



# ORGANIC FARMING RESEARCH FOUNDATION

*Fostering the improvement and widespread adoption of organic farming.*

October 3, 2019

Ms. Michelle Arsenault  
National Organic Standards Board  
USDA-AMS-NOP  
1400 Independence Ave., SW  
Room 2648-S, Mail Stop 0268  
Washington, DC 20250-0268

**RE: USDA National Organic Standards Board Research Priorities, 2019  
Docket # AMS-NOP-19-0038**

Thank you for the opportunity to offer comments on the Materials Subcommittee Proposal, 2019 Research Priorities, published August 13, 2019.

Founded in 1990, the Organic Farming Research Foundation (OFRF) serves the organic community nationwide by providing seed grants for cutting-edge, on-farm organic research; developing practical educational materials for farmers, ranchers, and other stakeholders; and advocating for federal farm policies that support organic agriculture. We work to foster the improvement and widespread adoption of organic farming systems through these three strategic areas.

In 2015, OFRF conducted its 6th nationwide survey of organic producers across the U.S. to assess their research needs and priorities, as reported in the *2016 National Organic Research Agenda*. In addition, we undertook an extensive review of USDA-funded organic research, summarized in *Taking Stock: Analyzing and Reporting Organic Research Investments, 2002-2014*. We used the results of these reports to deliver practical informational tools to producers through a series of science-based guidebooks and webinars on *Soil Health and Organic Farming*. These resources are freely available at <https://ofrf.org>. The following comments are based on the knowledge and experience gained through this body of work, subsequent meetings with farmers and ranchers, and the 2017 U.S. Census of Agriculture.

## General comments

Overall, OFRF supports the NOSB proposed organic research priorities for 2019, and we especially endorse the whole farm systems approach outlined in the opening statement of the Executive Summary. The proposed priorities address many of the key hurdles that current certified, transitioning, and aspiring organic producers face in meeting NOP Standards. We believe the NOSB priorities statement can be further strengthened as follows:

- A greater emphasis on the role of soil life, soil health, and effective root-microbe partnerships in meeting organic production challenges.
- Specific emphasis on management-intensive rotational grazing and multispecies grazing as key strategies for meeting organic livestock production challenges.
- Specific recommendations to develop promising research leads into practical application.
- A new Research Priority on organic management of invasive weed species.



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- A new Research Priority to evaluate efficacy of microbial inoculant and soil conditioning products marketed to organic producers.
- A new Research Priority on new risks associated with climate change, and best soil health and organic management practices to prepare for and help mitigate climate change.

These themes are developed further in the following comments on specific NOSB priorities.

## Comments on Executive Summary

In the following section, recommended new language is in underline, and language we suggest be deleted is ~~crossed out~~.

We suggest the following changes in wording of the three Livestock priorities to improve clarity and emphasize advanced grazing management systems:

1. Evaluation of methionine supplementation in the context of a systems approach in organic poultry production.
2. Prevention and management of parasites, examining breeds, geographical differences, alternative treatments, ~~and pasture~~ forage species, and rotational and multispecies grazing systems.
3. Organic livestock breeding for animals regionally adapted to outdoor life and living vegetation as their primary feed source.

Items 1, 8, and 9 under Crops were confusing as worded in the Executive Summary. Upon reading the full report and gaining a better understanding of these research priorities, we suggest rewording the Executive Summary statements for these three priorities roughly as follows:

1. Research the suitability of bio-based, biodegradable film mulches for organic systems, including decomposition rates as affected by soil type and other factors, decomposition products, and their impacts on soil and environmental health.
8. Factors impacting the nutritional value of organic crops, and comparative nutritional value of organic versus conventionally grown crops.
9. Side-by-side trials of synthetic materials currently on the National List or recently petitioned for inclusion thereon, in comparison with alternative natural materials and cultural practices; inclusion of National List materials in IR4 product trials.

The “general” topics include overarching priorities that require a multidisciplinary approach. In addition to the two priorities proposed by NOSB, the challenges posed by climate change fall into this category. We suggest the following modifications to this part of the Executive Summary:

### **~~General~~ Environmental and Socio-economic Challenges**

1. Examination of the *socio-economic* factors influencing access to organically produced foods.
2. *Addressing soil health, production, and yield economic* barriers to transitioning to organic production to help growers successfully complete the transition.
3. *Optimizing organic practices to enhance resilience to the impacts of climate change, sequester carbon, and reduce greenhouse gas emissions.*



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## Comments on 2019 Research Priorities

### **Livestock research priorities**

Regarding *methionine supplementation (Livestock #1)*, we suggest a greater emphasis on *grain crop breeding for higher methionine content*, and on *pastured poultry production systems*. Plant breeders at Mandaamin Institute in Wisconsin have developed advanced breeding lines of grain corn with enhanced methionine and total protein content as well as better nutrient use efficiency and performance in organic systems. When foraging in pasture, poultry consume insects and other invertebrates as well as vegetation and seeds. Research goals should include bringing high-methionine grain cultivars to market, and determining whether access to naturally occurring invertebrate food sources can provide adequate methionine to pastured organic poultry.

