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April 1, 2022

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

RE: Docket Number: AMS-NOP-21-0038; Notice of Meeting of the National Organic Standards Board

Dear Ms. Arsenault,

The Northwest Horticultural Council (NHC) appreciates the opportunity to comment on the National Organic Standards Board (NOSB) proposals and discussion documents pertaining to organic materials listed in the most recent NOSB meeting materials posted in the Federal Register on March 3, 2022. Many of the NOSB proposals, petitions, and discussion documents referenced in this letter are especially pertinent to the growers, packers, and shippers of organic apples, pears, and cherries in Idaho, Oregon, and Washington that the NHC represents.

The Pacific Northwest region is the epicenter for organic pome fruit and cherry production in the United States. The Pacific Northwest is the national leader in the production of organic apples, pears, and cherries. Over 22 million boxes of organic apples are now harvested from more than 32,537 acres in Washington state, amounting to 94.6 percent of the value of sales of fresh organic apple crop grown in the United States (USDA NASS 2019). There is also a significant volume of organic pears and cherries grown in our region, with more than 7,500 acres planted across the Pacific Northwest.

Organic tree fruit production in the region is increasing, with additional acreage transitioning to organic each year. The total value of the organic tree fruit crop for the region topped $620 million in 2019, of which organic apples alone accounted for approximately $540 million. In fact, tree fruit accounted for 60 percent of farm gate sales for all Washington state organics that year.

Organic tree fruit production, handling, and shipping is very complex. Our farmers must routinely manage dozens of pests that have the potential to make fruit unfit for consumption, or that suppress tree growth and overall production. The Food and Agriculture Organization estimates that 20 to 40 percent of global crop production is lost each year due to pests, with plant diseases contributing significantly to food waste and costing the global economy $220 billion. In the Pacific Northwest, growers must protect fruit from injury by 33 direct insect pests (those that feed directly on the fruit), 47 indirect insect pests (those that feed on the tree), two common bacterial pathogens, eight fungal pathogens, ten viral pathogens, and five phytoplasmas and viroids. Another seven postharvest diseases can cause fruit decay, costing the fruit industry millions of dollars in losses each year after farmers have already invested in growing and harvesting the crop (Washington State University, 2020). Invasive or emerging pests are also a continual threat.

In addition to pests and diseases that affect the fruit or the tree, our growers and packers must also combat foodborne pathogens, such as *Listeria monocytogenes*, pathogenic *E. coli*, and *Salmonella*, that pose a serious threat to consumer health and are naturally occurring in the environment. As discussed further below, growers and packers must have access to the sanitizers necessary to prevent cross-contamination on food contact surfaces through the harvest and packing process. Access to different types of sanitizers with different modes of action is critical to sanitizing the different types of food contact surfaces and attacking the multitude of microorganisms that can be found in the growing and packing environments.

The Organic Food Production Act (OFPA) states that synthetic substances may be permitted if, among other things, the substance is deemed "necessary to the production or handling of the agricultural product because of the unavailability of wholly natural substitute products." We ask the NOSB members to be cognizant of the impacts to the practical abilities of organic growers and packers to produce organic food in a matter that allows for effective management of these diverse pest threats when considering whether a listed material truly has a wholly natural alternative. In particular, the evolution of insect, weed, and microbe resistance means that producers and packers need access to multiple tools to deploy season-long pest management programs that allow for the rotation of products with differing modes of action to manage the evolution of pest resistance and therefore to be able to continue growing and handling of organic food. One product often cannot and should not be considered as a full substitute for another.

Not all alternatives provide equal efficacy in controlling the target pest organism; nor, is it a given that an alternative product is compatible with all pest management or food safety programs in all regions of the country in vying to manage varying pest and pathogen complexes under a myriad of weather and soil conditions. Impacts to material supply chains is another consideration when considering delisting existing materials. Manufacturers and distributers may not have the capacity to facilely step-up production and distribution of alternative products to fill a void created by delisting, leaving end users without the materials they need to produce and pack organic produce.

