



Guidance for Designing a Compliant Crop Rotation

Crop rotation is an important cultural method for managing nutrients, combating pests, and protecting vital natural resources. Rotations designed using knowledge of plant biology, weed cycles, and nutrient cycling can boost yields and provide investments in soil fertility. It is important to consider, however, that while crop rotation has formal and informal meanings, certified organic operators are required to create a crop rotation as defined through the National Organic Program (NOP). Certifiers, such as PCO, evaluate whether a crop rotation is compliant with organic regulations based on the regulatory definition and several standards that refer to crop rotation (7 CFR 205.203, 205.205 and 205.206).

NOP defines crop rotation as “the practice of alternating the annual crops grown on a specific field in a planned pattern or sequence in successive crop years so that crops of the same species or family are not grown repeatedly without interruption on the same field. Perennial cropping systems employ means such as alley cropping, intercropping, and hedgerows to introduce biological diversity in lieu of crop rotation.” (7 CFR 205.2)

Crop rotation: a functional standard

Crop rotation is a required practice in the NOP organic regulations. Generally, crop rotations are planned to take advantage of inherent crop characteristics that will benefit the land, the farmer, and subsequent crops. While there are multiple strategies and possibilities for rotating crops in a given field over time, there are specific functions that must be considered during its design and implementation. PCO will look at your rotation to determine whether it fulfills the following criteria: (1) Maintains or improves soil organic matter; (2) Assists with the management of pests in annual and perennial crops; (3) Manages deficient or excess plant nutrients; and (4) Provides erosion control. In addition, according to organic regulations, crop rotations cannot include the same plant species or family grown repeatedly without interruption on the same field. There are several ways for operations to fulfill the crop rotation; some examples of strategies used to fulfill the required functions are included on the next page.

How do I know if my crop rotation is compliant?

When reviewing a crop rotation for compliance, PCO looks at the pattern of crops grown in the

General Guidelines for Crop Rotation:

- ✓ Interrupt plant families/species in the same field for a minimum of one growing season.
- ✓ Alternate heavy nitrogen feeders with nitrogen-fixing crops or cover crops.
- ✓ Plan cover crop usage to avoid bare soils or periods of active nutrient mineralization without plant growth.
- ✓ Disrupt pest cycles (weeds, insects, diseases) by avoiding shared hosts in the same field in subsequent years.

same field over time. The time periods of growth, types of crops grown, use of cover crops and repetition of plant families and species are examined to determine whether the organic operator’s plan provides the required functions. If it is unclear whether a crop rotation plan is compliant, then you will be required to submit justification that details how the required functions are being filled. The justification must include how you have come to that conclusion (e.g. monitoring, cooperative extension advice/consulting, published research, etc.).

Examples of Crop Rotation Functions in Practice

Alternate crops that require heavy cultivation with either mulched or reduced tillage crops, or the use of cover crops to build carbon reserves in the soil.

Long rotations that include a perennial crop, such as hay, can interrupt pest life cycles or outcompete annual weeds for resources.

Maintain or improve soil organic matter.

Assist with the management of pests.

Include a perennial crop, such as hay, as a method to build soil carbon (e.g. corn -> soybeans -> oats -> alfalfa). Hay crops can be an organic matter sink, however, if not fertilized according to their nutrient needs.

In addition to avoiding the repeated plantings of crops within the same family or species, a grower may use trap crops, may use cover crops with allelopathic or pathogenic properties (e.g. mustards), or may intercrop with flowering crops to attract pest predators.

Alternate heavy nitrogen feeders with nitrogen-fixing plants (e.g. edamame -> pumpkins -> snap peas -> beets) or the use of cover crops (e.g. broccoli / red clover under seeded -> sweet corn / rye -> peppers / peas and oats -> carrots / buckwheat).

Manage deficient or excess nutrients.

Plant vulnerable fields in sod or high residue crops.

Provide erosion control.

For excess plant nutrient management, this could be managed through the use of cover crops, which can take up mineralizing nutrients during periods when a cash crop is not grown. Some cover crops function particularly well at scavenging nutrients (e.g. buckwheat for phosphorus, rye for nitrogen, etc.).

Minimize the amount of time the field is bare, through intensive cropping systems (that do not require intensive tillage) or the use of cover crops, to prevent water or wind erosion.

A note on biological diversity

Crop rotation naturally introduces biological diversity to organic operations through the changes in crops grown on the same field over time; however, some perennial crops or long-term rotations may require other strategies for introducing biological diversity. Solutions are site-specific, however strategies include (1) the creation of wildlife corridors, (2) installation of hedgerows, (3) cultivating cover crops between rows of perennial plants, and (4) using biologically active soil amendments, such as compost.

Pennsylvania Certified Organic (PCO)

pco@paorganic.org • www.paorganic.org • 106 School Street, Ste 201 • Spring Mills, PA 16875 • 814.422.0251 • fax 814.422.0255

PCO Guidance on Crop Rotation V1, 2/21/19