

Module 4 - Crop Rotation

Lesson 4.1 Designing a Crop Rotation



Description

The concept of crop rotation is not new to organics. It is as old as agriculture itself. In this lesson, discuss the central role crop rotation plays in organic weed, pest, disease, and fertility management.

Learning Objectives

- Understand the six principles of crop rotation
- Understand the goals of crop rotation
- Understand the role of context in designing a crop rotation

Watch the Video



Dig Deeper

- Crop Rotation on Organic Farms - <https://www.sare.org/resources/crop-rotation-on-organic-farms/>
- Building Soils for Better Crops - <https://www.sare.org/resources/building-soils-for-better-crops/>
- Organic Field Crop Handbook - <https://cog-shop.myshopify.com/products/organic-field-crop-handbook-3rd-edition>
- Risk Management Guide for Organic Producers - https://organicriskmanagement.umn.edu/sites/organicriskmanagement.umn.edu/files/2021-02/risk_management_publication.pdf
- Systems Research for Agriculture: Innovative Solutions to Complex Challenges - <https://www.sare.org/wp-content/uploads/Systems-Research-for-Agriculture.pdf>

Sources and References

Cavigelli, A. M., et al. Increasing Crop Rotation Diversity Improves Agronomic, Economic, and Environmental Performance of Organic Grain Cropping Systems at the USDA-ARS

Beltsville Farming Systems Project. Crop Management, Volume 12, Issue 1, 29 Apr. 2013, <https://access.onlinelibrary.wiley.com/doi/10.1094/CM-2013-0429-02-PS>

Bailey, L. H., Cyclopedia of American Agriculture: A Popular Survey of Agricultural Conditions, Practices and Ideals in the United States and Canada: Volume II. Crops - 436. 1907. Cornell University Library, https://reader.library.cornell.edu/docviewer/digital?id=chla2949859_1692#page/4/mode/1up

Magdoff, Fred, and Harold Van Es. Building Soils for Better Crops - Fourth Edition. SARE, 2021, <https://www.sare.org/wp-content/uploads/Building-Soils-for-Better-Crops.pdf>

Mohler, Charles, and Sue Ellen Johnson. Crop Rotation on Organic Farms, A Planning Manual. SARE, July 2009, <https://www.sare.org/wp-content/uploads/Crop-Rotation-on-Organic-Farms.pdf>

Teasdale, John R., et al. Weed Species and Traits Associated with Organic Grain Crop Rotations in the Mid-Atlantic Region. WSSA, 3 July 2019, <http://www.asacim.org.ar/wp-content/uploads/2019/12/teasdale2019.pdf>

Lesson 4.2 Example Crop Rotation



Description

Designing a crop rotation is like buying a new pair of work boots. You will be wearing them for a long time and you have to be able to work efficiently and comfortably in them. The boots must be sturdy yet flexible, supportive yet comfortable - a balance of needs. In this lesson, we look at balancing needs when designing a crop rotation in two agronomic regions: semi-arid west and humid east.

Learning Objectives

- Understand the limitations of short crop rotations
- Understand the benefits of crop sequencing within a rotation

Watch the Video



Dig Deeper

Managing Cover Crops Profitably -

<https://www.sare.org/resources/managing-cover-crops-profitably-3rd-edition/>

Risk Management Guide for Organic Producers -

https://organicriskmanagement.umn.edu/sites/organicriskmanagement.umn.edu/files/2021-02/risk_management_publication.pdf

Sources and References

Example crop rotations designed based on input from the OATS Regional Advisory Committees.

Lesson 4.3 Focus Farmers Talk Crop Rotation



Description

We hear directly from successful organic farmers about their approach to crop rotation.

Learning Objectives

- Understand the goals of crop rotation
- Understand the role of context in designing a crop rotation
- Understand the limitations of short crop rotations
- Understand the benefits of crop sequencing within a rotation

Watch the Video



Module 4 Quiz

*Correct answers are in **bold**.*

Which below are from the six principles of crop rotation (as adapted from "Better Soils for Better Crops")?

- **Follow legumes with hungry feeders**
- Minimize tillage
- **Break pest/disease cycles**
- Incorporate manure quickly after spreading
- **Grow fertilizer/fertility in place**
- Cereal rye has allelopathic effects

The USDA organic regulations do not require the use of a crop rotation on organic farms.

- True
- **False**

Which statements are true about crop rotation on organic farms?

- One size fits all.
- **Crop rotation is one of the most important hammers in the toolkit.**
- **Longer, phenologically diverse crop rotations are more effective for weed, pest, and disease suppression.**
- It is easy to find markets for uncommon crops in a rotation.

Which role does a legume-based pasture play in crop rotation:

- **Provide weed control through mowing and competition**
- **Fix nitrogen**
- Scavenge left-over nutrients
- Bring in highest revenue per acre

What are some possible issues and improvements for this rotation?

<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
Soybeans to Cereal Rye	Soybeans to Cereal Rye	Corn to winter fallow

- No legumes to provide Nitrogen
- **Low diversity of crop families**
- **Corn (heavy-feeding crop) should follow a legume**
- **Growing the same crops multiple years in a row**
- Shorter, simpler rotations are often better
- Few opportunities for weed control
- **Corn can suffer after rye due to allelopathic effects**



This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under agreement number 2020-38640-31522 through the North Central Region SARE program under project number ENC20-192. USDA is an equal opportunity employer and service provider. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.