

National Organic Standards Board
Crops Subcommittee Discussion Document
Field and Greenhouse Container Production
August 29, 2017

Introduction

Since 1995, the National Organic Standards Board has discussed the production of crops in greenhouses and/or containers, and grown in a variety of substrates. This has resulted in numerous recommendations that have not been incorporated into the USDA organic regulations. USDA accredited certifiers have been approved to develop standards for hydroponics and containers and certify operations to those standards, as long as their organic certification requirements do not conflict with current regulations. Many of the unique aspects of operations that are hydroponic in recirculating systems or hydroponic in containers, where the crop relies upon soluble nutrients due to the use of inert substrates in those containers, are not explicitly addressed in the current USDA organic regulations. This discussion document provides background on the issues and why there is a need to address various aspects unique to container operations, both hydroponic and soil-based.

In the equivalency agreements for organic trade between two of our major trading partners, the European Union and Canada, hydroponic crops are not allowed to carry the organic label and are an exception to the agreement. Other aspects of container and greenhouse growing are also covered by our trading partners. Bringing the USDA organic regulations more in line with international organic regulations could improve trade and lessen confusion in the marketplace.

Background

In a separate proposal to be voted on at the Fall 2017 NOSB meeting, the Crops Subcommittee has proposed the following standard for container production:

For container production to be certified organic, a limit of 20% of the plants' nitrogen requirement can be supplied by liquid feeding, a limit of 50% of the plants' nitrogen requirement can be added to the container after the crop has been planted, and the container substrate must be at least 50% soil and/or compost by volume. For perennials, the nitrogen feeding limit is calculated on an annual basis. Transplants, ornamentals, herbs, and aquatic plants are exempted from these requirements.

In the proposal, hydroponic is defined as

any container production system that does not meet the standard of a limit of 20% of the plants' nitrogen requirement being supplied by liquid feeding, and a limit of 50% of the plants' nitrogen requirement being added to the container after the crop has been planted is defined as hydroponic, and should not allowed to be certified organic. For perennials, the nitrogen feeding limit is calculated on an annual basis. Transplants, ornamentals, herbs, sprouts, fodder, and aquatic plants are exempted from these requirements.

Whether or not these items are recommended by the National Organic Standards Board and subsequently incorporated into the organic regulations by the National Organic Program, there are other aspects associated with these operations that are beyond requirements for nutrient and substrate

sources and percentages. These systems produce crops either in greenhouses or in field situations and rely on some practices that are not typical of a field grown operation.

The lack of standards overseeing these practices leads to inconsistency between hydroponic operations and field grown crop production.

Relevant Areas of the Rule and the Organic Foods Production Act (OFPA)

There are numerous areas of the OFPA and the USDA organic regulations that address growing crops and would address the need for hydroponic systems of all types to meet those requirements as well.

Organic Foods Production Act of 1990 (OFPA)

§6504. National standards for organic production

To be sold or labeled as an organically produced agricultural product under this chapter, an agricultural product shall—

- (1) Have been produced and handled without the use of synthetic chemicals, except as otherwise provided in this chapter;
- (2) Except as otherwise provided in this chapter and excluding livestock, not be produced on land to which any prohibited substances, including synthetic chemicals, have been applied during the 3 years immediately preceding the harvest of the agricultural products; and
- (3) Be produced and handled in compliance with an organic plan agreed to by the producer and handler of such product and the certifying agent.

§6512. Other production and handling practices

If a production or handling practice is not prohibited or otherwise restricted under this chapter, such practice shall be permitted unless it is determined that such practice would be inconsistent with the applicable organic certification program.

.... (g) Limitation on content of plan

An organic plan shall not include any production or handling practices that are inconsistent with this chapter.

USDA Organic Regulations

§205.2 Terms defined.

Organic production. A production system that is managed in accordance with the Act and regulations in this part to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity.

§ 205.200 General.

The producer or handler of a production or handling operation intending to sell, label, or represent agricultural products as “100 percent organic,” “organic,” or “made with organic”

(specified ingredients or food group(s))” must comply with the applicable provisions of this subpart. Production practices implemented in accordance with this subpart must maintain or improve the natural resources of the operation, including soil and water quality.

§ 205.203 Soil fertility and crop nutrient management practice standard.

