other times, though, things get ugly. Farmland advisor and author Johnny Klemme tells the story about two brothers who farmed together and had a plan in their minds about what would happen after they were gone, but they never wrote anything down. One of the brothers died unexpectedly, and his daughter inherited his portion of the farm. She immediately filed a partition suit and forced the sale of their 150-year-old family farm, because none of the other family members had enough cash to buy her out.

With land prices far exceeding productive capacity in many areas these days, the pressure to sell can be immense — even if in some cases the attachment surpasses monetary value. A corporation recently proposed buying a family farm in Kentucky for \$2 million. Grandpa said no. They offered \$4 million. Still no. \$8 million. No. “Then what’s the price?” they asked. “It’s priceless,” he said. “You can’t put a price on my time with my family and my grandkids and the memories we’re making here.”

Eventually, though, all farms do pass hands. This is often a huge, once-in-a-generation event that is extremely emotional for all involved. What should happen when grandma and grandpa die and there are several children, each of whom is in a different stage of life, has different desires for what happens to the land, and is more or less attached to the

place they grew up?

American Family Farmland by Johnny Klemme seeks to address the multitude of concerns and decisions a family faces in a situation like this. Through stories and plain talk, Klemme helps family members think through all the options in this complex situation.

One of Klemme’s most important messages — as simple and obvious as this sounds — is that families that start the planning process early have more successful successions. When children who want to farm know from the beginning of their careers that their parents and grandparents have prepared a path for them to take ownership of the farm, it gives them the confidence they need to invest their time and energy. Children who don’t want to farm know that they’ll get a fair inheritance as well.

Klemme walks readers through both the intangibles — how to determine what your goals really are, how to relate to family members who feel differently — and the complex financial and legal options available these days: 1031 tax-deferred exchanges, land trusts, conservation easements, and many more. While there’s no specific regenerative or ecological focus to the book, Klemme does address the concerns many people have that the land their family owns not be degraded by future owners.

This book succeeds in demonstrating that with good planning, farm succession can be a winning situation for everyone. [ACRES.](http://www.acresusa.com)

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American Regeneration Conference. April 30–May 2. **Bandera, Texas.** The 1st annual American Regeneration conference, a partner event with Acres U.S.A., will focus on the new American dream and regenerative agriculture's place in it. Gain insights from leading farmers, ranchers, homesteaders, and health & policy advocates, while enjoying a truly nourishing farm-to-table experience. acresusa.com/events

Applying Principles of Regenerative Agriculture on Small Diversified Farms. May 30. **New Castle, Virginia.** Join Understanding Ag's John Hays and Adam Taylor to learn how principles of soil health, rules of adaptive stewardship, and an understanding of ecosystem processes can be applied to farms of any size in any production context. acresusa.com/events

Acres U.S.A. Farm Weird On-Farm Event. June 27. **Gaston, Indiana.** An all-day field day at Jason Mauck's farm. Learn about and watch harvesting of a relay-cropped wheat-soybean field, stock cropping, alley cropping, hog production and more. acresusa.com/events

Acres U.S.A. On-Farm Day. July 10. **Viroqua, Wisconsin.** Join host Taylor Henry, owner and CEO of Acres U.S.A., for a one-day, in-person event designed for graziers, ranchers, and regenerative livestock producers who want to deepen their understanding of holistic cattle care. acresusa.com/events

Rodale Organic Field Day. July 17, 2026. **Kutztown, Pennsylvania.** A one-day on-farm learning experience where Rodale Institute researchers share organic/regenerative practices, research results, and demonstration stations across farm plots. rodaleinstitute.org/organic-field-day

2026/27 CALENDAR

Our cross-channel themes include our print magazine, EcoFarmingDaily.com
how-to articles and our eNewsletters reaching 20,000 subscribers every week.