Regarding *prevention and management of parasites (Livestock #2)*, multi-paddock rotational grazing systems reduce livestock exposure to parasites. Multispecies grazing systems that run poultry immediately after mammalian livestock leave each paddock further reduce risks as the poultry consume parasites in livestock dung. Additional research to quantify and optimize the parasite-control benefits of these strategies in organic livestock production is warranted.

Regarding *organic livestock breeding (Livestock #3)*, we recommend adding performance in advanced grazing systems, such as management-intensive rotational grazing and multispecies grazing as priority breeding objectives for organic livestock.

Finally, we recommend that NOSB consider adding *two new research priorities* under livestock:

- Management-intensive rotational and multispecies grazing systems: Do these practices improve forage quality, quantity, and duration; livestock and poultry productivity; quality of organic meat, dairy, and eggs; and net economic returns (profitability)? What regional adaptations of these approaches are needed to optimize outcomes on a site-specific basis?
- Crop-livestock integration: Can livestock grazing of crop residues or cover crops, rotating grazed pasture with annual crops, and tree crop / grazing systems (silvopasture) benefit soil carbon sequestration and soil health, nutrient cycling, crop and livestock production, and farm profits? What are the benefits and drawbacks of different combinations of crop and animal species in different regions, soils, and production systems?

### **Crop research priorities**

Regarding *ecosystem provisioning and biodiversity of organic systems*, this new priority for 2019 actually represents two distinct issues, which might be proposed as separate priorities:

- Life-cycle analysis of environmental costs and benefits of inputs used for organic production, such as seaweed and fish-based soil amendments.
- Impact of diversified and agroecologically designed organic farming systems on biodiversity and ecosystem services within the farm and in its surroundings.



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Regarding *organic no-till*, we are pleased to see the strong emphasis on soil health, holistic assessment of benefits, and within-farm prioritization based on varying resource concerns among fields. Currently, weeds usually make *continuous* no-till impractical in organic production of annual crops, and weeds can be a major challenge even in rotational no-till (roll crimped cover crop, tillage after cash crop harvest). Thus, additional research is needed to develop workable strategies to manage weeds without herbicides and with minimum soil disturbance. In addition, cash crops need genetic traits that allow them to establish well and thrive in no-till terminated cover crops, which can result in cooler wetter soil, slower N mineralization, and somewhat greater weed competition. Therefore, we recommend the following modifications to this research priority:

- Rename this research priority Minimum tillage in organic systems, or Organic minimum tillage.
- Add good cold germination, rapid emergence and establishment, seedling vigor, nutrient uptake efficiency, and overall weed competitiveness to crop cultivar development goals for organic conservation tillage systems.
- Add reduced tillage weed management, including development of new tools and techniques that provide greater weed control for less soil disturbance.

Regarding *managing cover crops for on-farm fertility*, we recommend a slight change of emphasis: utilizing cover crops as the *primary* means to sustain soil life, soil health, and fertility, and not the *sole* means. While heavy reliance on off-farm sourced compost, manure, and other organic fertilizers and amendments can elevate production costs, build up excessive soil phosphorus (P) and other nutrients, and entail adverse environmental impacts, eliminating *all* compost and nutrient inputs from a system that harvests crops or animal products for off-farm sales will eventually deplete one or more nutrients and thus prove unsustainable in the long run. Cover crops replenish organic carbon and nitrogen, sustain healthy, diverse soil biota, improve cycling of all plant nutrients, and help combat pests, weeds, and disease; however, they cannot replenish P and other mineral nutrients removed in harvest. In addition, research has shown synergistic benefits of cover crops and high-quality finished compost for soil organic matter and soil health, carbon sequestration, microbial activity and diversity, and nutrient cycling.

We recommend further research into integrated soil health strategies for organic cropland, in which cover crops and “tight” (no-fallow), high biomass rotations play the central role, and are supplemented by compost at rates that maintain optimal P and other nutrients without surplus, and other practices such as reduced tillage. Can such systems optimize soil health, nutrient balance, crop yield, quality, and farm profit in the long run?

Regarding *disease management*, we applaud NOSB for proposing an IPM approach that emphasizes biological controls and aims to minimize the need for copper. Recent research has identified many soil and root-symbiotic microbes that suppress plant pathogens and/or induce systemic resistance to both soil-borne and foliar pathogens. In many crops, cultivars and breeding lines vary widely in genetic capacity to associate with beneficial microbes and thereby avoid disease. Therefore, we recommend that the disease management research priority be expanded to include soil management and crop cultivar development for enhanced beneficial crop-root microbe partnerships that protect organic crops from soil borne and foliar pathogens.