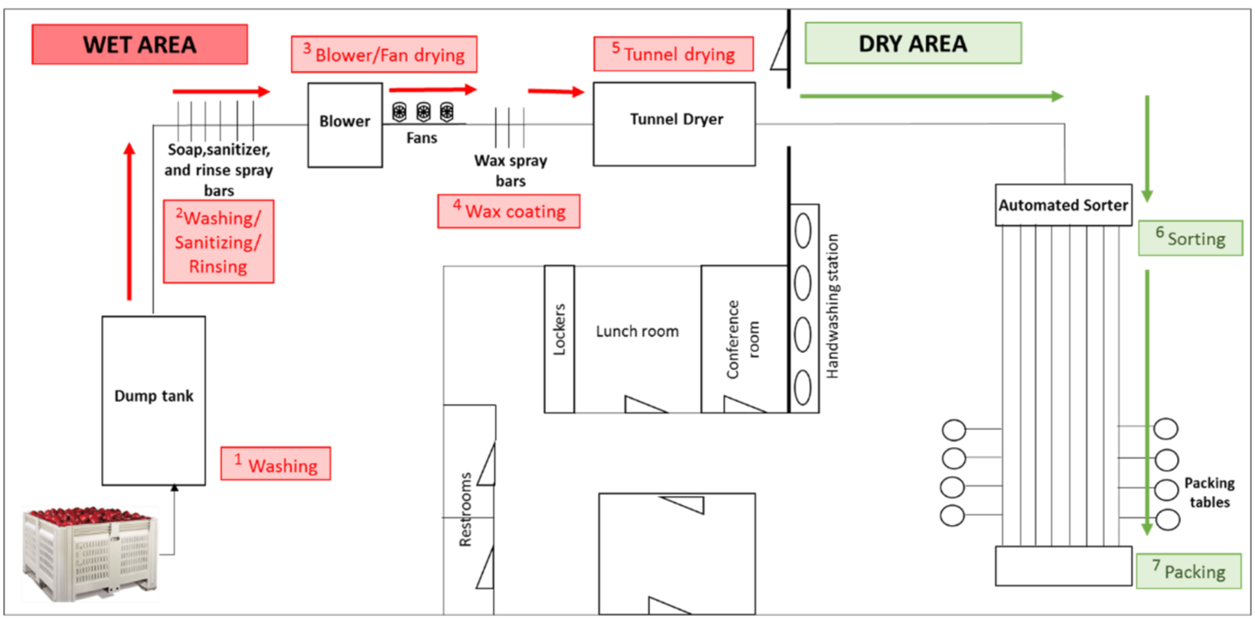
The NHC appreciates the good work of the Board in its preparation of the Proposals and Discussion Documents for the NOSB meeting. We have compiled a list of materials from those listed by the NOSB for review that are of particular importance to organic tree fruit growers and packers. Below, you will find this list – complete with NOSB citation, a brief description of the item's standard usage, and a statement as to why the product is needed.

Sanitizers and Disinfectants

Fresh produce is grown in the open environment where dangerous, and sometimes deadly, pathogens exist. It is impossible to eliminate the potential for these pathogens to reach the surface of produce in the field, and therefore it is critical for growers and packers to have the tools necessary to combat these pathogens before they reach the consumer. This includes cleaning the produce itself, as well as cleaning and sanitizing all food contact surfaces (including water) to reduce the potential for cross-contamination. Protecting public health is the top priority of the tree fruit growers and packers we represent, and we encourage the NOSB to not make it more difficult for them to deliver a safe and healthy product to consumers.

After harvest, some tree fruit (including apples) may be stored for up to 12 months in either refrigerated or controlled atmosphere cold storage. Following storage, fruit is run over a packing line to be graded and placed in various packages (see Figure). Packing lines consist of a wet area and a dry area. The wet area consists of a water flume system called a dump tank, various conveyor systems, an array of spray bars for soap, rinse, and sanitizer application; and a fan and heated tunnel system to dry the fruit. The main parts of the dry area are an optical sorter/grader and various packaging stations.

