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**National Organic Standards Board
Materials Subcommittee
Proposal: Research Priorities for 2014**

August 26, 2014

Introduction

A Recommendation for a Framework to set Research Priorities was approved at the National Organic Standards Board (NOSB) meeting in May 2012. Part of that recommendation was that the priorities from the previous year of NOSB deliberations would be presented at each fall meeting. Therefore, we have collected suggested research topics from the NOSB Subcommittees and from suggestions within the public comments and present the top research priorities for approval this fall.

Each fall, after a recommendation is finalized by the NOSB, the Chair of the Board will make sure it is sent to the primary organic research funders such as NIFA, ARS, NRCS, and private foundations and other funders that may be identified. In addition all NOP staff, NOSB members and stakeholders can use the list for inspiring appropriate research.

Background

The reasons for encouraging research into organic production systems are well discussed in the previous two Materials Subcommittee papers from fall 2011 and spring 2012.

The recommendation that was passed recommends that potential topics be prioritized. The criteria for prioritization are for those topics that the NOSB believes will have the largest long-term impact on growth and integrity of organic agriculture. These criteria are not presented in order of importance, but will be evaluated by the Materials Subcommittee in selecting the top research needs.

Criteria for research topics are:

- Persistent and chronic (i.e., perennial topics of debate and need)
- Challenging
- Controversial (i.e., topics on which there are widely differing perspectives or for which there have been close NOSB votes)
- Nebulous (i.e., the research need is hard to identify but the organic agriculture need is clear). For example, improved methods of weed control.
- Lacking in primary research. That is, topics for which there is no active research being conducted, primarily relating to the criteria in OFPA for review of materials.
- Relevant to assessing the need for alternative cultural, biological, and mechanical methods to materials on the National List.

Research Priorities in 2012 and 2013

In 2012, the NOSB adopted research priorities and identified topics for future review. In 2013, the Materials Subcommittee proposed research priorities and identified topics for future review, but they were not adopted by the NOSB until spring of 2014 because the fall 2013 meeting was cancelled due to a government shut down. All of these topics, listed here, are still priorities.

Research Priorities for 2012¹

Whole Farm Systems Research
Evaluation of Copper Sulfate for Rice
Evaluation of Antibiotics (Tetracycline and Streptomycin) alternatives
Evaluation of Genetically Modified Vaccines (GMO)
Organic Aquaculture
Methionine Alternative
Carrageenan

Priorities for 2013²

Whole Farm Systems
Alternatives to Antibiotics (Tetracycline and Streptomycin) for Fire Blight
Evaluation of Genetically Modified Vaccines (GMO)
Methionine Alternative
Organic Aquaculture
Aquatic Biodiversity
Herd Health
Pastured Poultry and Salmonella
Commercial Availability Assessments
Consumer Demand
Fate of Genetically Engineered Plant Material in Compost
Reduction of Genetically Modified Content of Breeding Lines

Proposal: NOSB Research Priorities 2014

For 2014, the Subcommittee has added the topics below as priorities for research. In addition, the Subcommittee continues to support all research priorities identified in 2012 and 2013.

Handling Subcommittee

Alternatives to Bisphenol A (BPA)

The Handling Subcommittee plans to take up the issue of whether to prohibit BPA in packaging material used for organic foods in light of mounting evidence that it may be harmful. There needs to be an increase in research about suitable alternatives for the linings of cans used for various organic products such as tomatoes, beans and soups.