JANUARY 2027 – FOCUS: SEEDS

Featuring articles and information about non-GMO seeds, seed-planting, germination and more.
Ad Reservation Deadline: November 15, 2026

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MAY 2026 – FOCUS: PERMANENT CROPS

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Ad Reservation Deadline: August 15, 2026

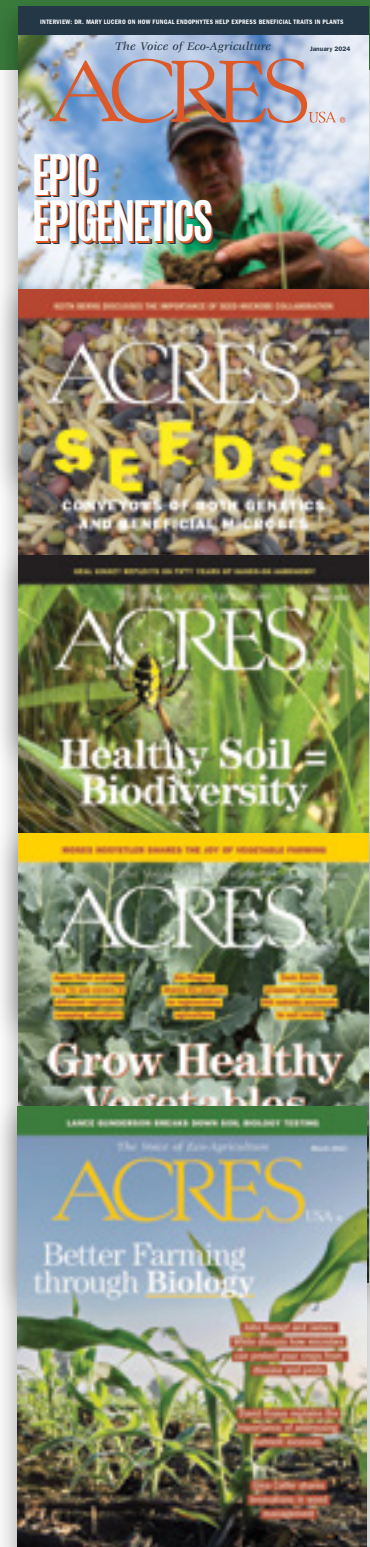
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FUNGICIDES AND TILLAGE AND BARE SOIL, OH MY!

Q. What are some of the significant factors that limit the establishment of the large populations of soil biology that are necessary for quorum sensing?

A. Many people would say tillage, but I don't believe that to be the case. As soil health improves, and as we get more diversity, tillage is not the most destructive thing that we do to soil biology. There are contexts in which tillage is very problematic — I'm not disputing that — but in most environments, tillage is not as damaging as fungicide applications and bare soil.

Fungicide applications are pretty much at the top of the list of what suppresses soil biology. Herbicides are a drop below fungicides and insecticides. I'm speaking in very broad brushstrokes — there are individual exceptions — but fungicides are the most detrimental, followed by herbicides, followed by insecticides.

We should also start managing our soil as though we're trying to propagate microbes in a Petri dish in a laboratory. That means we need to limit direct exposure to sunlight. This is so detrimental — not just because of ultraviolet and other radiation, but purely as a function of heat. We know that enzymes are denatured at around 110 degrees Fahrenheit, and in almost any environment you can easily reach 140 degrees Fahrenheit on bare soil on a summer day. That means you have no enzymatic activity, and therefore next to no biological activity, in the top six inches.

If you have intentionally grown a diverse cover crop in order to establish quorum sensing, how long does that legacy effect last? Well, it's not gonna last very long if you have bare soils and you put two applications of fungicide on it.

From John Kempf's Eco-Ag U presentation at the 2025 Acres U.S.A. conference. Recordings of the conference are available at conference.acresusa.com/recordings-2025.

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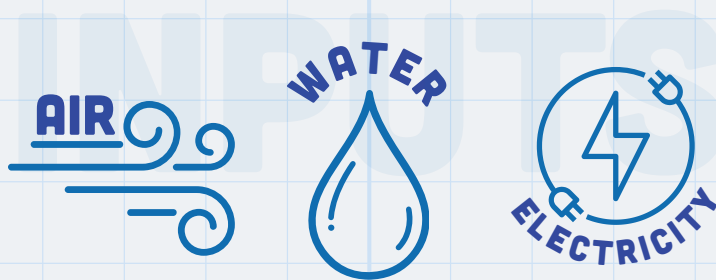


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