Figure: Depiction of a typical apple packing line (Source: Dr. Faith Critzer, University of Georgia)



Growers and packers need access to more than one type of sanitizer to be able to achieve the critical objective of delivering a safe and healthy product to consumers year-round. Each sanitizer and disinfectant listed below has specific benefits that make it the most effective and appropriate choice for a particular circumstance. It is also important to note that different products with different modes of action are regularly used in postharvest handling in order to manage the vast array of public health microorganisms, which include viral, protozoa, and bacterial targets. Therefore, growers and packers must have access to multiple products to combat the full plethora of pathogens of human health concern. Many packers rely on an environmental monitoring program to assess when to change products for a particular action – whether it be a sanitizer used on a particular food contact surface, or applied to water systems such as hydrocoolers, dump tanks, flumes, and spray bars.

For example, a grower may use peracetic acid (PAA) to sanitize food contact surfaces in the field. Once the fruit reaches the packinghouse, the packer may use calcium hypochlorite as a wash water sanitizer and PAA in the spray bars. At the end of the day, the lines may be sanitized using chlorine dioxide or ozone, while sodium hypochlorite may be used to sanitize the cold storage rooms. This regiment may change should environmental monitoring data show that the effectiveness of sanitation on a particular food contact surface is reduced.

In addition to the need to attack these pathogens from multiple directions, the maintenance of multiple sanitizers is also important because of concerns that reliance on a single type of sanitizer could lead to resistance evolution by the pathogens. This concern is being further explored by leading *Listeria* researcher Dr. Martin Wiedmann (Cornell University) and colleagues in a study funded by the Center for Produce Safety (Estrada 2020).

Lastly, it should be noted that in addition to protecting human health, these sanitizers are needed for growers and packers to comply with the requirements of the Food Safety Modernization Act's Produce Safety Rule and Preventive Controls for Human Food Rule.

§205.601 Sunsets: Synthetic substances allowed for use in organic crop production:

§205.601(e)(3) Boric acid; As insecticides (including acaricides or mite control): Boric acid may be used in produce packing facilities to combat ant and/or roach infestations. Boric acid is effective and is a much simpler and less processed compound than most available commercial pesticides. Boric acid also is relatively safe for non-targeted organisms and is not routinely applied, but is applied only when ant and/or roach infestation is detected in a break room, lunchroom, kitchen, or other employee facilities. It would not be used on or near produce handling equipment, therefore it is not a risk for chemical contamination of organic produce.

§205.605 (b) Sunsets: Nonagricultural (Nonorganic) substances allowed as ingredients in or on processed products labeled as ''organic'' or ''made with organic (specified ingredients or food group(s)).

§205.605 (b) Acidified Sodium Chlorite: Sodium chlorite, activated with citric acid, is used as a re-circulating process water sanitizer in some situations. When used correctly, it is very effective at killing pathogenic bacteria in water. This is necessary to prevent microbial cross-contamination in re-circulating process water systems. While there are other compounds which can form this same function, there are some advantages which make sodium chlorite a necessary option for some operations.

Affordable, accurate, and robust technology exists which can monitor effective sodium chlorite levels and automatically inject necessary product to maintain proper levels without over-injecting. This is a particular advantage over paracetic or peroxyacedic acid (PAA), which is also effective at the correct levels, but monitoring and dosing equipment is prohibitively expensive and prone to failure. As a result, most operations using PAA must rely on manual monitoring and injection to operate within target levels, which is often subject to over or under dosing.

Sodium chlorite systems require less equipment to utilize and have lower risk to occupational handlers than calcium chlorite systems. While sodium chlorite and calcium chlorite can use the same monitoring systems, calcium chlorite systems require additional equipment for mixing and injecting product. Calcium chlorite necessitates dilution of tablets into a container prior to adding to the re-circulating process water. Some operations do not have the space for the calcium chlorite equipment.