¹ 2012 Other Topics for Future Review

Parasitism
Mastitis
Herd Health
Plant Extract to organically control methane producing bacteria in livestock

² 2013 Topics for Future Review

Chlorine Alternatives
Sulfuric Acid Alternatives
Parasitism
Mastitis
Pneumonia

This issue meets the following criteria in the NOSB research priorities framework:

- Persistent and Chronic
- Challenging
- Lacking in Primary Research

Crops Subcommittee

Plant Disease Management

There is a need for research into plant disease management practices and alternative materials, particularly for the humid areas of the country, that decrease reliance on copper or other substances that might have a negative impact on the soil and health of workers. Pathogens include, but are not limited to: *Alternaria*, *Erwinia*, *Pseudomonas*, *Xanthomonas*, *Cercospora*, *Colletotrichum*, *Cladosporium*, powdery mildew, downy mildew, *Phytophthora*, *Pythium*, *Mycosphaerella*, *Phomopsis*, *Taphrina*, *Elsinoe*, *Gnomonia*, *Fusicladium*, *Nectria*, *Phyllosticta*, *Diplocarpon*, *Albugo*, *Guignardia*, *Botrytis*, *Exobasidium*, *Entomosporium*, *Exobasidium*, *Pestalotia*, *Phoma*, *Cristulariella*, and *Monilinia fruticosa*.

Citrus greening, caused by the bacterium *Candidatus Liberibacter*, and spread by a disease infected Asian citrus psyllid, is an emerging problem. Promising avenues of research include disease-resistant varieties, predators and parasites and how they interact with approved materials, nutrition (calcium, boron, and nitrogen have been identified), and botanical oils.

In particular, both biological control of plant diseases and bio-pesticides should be a research priority to support organic growers. A large body of research has shown that plant diseases caused by bacteria and fungi can often be prevented by the application of a non-pathogenic microorganism before infection occurs. Although much basic research has been done to identify microbial biological control agents, there is still a need for commercial development, field testing, and adoption by growers. Biological controls have been researched for late blight of potato and tomato (*Phytophthora infestans*), several diseases caused by *Botrytis cinerea*, and powdery mildew (several species), controlled by mites, fungi, bacteria.

Although many biological controls and bio-pesticides have been effective in research plots, they have often not succeeded commercially because they can't compete with inexpensive synthetic chemicals used by non-organic farmers. Biological materials are often more expensive than conventional pesticides, and they need be applied before disease is apparent. In the past, there was little market for biological controls, because the organic acreage was limited. Now that organic acreage has increased, the market for alternative plant disease controls has also increased, which can spur commercialization of natural methods of disease control. The availability of biological controls for plant diseases can also make it more feasible for conventional farmers to transition to organic, thus benefitting organic consumers.

This topic meets all the criteria in the NOSB research priorities framework.

Soil Building Practices

Humates seem to fill a need for practices and materials that accelerate the development of organic matter in the soil, especially in the transition to organic practices. Are there other such practices and materials? Building soil health with nonsynthetic practices is integral to organic management practices.

This meets all the criteria for research support.

Mitigation Measures for Residues in Compost

Residues of pesticides in compost material are a problem that requires research, according to OMRI. Because of the importance of compost to organic management systems, research is needed on types of mitigation measure that are efficacious, identification of problematic feedstock (e.g. cotton-based materials and yard waste), types of corrective action, and if thresholds for allowable residues are established, testing guidelines are required.

This meets all the criteria for research support.

Organic No Till

Organic no-till practices are a subset of whole farm systems. Unlike chemical-based no-till systems, organic no-till builds biodiversity and increases soil health. And, compared to tilled organic systems, organic no-till preserves and builds more soil organic matter, conserves more soil moisture, reduces soil erosion and requires less fuel and labor. Some of the questions raised for whole farm systems in general relate to organic no-till practices: How does biodiversity contribute to pest and disease resistance? What is the relationship between nutrient balancing fertilization practices and microbial life in the soil and susceptibility or resistance to pests? In addition, research into organic no-till should address practices that lead to effective weed control with minimum interference with the crop.

This issue meets the following criteria in the NOSB research priorities framework:

- Persistent and Chronic
- Challenging
- Lacking in Primary Research

Materials/GMO Subcommittee: Seed Purity from GMO Research Needs

How contaminated with GMOs is at-risk seed?