(a) The producer must select and implement tillage and cultivation practices that maintain or improve the physical, chemical, and biological condition of soil and minimize soil erosion.

(b) The producer must manage crop nutrients and soil fertility through rotations, cover crops, and the application of plant and animal materials.

(c) The producer must manage plant and animal materials to maintain or improve soil organic matter content in a manner that does not contribute to contamination of crops, soil, or water by plant nutrients, pathogenic organisms, heavy metals, or residues of prohibited substances....

Discussion

This document will address three areas:

1. Use of artificial light
2. Use of synthetic mulches including, but not limited to, plastic film and woven landscape cloth.
3. Disposal of crops, substrates, and containers at the end of the crop’s production cycle.

Artificial Light

Artificial light used to grow plants is present in the organic standards of EU certification bodies and Canada. The EU Final Report on Greenhouse Production 2013 states the following:

In the Group’s opinion, the provision of artificial light is in line with the objectives and principles of organic farming, if the normal daylight is insufficient for the normal growing of crops. It should only be allowed on dark, overcast days and for extending the daylight period, and only during autumn, winter and early spring. However, the intensity of artificial light used in overcast or short days should not exceed the Photosynthetically Active Radiation (PAR) of the country during a summer day (21st of June) and the number of hours should not exceed 12 hours of daylight including artificial light.

Artificial light should also be allowed for the production of seedlings and herbs in pots, for the forcing of herbs, and for photoperiod induction of flowering.

Large production units using artificial light can create a dome of light above the production units (‘light pollution’), which can lead to the disruption of natural behavior patterns of birds, bats and insects.

Lighting during night hours should therefore be avoided, and an appropriate dark period provided for the plants. Where possible, energy-efficient light bulbs, electricity from renewable sources and/or intelligent greenhouse management systems should be used¹.

In addition, here is an example of one EU certifier's standard (Ecocert) for the light spectrum of the artificial light used to grow organic crops:

The maintenance of the temperature of the culture medium and complementary artificial light with lamps adjusted to the light spectrum of the species are authorized over difficult periods (winter conditions in temperate zones, restart of strains, etc.) after approval by Ecocert².

The Canadian Organic Standards allow the following:

7.5.9 Full-spectrum lighting is permitted³.

The use of artificial light can mimic the spectral quality of natural light and duration of natural light to these plants during the growing season. Artificial light is sometimes used to promote faster plant growth, or replace natural light altogether. This discussion will seek to determine what types of artificial light are compatible with the principles of organic agriculture.

There is a prohibition for organic livestock in 205.238 (c) (3) to administer hormones for growth promotion. The argument could be made that the use of artificial light designed to grow specific crops faster than can be performed in a natural setting might also need to be prohibited. The allowance to force herbs or induce flowering for the ornamental industry might be considered an exception, since these are necessary to the production of the crop. However, lettuce, other vegetables, and fruits would not require this artificial stimulant to produce a sellable crop.

Synthetic Mulch

Many container systems rely on the use of synthetic mulches to control weeds under the pots in the field, hoophouses or in greenhouses. Some may be impermeable and others are woven to allow some air and water infiltration. Typically, this synthetic mulch is not removed at the end of the harvest season as required of annual organic crops. Instead, it remains in the field for many years, even beyond a decade. For the woven landscape cloth, even though some water and air can infiltrate, it is not porous enough to absorb heavy downpours and can result in runoff and erosion beyond the edges of the synthetic mulch. In addition, the top few inches of the soil below the synthetic mulch can become sterile due to heat buildup beneath the mulch. Hundreds of acres are currently covered using these synthetic mulches for numerous years on organic farms. The adverse effects of synthetic mulches on the natural resources of the farm, as well as secondary effects on adjoining land, are issues that could be addressed.

¹

https://ec.europa.eu/agriculture/organic/sites/orgfarming/files/docs/body/final_report_egtop_on_greenhouse_production_en.pdf

² <http://www.ecocert.com/sites/default/files/u3/Ecocert-Organic-Standard.pdf>

³ <http://www.tpsgc-pwgsc.gc.ca/ongc-cgsb/programme-program/normes-standards/internet/bio-org/pgng-gpms-eng.html>

A requirement that these synthetic mulches be covered by a biologically based mulch such as straw, wood chips, hay etc. would mitigate numerous issues associated with this use. The soil temperature underneath a wood chip covered landscape cloth is cooler, and mulch protects the fabric from UV radiation thereby prolonging the useful life of the synthetic mulch. Woodchips or straw (and other naturally derived mulches) are proven tools for reducing the impact of raindrops and thereby enhancing infiltration of rainwater and reducing surface water runoff. Snow and ice would be trapped in the “organic” mulch and lessen the incidence of runoff issues, since these would slowly melt and infiltrate down into the soil.