Sodium chlorite residues are very easily rinsed off a product with a simple freshwater rinse system, resulting in minimal risk of chemical contamination of the organic products. No pathogenic microbial kill steps currently exist for whole fresh produce. To produce the safest possible organic produce for the consumer, packers use a systems approach to reduce pathogens on the product. Different sanitizers have different ways of attacking pathogens, so a packer may use sodium or calcium chlorite, PAA, chlorine dioxide, ozone, or some other sanitizer in different steps of the packing process to maximize pathogenic reduction to reduce the potential for the evolution of pathogen resistance and to provide the safest produce to the consumer. All of these are effective sanitizers, and all have characteristics that make them appropriate for different commodities and different processes. The NHC supports the re-listing of Acidified Sodium Chlorite.

CROPS SUBCOMMITTEE SUNSET MATERIALS ~ Spring 2022 Meeting
§205.601 Synthetic substances allowed for use in organic crop production; As herbicides, weed barriers, as applicable; (b) As herbicides, weed barriers, as applicable

§205.601 (b)(1) Herbicides, soap-based: The NHC supports the re-listing of soap-based herbicides. While not used extensively or on a routine basis, these products are used for situational control of weeds in roadways, ditches, right of ways, and building perimeters when advantageous over alternative methods. The option to use these products should remain available. They are considered safe to humans and are environmentally benign, decomposing rapidly so to not persist in the environment.

§205.601 (b)(2)(iii) Biodegradable Biobased mulch film: The NHC supports the re-listing of Biodegradable Biobased mulch film, though currently not deployed in organic tree fruit production due to the lack of currently available products that meet the modified criteria. However, there is an annotation pending approval by the NOP from a previous NOSB meeting and an annotation proposal. Biodegradable biobased mulch film has potential to be one of the few options available for situational use to suppress weeds and conserve water under particular conditions in some organic orchards.

§205.601(e)(9) Sticky traps/barriers: The NHC supports the re-listing of sticky traps. Routine biological monitoring of pest insects allows the grower to know what pests are present, when they are present, and at what population levels they are present, and is the foundation of organic pest management. Tactics and tools to manage pests should only be deployed once monitoring knowledge is in hand to determine whether a management decision is warranted, and if needed, to best time the use of that management tactic or tool. Without the use of sticky traps to manage codling moth and other key moth pests that directly damage fruit, injury levels would be unsustainable. Use of sticky traps baited with attractant stimuli, such as female sex pheromone, is the principal method for establishing when key tortricid moth pests become active in an orchard. This establishes biofix and initiates the accumulation of degree days that determine when moth eggs are laid and when larvae emerge to best time control actions. By pinpointing control action timing, growers can reduce the overall number of control actions. Those control actions are also guided by the number of pest insects trapped over time (whether a threshold is surpassed) following a biofix. Without these tools, growers are making uninformed decisions on whether and when to initiate a control decision. There are no viable options to replace use of sticky traps.

§205.601(i)(2) Coppers, fixed; As plant disease control: The NHC supports the re-listing of fixed copper (Cu) pesticide compounds. These compounds have protectant activity against several bacterial and fungal diseases. A combination of broad spectrum of activity, ability to withstand frequent wet weather events, and inexpensive cost makes this group of compounds valuable in pest management programs (Pscheidt 2022). The use of coppers for control of bacterial diseases in organic tree fruit orchards is critically important, particularly for prevention of fire blight in apple and pear production. This is especially true since the loss of the antibiotics streptomycin and oxytetracycline for use in organic for fire blight (*Erwinia Amylovora*) management. Copper products are generally only used for fire blight management when there is risk predicted by available fire blight predictive models, such as when there is warm wet weather during bloom, as. As such they are not used every year.

