



## **BEYOND PESTICIDES**

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**Docket ID # AMS-NOP-19-0095**

### **Re. CS: Biodegradable Biobased Mulch Film Annotation**

These comments to the National Organic Standards Board (NOSB) on its Spring 2020 agenda are submitted on behalf of Beyond Pesticides. Founded in 1981 as a national, grassroots, membership organization that represents community-based organizations and a range of people seeking to bridge the interests of consumers, farmers and farmworkers, Beyond Pesticides advances improved protections from pesticides and alternative pest management strategies that reduce or eliminate a reliance on pesticides. Our membership and network span the 50 states and the world.

Beyond Pesticides reiterates what many said at the time that biodegradable biobased mulch film (BBMF) was first petitioned for use in organic production—the available products are not “ready for prime time.” It is disappointing that having discussed at length in 2012 what would make an acceptable BBMF product that there is now an effort to undo that work.

### **Synthetic mulches should not replace organic mulches.**

Organic mulches have always been a central aspect of organic production. The Rodale *Encyclopedia of Organic Gardening*, for example, begins its long entry on “mulch” with this: “A layer of material, preferably organic material, that is placed on the soil surface to conserve moisture, hold down weeds, and ultimately improve soil structure and fertility. As with composting, mulching is a basic practice in the organic method; it is a practice which nature employs constantly, that of always covering a bare soil.”<sup>1</sup>

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<sup>1</sup> Rodale, J.I. and the staff of Organic Farming and Gardening magazine, 1959. *The Encyclopedia of Organic Gardening*, Rodale Books, Inc., Emmaus, PA. P. 722.

According to the NOSB Principles of Organic Production and Handling,<sup>2</sup> Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. These goals are met, where possible, through the use of cultural, biological, and mechanical methods, as opposed to using synthetic materials to fulfill specific functions within the system.

Reliance on synthetic mulches for functions that can be performed by organic mulch is not compatible with organic production. Since soil warming cannot be achieved by organic materials like straw, both the listings for plastic mulch and BBMF should be annotated “for soil warming only.”

### **Synthetic materials must meet all of the OFPA criteria.**

In order to be included on the National List, synthetic materials must not cause harm from manufacture through disposal, be necessary for organic production, and be consistent with organic production. Avoiding harm from cradle-to-grave impacts requires that BBMF be both biobased and biodegradable.

### **The original listing for BBMF clearly intended the BBMF to be 100% biobased.**

The lack of a qualifier on “biobased” clearly expresses the intention that the BBMF be 100% biobased. If that isn’t clear, then reading the checklist attached to the recommendation should clarify the issue. If the BBMF was not intended to be 100% biobased, then the NOSB review as reflected in the checklist, would have addressed the manufacture of non-biobased components.

### **Responses to CS questions.**

#### **1. Is the biodegradability of the mulch film the main issue, or should a future annotation include other issues?**

Biodegradability is one of the issues that was important to the NOSB in listing BBMF. The listing would not have been approved without addressing both the biobased properties and the biodegradability. In addition, the motion to list included, “Grower must take appropriate actions to ensure complete degradation.” This should be included in a future annotation. NOP should provide appropriate guidance.

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<sup>2</sup> NOSB Recommendation Adopted October 17, 2001.

A 2015 report<sup>3</sup> from the Organic Materials Review Institute (OMRI) and the 2016 supplemental technical review by OMRI<sup>4</sup> confirm what many evaluators said when biodegradable biobased mulch film (BBMF) was first proposed for the National List—BBMF is “not ready for prime time.” The 2015 report states that BBMF, as specified in the NOSB recommendation and NOP regulations, does not exist in the market. The recommendations, regulations, and NOP Policy Memo 15-1 (2015)<sup>5</sup> make it clear that the BBMF must be 100% biobased. According to OMRI’s report, based on consultation with manufacturers, “In summary, the biobased content for commercially available BBMFs at the time of this report ranges from ~10-20%, with the remaining portion being derived from fossil fuels or other inorganic materials such as minerals and dyes.”<sup>6</sup>

During the 2017 sunset review, we said:

Faced with this information, the NOSB really does not have much choice if it is to comply with the statutory and regulatory requirements. Should the board revise the listing (and definition) in the regulations to match the available products, which do not meet the standards of the law? Should the NOSB vote to relist BBMF with its current annotation to incentivize the market to develop compliant material? Or should the NOSB delist BBMF, as it currently exists in the market, until such time as the board is petitioned to list a synthetic material that meets the standards of OFPA?