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Regarding *organic nursery stock production*, a new priority for 2019, we agree that this is an important priority. Since research has shown that application of the correct ectomycorrhizal inoculants to roots can substantially (50% or more) enhance establishment and early growth of woody perennial

horticultural crops, we encourage NOSB to expand this research priority to include fine tuning the use of mycorrhizal inoculants to make organic nursery stock production easier and more profitable, thereby helping to close the demand/supply gap.

Regarding *management and control of invasive insects*, we agree that this is a top priority. In addition, we recommend a *new research priority: management of invasive weeds*. Weeds pose one of the greatest barriers to successful organic crop production. Invasive weeds include exotic species that aggressively displace both crops and native plant species, and creeping perennial species (exotic or native) that are difficult to control without repeated, intensive tillage. The NOP standards require certified organic producers to use tillage and cultivation practices that maintain or improve soil condition. Thus, development of integrated, organic management strategies that effectively control invasive weeds without excessive tillage continues to emerge as a top research priority for organic producers.

Regarding *nutrition in organic crops*, we recommend the wording *nutritional value of organic crops* to clarify that this priority addresses benefits of organic products for human nutrition and health, and does not pertain to nutrient sufficiency for crop growth *per se*. In addition to the research questions already stated in the NOSB document, we recommend adding the following: How do organic soil health and fertility practices—crop rotations, cover crops, compost and other organic or natural mineral amendments, etc. — affect the nutritional value or “nutrient density” of organically produced crops?

Regarding *side by side efficacy assessments of organic inputs*, we endorse this priority, and suggest that the wording be clarified as “... comparisons between National List-allowed and petitioned synthetic inputs versus non-synthetic alternative inputs or practices.” The term “organic inputs” suggest a comparison of different natural materials.

On a related theme, we encourage NOSB to adopt a *new research priority: evaluation of microbial inoculants, soil conditioners, and other amendments in a range of crops, soils, climates, and production systems*. Vendors of organic amendments now offer a large and growing array of microbial inoculants, organic soil conditioners, and other materials claimed to improve soil health, crop vigor and quality, and combat weeds, pests and diseases. There is an urgent need for impartial evaluation of these materials to help producers decide which products to use, and to avoid unnecessary expenditures on products that are unlikely to yield benefits.

## **Food Processing and Handling**

One research priority that has emerged in OFRF surveys is the nutritional value of organic compared to conventionally produced crops and animal products. In order for organic farming to be profitable, it must retain its reputation for the health advantages of organic food products, as well as more benign and beneficial impacts of organic practices. Thus, we have two concerns about the use of *celery powder* as an organic substitute for nitrite in curing meats. First, organic practices designed to increase the



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nitrate content of organic celery for this use are likely to include increased use of high-nitrogen fertilizers such as poultry litter, feather meal, blood meal, or Chilean nitrate. Over application of any of these materials, or incorporation of a large, high-nitrogen cover crop such as hairy vetch, has been shown to lead to high soil nitrate-N levels and substantial nitrate leaching or denitrification into the greenhouse gas nitrous oxide. Second, nitrite from any source, including fermented celery, is a human carcinogen, especially when ingested with high-protein foods with which it forms nitrosamines.

Therefore, we strongly recommend that NOSB modify this research priority to “*seeking non-toxic and environmentally friendly alternatives to nitrites for curing organically raised meat.*”

## **General** (suggested heading: **Environmental and Socio-economic Challenges**)

Regarding *increasing access to organic foods*, cost is often a barrier to choosing organic foods, especially for cash-strapped or food-insecure families. This research priority should include market and distribution strategies that make organic food more affordable while sustaining farm income, such as direct marketing, CSAs, cooperatives, food hubs, and urban community farms.

Regarding *barriers to transition to organic production*, one well-known barrier is the often sub-optimal soil health conditions and high weed populations in transition fields. Such land often has a history of conventional crop production. Several studies have shown that rotating the land into multispecies perennial sod for the three-year transition period can restore soil health and fertility, and reduce weed pressure. However, many producers cannot afford the foregone income that this strategy entails. Thus, we recommend expanding the research topic to include development of cropping strategies that simultaneously build soil health and provide sufficient cash flow to sustain farm operation solvency. Because available land, other resources, and financial circumstances vary widely among farms, research should prioritize transition strategies with sufficient flexibility for site-specific adaptation.

Finally, given the urgency of the mounting climate crisis, we strongly recommend adopting a *new research priority: soil health and best organic practices to mitigate the impacts of climate change on organic production*. All farmers face increasing risks from the impacts of climate change on crops, livestock, and personnel. Organic operations face the same climate risks. However, many organic practices, especially those related to soil health and system diversity, can make the operation more resilient and thereby reduce the risk of severe losses to drought or other adverse weather. In addition, best soil, nutrient, and livestock management practices can sequester carbon and reduce greenhouse gas emissions

Thank you again for this opportunity to provide input on NOSB Research Priorities for 2019.

Sincerely,

Brise Tencer  
Executive Director, OFRF