Blossom blight occurs in the spring. Infected blossoms turn brown on apple and nearly black on pear, and bacteria progress into the tender shoot growth. Shoot blight develops in late spring or early summer on actively growing terminal shoots. When the disease is severe and progresses to whole limbs, the tree takes on the appearance of having been scorched by fire, hence the name fire blight.

Fixed copper products average 70% efficacy when used alone compared to many other organic alternatives which have 20-40% efficacy (*eg., Bacillus subtillus* and essential oils). The Washington State University extension specialist who works with organic producers advises them that the best organic management program is a combination of Blossom Protect (*Aerobasidium pullans*) used at 70 and 90% bloom, followed by soluble coppers during full bloom to petal fall *IF* there is risk (Tianna DuPont, personal communication). Dr. DuPont further states that due to the low percentage of copper and infrequency of these sprays, the risk of buildup in soil and water is minimal. However, the benefit is large. For example, in a year with a warm wet spring like 2017, 22% of apple acres and 65% of pear acres had fire blight infections in Washington resulting in $9 million in losses, and 194 acres of pears and 300 acres of apples were reported to have been removed due to fire blight in 2017. Losing an important tool in our toolbox for fire blight management could result in even more catastrophic losses in a weather conducive year.

In organic farming, copper compounds are the most effective active ingredients against several pathogens such as anthracnose, downy mildew of grapevine, late blight of potato, and powdery mildew of many other crops (Finckh et al. 2015). At this time, there are no highly effective alternatives to copper for fire blight prevention, and the decision to delist would leave growers with little to protect their trees. Lamichhane *et. al.*, state that often copper compounds are the only means available for growers both in conventional and organic farming to manage diseases caused by plant pathogenic bacteria both of annual and perennial crops including tomato spot, citrus canker, fire blight of pome fruits, walnut blight, stone fruit canker, mango apical necrosis, and olive knot… and "adoption of best management practices may significantly reduce the number of sprays since more frequent sprays and at higher doses may not necessarily result in significant increases in disease control." Van Zwieten reports that, "…more effective use of Cu has been achieved based mainly on monitoring and forecasting systems." Monitoring and forecasting systems are routinely used in management of fire blight in tree fruit production.

We agree that copper-based materials must be used in a manner that minimizes accumulation in soil and water and decreases harmful effects for soil and water biota. It is understood that soil type, pH, and organic matter in soil all affect the fate of copper (Pscheidt 2022). Research into advanced formulations of copper products, tank mixing with iron and molecules to enhance the availability of free Cu ions (Lamichhane 2018), timing of application, and advances in spray technology can lead to more efficient use of these products, and into alternatives to copper-based antimicrobial compounds should be further intensified to ensure that growers have sufficient tools for the implementation of sustainable crop protection strategies. Although scientists have searched for organic alternatives for copper products for disease control, including biocontrol agents, microbial extracts, natural derivatives, plant extracts, and plant growth regulators, the progress so far still does not guarantee the replacement of copper compounds.

§205.601(i)(3) **Copper sulfate:** The NHC supports the continued listing of Cu sulfate while research into alternative formulations and practices to mitigate unintended harms can provide disease management options for organic tree fruit producers. Use of Cu sulfate is generally limited in tree fruit production to dormant stages in tree phenology, before flower development, for overwintering forms of fire blight (pome fruit) and *Coryneum* blight in cherries. As with fixed Cu, Cu sulfate must be used in a manner that minimizes accumulation in soil and water and decreases harmful effects for soil and water biota. Copper sulfate's high solubility in water is known, but soil type, pH, and organic matter in soil all affect the fate of Cu sulfate. In the Pacific Northwest, tree fruit horticultural systems, soil types, timing of Cu applications, method of Cu applications, and irrigation practices significantly reduce any chance of leaching and water run-off for most orchards. The decision to delist would leave growers with little to protect their trees.