One could argue that the board retain the listing BBMF, but only with an annotation that meets the standards of the law. To do so, however, would break with NOSB precedent to list allowed synthetic materials currently available to producers that meet the standards of the law. To list a substance not currently available raises confusion among certifiers and enforcement issues for a regulatory program already stretched thin.

Clearly, the materials, substances, and practices allowed in certified organic production must meet the standards, rather than the reverse. Regardless of the pressure to allow this material as currently available in the market, we advocate that the board acknowledge, given the new scientific reviews that it now has, that the elements and safeguards of the NOSB’s Fall 2012 decision, however well-intentioned as protection against adverse environmental impacts, including adverse effects to the soil biology, are currently hypothetical and not specific to a specific substance currently available. The previous board, based on incomplete information and science, attempted to construct an annotation

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<sup>3</sup> OMRI, 2015. Report on Biodegradable Biobased Mulch Films.

<https://www.ams.usda.gov/sites/default/files/media/Biobased%20mulches%20report.pdf>.

<sup>4</sup> OMRI, 2016. Supplemental Technical Evaluation Report: Biodegradable Biobased Mulch Films.

<https://www.ams.usda.gov/sites/default/files/media/BiodegradableBiobasedMulchFilmTRCrops.pdf>.

<sup>5</sup> Although the memo was withdrawn, it was withdrawn with the statement, “Following our analysis of all information, we determined that Policy Memorandum 15-1 (January 22, 2015) did not present new information or impose additional requirements compared to the 2014 final rule.”

<sup>6</sup> OMRI, 2015. Report on Biodegradable Biobased Mulch Films.

<https://www.ams.usda.gov/sites/default/files/media/Biobased%20mulches%20report.pdf>.

compliant with the underlying statutory requirement that plastic material used as a ground cover in organic production must be removed after harvest (OFPA §6508(c)) It is the degradation process that equates with removal, which, therefore, requires a scientific determination and finding that synthetic material does not remain in the field.

The review in the 2016 Supplemental TR (STR) shows that many questions are still open. In fact, in considering the questions posed by the Crops Subcommittee (CS), the STR says, “Although these mulches, referred to herein as biodegradable mulch films (BMFs), do not meet the requirement for 100% biobased polymer content specified in NOP Policy Memo 15-1, they are discussed in this technical report since they have undergone field research related to the focus questions requested by the subcommittee, whereas very little field research on 100% biobased biodegradable mulch film is reported in the literature.”<sup>7</sup>

## **2. Is there information on the toxicity or effect of all secondary metabolite residues as the product breaks down?**

Information on the toxicity and effects of metabolites is important for sunset review of the material. To our knowledge, such information is incomplete. Information on degradation of some polymers that might be used in BBMFs is given in the 2012 TR,<sup>8</sup> but information about others has not been provided.

## **3. What is your opinion on mulch films that could be engineered to include macro or micro- nutrients or pesticides that would then make the mulch film provide more benefits than just a mulch?**

Use of synthetic macronutrients is not compatible with organic production.<sup>9</sup> Any synthetic additives must be on the National List (NL) for that purpose. Even those pesticides that are on the NL must be applied only in accordance with the pest control hierarchy,<sup>10</sup> which would preclude their use in BBMF.

## **4. Is the risk/benefit of keeping plastic mulches out of landfills part of the Organic Food Production Act criteria the NOSB should consider when reviewing this material?**

The risks and benefits of landfilling nondegradable mulches should be taken into account when considering their sunset, not BBMF.