There is a lack of data on how much crop contamination is occurring from seeds as a vector compared to drift or handling practices.

This issue meets the following criteria in the NOSB research priorities framework:

- Persistent and chronic (i.e., perennial topics of debate and need)
- Challenging
- Controversial (i.e., topics on which there are widely differing perspectives or for which there have been close NOSB votes)
- Nebulous (i.e., the research need is hard to identify but the organic agriculture need is clear). For example, improved methods of weed control.
- Lacking in primary research. That is, topics for which there is no active research being conducted, primarily relating to the criteria in OFPA for review of materials.

Research on integrity of breeding lines and foundation seed and ways to mitigate small amounts of genetic presence in breeding lines.

A concurrent question is: Are public germplasm collections that house at-risk crops contaminated?

Breeding lines may have been created through genetic engineering methods such as doubled haploid technology, or they may have had inadvertent presence of GMOs from pollen drift. The extent of this problem needs to be researched.

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Risk Reduction from Off-Target Exposure to Non-Permitted Materials

What we have found to be true is that organic farmers can gather a great deal of vital information about how to reduce the impact of contamination from the development of a sound organic system plan (OSP) and through the knowledge shared by their USDA organic certification agent.

However, even if the best OSP plan is intact, organic farms may still be at risk from the impact of contamination from agricultural farms utilizing GMOs and their pesticide treatment.

Successful coexistence suggests that organic farms can exist without harm, consistent with consumer and farmer choice to avoid or minimize contamination. Avoidance or minimization may be achieved through users of GMOs and pesticides adopting practices that prevent non-permitted materials in OSPs from causing involuntary exposure by moving off their target site.

Research efforts are needed on behalf of organic stakeholders, NGOs, USDA (Natural Resources Conservation Service, National Institute of Food and Agriculture, Risk Management Agency, etc), Land-Grant Institutions, and in coordination with partner agencies, such as the U.S. Environmental Protection, state Departments of Agriculture, and others, on alternative strategies that can 1) develop and examine management practices that enhance public and farmer awareness of at-risk organic farms, 2) identify effective practices and standards that will prevent non-target impacts of materials used on farms not certified organic, and 3) best methodologies to provide information and training.

Critical and timely questions include: Are there strategies in place or that could be put in place that can provide information, training, to enhance public awareness of at-risk organic farms? Which methodologies are successful in ensuring risk reduction from materials not permitted under organic standards?

This issue meets the following criteria in the NOSB research priorities framework:

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Livestock Subcommittee

Mastitis

Mastitis, which has been listed for two years as a topic for further review, is the second priority of the Livestock Subcommittee. Mastitis is a disease that results in inflammation of the mammary gland. It is generally associated with dairy animals. It can be caused by bacteria, physical injury, etc. Mastitis is one of the most common and expensive diseases of dairy cattle. It can result in reduced milk production, discarded milk, treatment, and veterinary expenses. An urgent need exist for looking at ways to reduce mastitis in dairy herds. The research needs include the areas of herbal treatment of mastitis and management practices, and consider the efficacy of organic treatments used by, recommended to, and available to organic producers.

This issue meets the following criteria:

- Persistent and chronic (i.e., perennial topics of debate and need)
- Challenging
- Lacking in primary research on mastitis prevention. That is, topics for which there is no active research being conducted, primarily relating to the criteria in OFPA for review of materials.
- Relevant to assessing the need for alternative cultural, biological, and mechanical methods to materials on the National List.

Parasitism

Parasitism of livestock, which has been listed for two years as a topic for further review, is the third priority of the Livestock Subcommittee. The control of internal and external parasites is important to animal welfare, growth, reproduction, and production. In organic production, the control of parasites is critical. The use of antibiotics is prohibited. A limited number of substances are available to control parasites. Antibiotics are not allowed in organic livestock production for growth, reproduction, and production. Antibiotics can be used on sick animals. However, these animals cannot be sold as organic. A critical need exist to explore ways to find materials for the control of internal and external parasites in organic livestock operations. Research is needed that considers the efficacy of organic treatments used by, recommended to, and available to organic producers.