§205.601(i)(11) Polyoxin D zinc salt: The NHC supports the continued listing of Polyoxin D zinc salt. This material has only recently been registered for use to control fungal diseases in the United States and research has indicated positive results in managing disease in apple (Dowling *et.al.*, 2016). Polyoxin D zinc salt has an exemption from the requirement of a residue tolerance (2018) due to its low toxicity (Dowling 2018), is considered safe to human health, and has a unique mode of action (FRAC 19) for use with other fungicides in managing against the evolution of pathogen resistance. This material should remain listed while research into its use as an effective fungicide progresses.

§205.601(j)(3) Humic acids as plant or soil amendments: The NHC supports the continued listing of humic acids for use as plant and soil amendments. Humic acids are widely used in organic tree fruit production in the Pacific Northwest. Research shows that application of humic acid can improve soil pH, available nutrient content, total enzyme activity, ecosystem multifunctionality, and change the structure of soil bacterial and fungal communities, all leading to decreased defoliation of fruit trees while increasing fruit yield (kang *et. al.*, 2021 and Castellano-Hinojosa *et.al.*, 2021). Previous reviews by NOSB members found humic acids to be compliant with all OFPA criteria, while posing no human or environmental concerns.

§205.601(j)(10) Squid byproducts as plant or soil amendments: The NHC supports the continued listing of squid byproducts. Squid byproducts are biostimulants that act on the metabolic and enzymatic processes of plants to facilitate plant acquisition of nutrients, including nitrogen, potassium, and phosphorus. Squid byproducts are being used in tree fruit production to improve tree productivity and crop quality. Madende and Hayes (2020) hypothesize that fish processing waste products also have potential applications to help plants cope with stressful environmental conditions such as drought, abiotic stress, and cold. Ahuja *et. al.*, (2020) report that use of fish waste products in agriculture recycles nutrients that would otherwise be wasted, stating “Every ton of consumed fish generates about 30–70% fish waste.” The use of fish waste is one way of addressing food waste reduction.

§205.601(j)(7)(i) Soluble boron products: The NHC supports the continued listing of soluble boron. Boron is an essential nutrient for development of roots, flowers, new shoot development, pollen germination, and fruit set. In pome fruit and cherry, boron deficiency can result in reduced yield, small, mishappen fruit, internal corky tissue, cracking, russeting, premature ripening, and increased premature fruit drop (Peryea 2018). Pears have a higher boron requirement than apples or cherries. Foliar application of boron solutions is an efficient way to increase the boron content of fruit trees. Washington State University Orchard Soils & Fruit Tree Mineral Nutrition Research Scientist, Dr. Frank Peryea, suggests a foliar spray rate of 1.0 lb. boron/acre for B-deficient orchards in Washington, and soil application at a rate of 1-3 lbs. actual boron per acre if the soil test level is below 0.5 mg/kg or if boron deficiency symptoms are present. Trees grown in sandy soils may require multiple boron applications, based on leaf and soil testing.

§205.601(j)(7) Micronutrients(ii) Sulfates, carbonates, oxides, or silicates of zinc, copper, iron, manganese, molybdenum, selenium, and cobalt: The NHC supports the continued listing of these micronutrients. These essential mineral elements are required for a plant to complete its life cycle (Peryea 2019). There are a range of soil types across the Pacific Northwest, and some soils require additions of micronutrients to maintain the proper levels for proper tree health. Brown (2021) reports that selenium deficiency in apple trees results in fruit producing substantially more ethylene at harvest and having substantially lower levels of fruit color, firmness, and sugar. Cobalt is considered important for the role it plays in nitrogen fixation (Hu *et. al.*, 2021). From Peryea 2019:

- Iron is a component of many plant proteins and enzyme systems. It is required for nitrate and sulfate reduction, N2 assimilation, and energy production. Iron functions as a catalyst or part of an enzyme system associated with chlorophyll production (hence, chlorosis as a deficiency symptom). It is possibly involved with protein synthesis and root tip meristem growth.