Another issue to be considered is the percentage of the land covered by the plastic film or cloth. Having large numbers of acres covered by synthetic mulches magnifies the issues mentioned above, and prevents the growth of habitat and food sources for beneficial insects and birds. A percentage of the growing area around the edges and pathways, and through the rows of containers sitting on the mulch, could be grass, beneficial insect habitat, or otherwise left uncovered by the synthetic mulch so the soil can absorb water and provide vegetation that promotes ecological balance and biodiversity.

Disposal of Crops and Containers at the End of the Crop’s Production Cycle

The crops and substrate used in container operations will eventually lose their productive capabilities and will need to be disposed of in some manner. Sending dump truck loads of large plastic pots and plastic liners with dead annual or perennial crops to a landfill does not meet the definition of organic production since it does not recycle the nutrients still present in those containers. The EU is currently reviewing a requirement that the substrate and vegetative matter from containers be composted and incorporated on-site and eventually spread on fields that are part of the same operation. The plastic pots can then be reused or recycled. Whether or not the vegetative material and approved organic substrates found in containers is composted and spread on site or at another location, this discussion document asks if consideration should be given to what happens to both the plastic residues and organic matter generated once the containers have outlived their productive capacity.

Public Comments from Previous Proposal and Discussion Documents

In order to have a robust and transparent interaction, these issues are being brought to the public for discussion. While the examples and issues being considered in this document are part of a container production system, if the same issues are found in greenhouse or field grown crops, it would be assumed that any future proposed regulations would apply to them as well.

Discussion Questions

1. Should the use of artificial light be limited to a specific number of hours per day? Describe your rationale for how many hours should be permitted.
2. Should the spectrum and intensity of artificial light be limited to full spectrum, which is as close to natural daylight as possible, or should other types of lighting, such as those that emit the red or ultraviolet spectrum of light or modified intensities, be allowed? Describe your rationale for the spectrums and intensities of artificial light for use in container operations.

3. Should the use of synthetic mulches which remain in place for numerous years, especially in an outdoor production setting, address the issues of soil and water quality as well as natural resource maintenance and improvement elaborated in this discussion document? Please describe the issues you feel are important and how they might be addressed.
4. Should the composting and field spreading of crop residue and substrates from container operations, and the recycling of plastic or non-compostable containers, be addressed within the NOP organic certification system?

Appendix - Definitions

Container – Any rigid or collapsible vessel and associated equipment used to house growing media and the complete root structure of terrestrial plants and to prevent the roots from contacting the soil or surface beneath the vessel, such as, but not limited to, pots, troughs, plastic bags, floor mats, etc.

Greenhouse – Permanent enclosed structure that allows for an actively controlled environment used to grow crops, annual seedlings or planting stock.

Growing media – Material which provides sufficient support for the plant root system and enables the plant to extract water and nutrients. Used interchangeably with the term "substrate".

Inert material- A material that will not chemically react with anything under normal circumstances

Nutrient solution – Growing solution used in traditional hydroponic production that is commonly composed of immediately plant-available soluble mineral salts in water

Soil – The unconsolidated mineral or organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. (ii) The unconsolidated mineral or organic matter on the surface of the earth that has been subjected to and shows effects of genetic and environmental factors of: climate (including water and temperature effects), and macro- and microorganisms, conditioned by relief, acting on parent material over a period of time. A product-soil differs from the material from which it is derived in many physical, chemical, biological, and morphological properties and characteristics (Soil Science Society of America Glossary).

Subcommittee vote:

Motion to accept the discussion document on Field and Greenhouse Container Production

Motion: Francis Thicke

Second: Steve Ela

Yes: 9 No: 0 Abstain: 0 Absent: 0 Recuse: 0

Approved by Francis Thicke, Subcommittee Chair, to transmit to NOSB, August 29, 2017