This issue meets the following criteria:

- Persistent and chronic (i.e., perennial topics of debate and need)
- Challenging
- Controversial (i.e., topics on which there are widely differing perspectives or for which there have been close NOSB votes)
- Lacking in primary research on parasite prevention. That is, topics for which there is no active research being conducted, primarily relating to the criteria in OFPA for review of materials.
- Relevant to assessing the need for alternative cultural, biological, and mechanical methods to materials on the National List.

Pneumonia

Pneumonia was a topic for further review in 2013, and is the fifth priority of the Livestock Subcommittee. Pneumonia denotes a swelling of the lungs. Pneumonia is rare when animal populations and densities are low. In the winter, animals are housed or gather more closely together, increasing the concentration of pathogens in their environment. Confinement and higher animal densities result in increased air temperatures, humidity, and condensation, which are beneficial conditions for pathogen survival and transmission. Pneumonia in a herd or flock means animals are not performing up to their maximum potential, production costs are higher, labor is increased, and food product quality is compromised. Responsible animal caretakers know it is their duty and responsibility to address animal welfare concerns and ensure a safe and healthy environment for their animals. Research is needed that considers the efficacy of organic treatments used by, recommended to, and available to organic producers.

This issue meets all of the research criteria.

Herd Health

Herd health was a topic for further review in 2012 and a priority issue in 2013. It is the sixth priority (tied with aquaculture) of the Livestock Subcommittee. The assessment of preventative organic practices to improve organic livestock health are critical and of high importance. These include general animal health as it relates to diseases prevention, uterine infections in peri-parturient animals, growth, and identification of vaccine types, nutrition, and production systems. It thus encompasses some of the more specific issues and is also related to the 2012 and 2013 priority of whole farm systems research.

This issue meets all of the research criteria.

Plant Extracts

Use of plant extracts to organically control methane producing bacteria in livestock was a topic for further review in 2012 and is the Livestock Subcommittee's ninth priority. Plant extracts that could be environmentally and economically beneficial to organically control methane producing bacteria in the animal could lead to practices that reduce methane. Reduced methane results in more energy going to the animal from a given amount of feed. This reduces total feed required to meet nutritional needs and particularly helps grazing animals which have high protein availability.

This topic meets the following research criteria:

- Challenging
- Nebulous (i.e., the research need is hard to identify but the organic agriculture need is clear). For example, improved methods of weed control.
- Lacking in primary research. That is, topics for which there is no active research being conducted, primarily relating to the criteria in OFPA for review of materials.
- Relevant to assessing the need for alternative cultural, biological, and mechanical methods to materials on the National List.

Call for Researchers

We hope that this information will be useful for researchers in many fields to defend and solicit funds for research that benefits organic production and handling. There is an ongoing need for organic research on a wide range of issues. There is a wealth of data and research on topics of interest to the organic community. However, there is a paucity of research on our current issues conducted in an organic environment. Therefore, we invite the public to comment on these topics, to circulate this widely, and to recommend

that funders also prioritize these topics. Please submit comments on funders who might want to remain informed of research opportunities in organics.

Committee Vote

Motion to adopt the proposal on NOSB Research Priorities for 2014.

Motion by: Jay Feldman

Seconded by: Zea Sonnabend

Yes: 7 No: 0 Absent: 0 Abstain: 0 Recuse: 0

Second Subcommittee Vote

Motion to amend the NOSB Research Priorities for 2014 by adding the section "Risk Reduction from Off-Target Exposure to Non-Permitted Materials."

Motion by: Jennifer Taylor

Seconded by: Jay Feldman

Yes: 5 No: 1 Absent: 1 Abstain: 0 Recuse: 0

Approved by C. Reuben Walker, Subcommittee Chair, to transmit to NOSB August 27, 2014