- Manganese is essential in photosystem II for splitting water and generating molecular O2, the first step of the electron transport chain of the photosynthesis process (hence, chlorosis as a deficiency symptom). It is a component of enzymes that protect the photosynthetic apparatus from injury by superoxides. Manganese replaces magnesium in activating several enzyme systems and activates indoleacetic acid (IAA) oxidases.
- Zinc is a component of at least four plant enzyme systems; it is specific for carbonic anhydrase. It activates various types of enzymes that influence carbohydrate metabolism (not the principal reason for Zn deficiency symptoms) and protein synthesis. Zinc influences auxin metabolism, particularly IAA (reason for stunted growth and "little leaf" disorder).
- Copper is a constituent of chloroplast proteins required for electron transport in the photosynthetic process (hence, chlorosis as a deficiency symptom). It participates in protein and carbohydrate metabolism and N2 fixation. Copper is part of oxidase enzymes that reduce molecular O2, including those required for lignin formation (shepherd's crook symptom). It is required for seed and fruit formation; deficiency reduces pollen viability.
- Molybdenum is a component of two major plant enzyme systems: (a) nitrogenase, which converts dinitrogen gas to ammonia; and (b) nitrate reductase, which converts nitrate to nitrite. The nitrite is then converted to ammonium by a different enzyme. Molybdenum requirement is reduced by increased availability and utilization of ammonium.

National Organics Standards Board Certification, Accreditation and Compliance Subcommittee (CACS) Discussion Document: NOSB Technical Support Initiative February 13, 2022

Technical support to the NOSB should be limited to career scientists at all agencies within the USDA, EPA, and FDA who could receive and vet input from scientists at public Land-Grant Universities. Government agencies are answerable to the public. Advisory panels like the NOSB are not. The NOSB is a 15-person, volunteer federal advisory board setting policy for a multi-billion-dollar industry, and the scientific expertise of the board is extremely limited. Congress recognized the natural limits of NOSB expertise in 1990 when the Organic Food Production Act was established, which is why the NOSB is given authority to convene technical advisory panels to consider specific issues. In practice this rarely occurs.

To properly vet the full scope of work NOSB members consider, technical support should be limited to the above mentioned, career scientists at all agencies within the USDA, FDA, and EPA. The impacts of decisions under consideration by the NOSB impact the livelihoods of many, and encompass scientific and economic implications for producers, consumers, and rural communities. Transparency of this entire process is critical to maintain trust in the decisions delivered by the board. Concerns already exist with NOSB member composition not reflecting the realities of farming for the preponderance of organic product, and in some instances representing or being influenced by highly partisan points of view. To prevent erosion of trust in NOSB decision-making, technical support to the NOSB should be limited to vetted scientists at public agencies who understand the impacts of regulatory actions across society. Career scientists are less susceptible to outside influence by stakeholders of all kinds, including those that might seek to advance a perspective that is lacking in knowledge of a particular commodity's production and handling needs or any evidence that a practice or allowed substance has a viable substitute and should be removed from the list.

Conclusion

The products referenced in these comments are important – and in some cases critical – to organic tree fruit production. The loss of these products would negatively impact the abilities of organic tree fruit growers and packers to protect against and manage injury from insect, disease and microbial pests and could have the unintended impact of forcing our local tree fruit growers and packers out of organic production. This is particularly true as it regards the potential loss of sticky traps, the loss of which directly jeopardizes the ability to make informed decisions in implementing tools and tactics responsibly in organic fruit production, and fixed copper for the prevention of fire blight in pome fruit. We ask that members of the NOSB consider their decisions carefully while recognizing the importance of these materials for the role each plays in organic tree fruit production and in preserving management options necessary to respond to food safety concerns and operational needs in organic production and packing.

Thank you for your careful consideration of these comments.

Sincerely,
NORTHWEST HORTICULTURAL COUNCIL

David Epstein, Ph.D.
Vice President for Scientific Affairs

CC: NHC Science Advisory Committee's Organic Subcommittee

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