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<sup>7</sup> OMRI, 2016. Supplemental Technical Evaluation Report: Biodegradable Biobased Mulch Films. <https://www.ams.usda.gov/sites/default/files/media/BiodegradableBiobasedMulchFilmTRCrops.pdf>.

<sup>8</sup> Technical Review, 2012. Biodegradable Mulch Film Made from Bioplastics. Lines 439-520.

<sup>9</sup> OFPA, §6508(b).

<sup>10</sup> Regulations at §205.206(e).

## **5. Are there any studies that track the impact on livestock or wildlife (terrestrial, avian and aquatic) that might be attracted to consume pieces of the biodegradable plastic before it has completely degraded in 2 years or secondary metabolites that remain in the soil and are taken up by crops?**

This question identifies a line of research that needs to be pursued in subsequent reviews of BBMF.

The science on the impacts of biodegradable plastic is incomplete and sometimes misleading. Ghimire et al. 2020 concludes, “We also found a significant reduction in mulch fragment recovery over after tillage incorporation, which indicates that the BDMs [biodegradable mulches] tested in this study will not accumulate to a significant level in the soil even after repeated applications.”<sup>11</sup> However, the authors also say, “However, plastic mulch fragments smaller than 2.36 mm would have passed through the sieve and so would not have been captured by the sieving method.” Ruimin et al. 2019 review what research on the impacts of micro- and nanoplastics on the soil and soil organisms.<sup>12</sup> They found that these small particles can have negative impacts on soil structure and other physical and chemical properties of the soil, thereby affecting nutrition that plants and animals can derive from the soil. Microplastics have a negative effect on earthworm survival. The article says, “Bandopadhyay et al. (2018) [indicated] that biodegradable plastic mulches affect soil microbial communities indirectly by changing the soil microclimate, soil physical structure and through the addition of contaminants adhering to the film fragments. Given the high degree of functional redundancy and diversity within the soil microbial community, it is highly likely that plastic mulch films will affect the composition of the microbial community as it will create new ecological niches within the soil.” It is unknown (by the study authors) “whether microplastics negatively affect keystone microbial species that are fundamental to the delivery of key soil functions (e.g. nitrifiers, arbuscular mycorrhizas) or whether they increase the prevalence of disease causing organisms (e.g. plant and animal pathogens).” Furthermore, as the study says, nanoparticles are known to be taken up by crop plants and hence may enter the food chain.

## **6. Should a future annotation try to include consideration that different soils and climates might not be able to meet the biodegradability standard set in the annotation, and how would certifiers be able to verify the use of the material met the biodegradability standard?**

The 2012 NOSB recommendation that resulted in the listing of BBMF included in the annotation the requirement, “Grower must take appropriate actions to ensure complete degradation at the end of each growing or harvest season.” This language should be included in the annotation. It was understood in 2012 that the “appropriate actions” would differ by climate and soil type. If this is not understood by growers and certifiers, then the addition to

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<sup>11</sup> Ghimire, S., Flury, M., Scheenstra, E.J. and Miles, C.A., 2020. Sampling and degradation of biodegradable plastic and paper mulches in field after tillage incorporation. *Science of the Total Environment*, 703, p.135577.

<sup>12</sup> Ruimin, Q., Jones, D.L., Zhen, L., Qin, L. and Changrong, Y., 2019. Behavior of microplastics and plastic film residues in the soil environment: A critical review. *Science of the Total Environment*, p.134722.

the annotation could be changed to: "Grower must take appropriate actions, based on soil and climate, to ensure complete degradation at the end of each growing or harvest season."

## **Conclusion**

It is contrary to NOSB process that having discussed at length in 2012 an acceptable BBMF product in compliance with OFPA, that there is now an effort to undo those recommendations. Regardless of the pressure to allow this material as currently available in the market, the NOSB should acknowledge, given the new scientific reviews that it now has, that the elements and safeguards of the NOSB's Fall 2012 decision, however well-intentioned as protection against adverse environmental impacts, including adverse effects to the soil biology, are currently hypothetical and not specific to a substance currently available and under review.

Thank you for your consideration of these comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Terry Shistar".

Terry Shistar, Ph.D.  
Board of Directors