

## Organic Regulations and Production Overview

October 2019

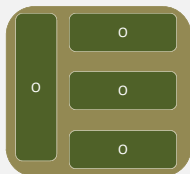
### USDA Organic Regulations

- Regulations combine science, tradition, politics, and pragmatism (for enforcement)
- Change over time
- Process based
- Not quantitative

### Transition to Organic

### 3 year land transition

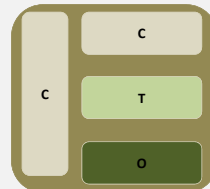
### Transition Strategies



**Full:** all fields at once.

conventional **C**  
organic **O**  
transitional **T**

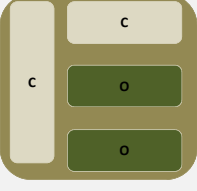
### Transition Strategies



**Gradual:** one (or more) fields at a time.

conventional **C**  
organic **O**  
transitional **T**

### Transition Strategies

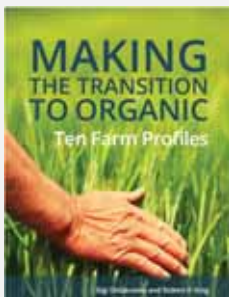


**Split:** Part conventional and part organic for long-term.

conventional **c**  
organic **o**  
transitional **t**

### Transition Strategies

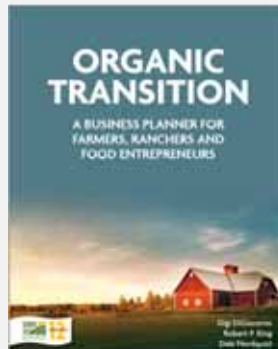
- Gradual transition can help
- But on worst/least productive ground first?
- Consider perennial, N cover crops during transition to add fertility and address weeds?
- Caution if converting CRP other conservation land to organic. Weeds, fertility, why was it in CRP (erosion?)



### Transition Strategies

**Challenges during transition:**

- Economic (no premium during 3 yrs; relationships with buyers)
  - Some buyers offer "transition" premium?
- Nutrients (N and P, esp on larger scale)
- Weed control
- Rotation / adding new crops



### Questions? Comments?





NRCS




 **No Synthetic Substances**

### Substances


- National List is the list of exceptions
  - Ex: biosolids not allowed; elemental sulfur is allowed synthetic (extraction)
- OMRI
- No GMOs or biosolids




## Substances

- Fertilizers: plant materials, rock dusts (gypsum, rock phosphate), animal byproducts, compost/manure, marine products/byproducts
- Pesticides: biological (Bt, spinosad), botanical (pyrethrum, neem), insecticidal soaps, minerals (sulfur, DE, copper-not accumulate in soil)
- Check inert ingredients too! (ex: most gypsum has synthetics, only mined allowed)
- Include in OSP and get approval in advance!




## Buffer



Organic fields must:

(c) Have distinct, defined boundaries and buffer zones...to prevent the unintended application of a prohibited substance

A buffer zone must be **sufficient** in size or other features to prevent the possibility of unintended contact by prohibited substances applied to adjacent land...







## Buffer Considerations

- Site prep is key for buffer plantings
- No synthetic substances in buffer zone (inc seed treatment)
- Perhaps 1 growing season of prep to limit weed competition
- Smother cropping (ex: sorghum-sudan) or solarization in smaller areas
- Mulch
- Porosity in multiple rows
- Natural resources/biodiversity



## Drift

IDALS with FieldWatch™ offers online registry tools to promote communication (mapping) including **driftwatch®**: a crop registry site. IDALS can investigate damage from drift, enforce laws (applicator license, etc)



## Crop Rotation



## Crop Rotation



must implement a crop rotation including but not limited to sod, cover crops, green manure crops, and catch crops to provide these functions:

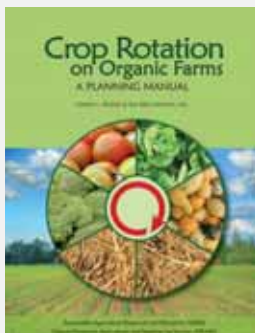
- (a) Maintain or improve soil organic matter content;
- (b) Provide for pest management in annual and perennial crops;
- (c) Manage deficient or excess plant nutrients; and
- (d) Provide erosion control.

§ 205.205

## Crop Rotation

For organic farmers, crop rotation is essential!

- Nutrients (esp N)
- Managing many diseases
- Weeds
- Building soil quality
- Manage some insects



## Long-Term Trials

- Examine long-term impact of organic rotations/systems
- 6 of the oldest grain-crop-based organic in the U.S. initiated in 1980's and 90's in PA, CA, MN, WI, MD, IA
- Multiple organic rotations range from 3-10 yrs



"A Review of Long-Term Organic Comparison Trials in the U.S."  
Sustainable Agriculture Research, 2015

## Long-Term Agroecological Research

CONVENTIONAL (2yr)	Corn -Soybean
ORGANIC (3yr)	Corn -Soybean -oats/alfalfa
ORGANIC (4yr)	Corn -Soybean -oats/alfalfa -alfalfa
ORGANIC (4yr)	Corn -Soybean -Corn -oats/alfalfa

- Est in 1998, Greenfield, Iowa State University
- Org corn & soybean yields have been equivalent or greater than conventional; close to conventional during transition (92% of conv corn; 99.6% of conv soy yields)
- Fertile soils and weed management experience?

"A Review of Long-Term Organic Comparison Trials in the U.S."  
Sustainable Agriculture Research, 2015

## Long-Term Trials

Keys to success/findings:

- Extended and diverse crop rotations – longer rotations are better
  - fertility, lower weed pressure, reduce soil erosion
  - SOC & potentially mineralizable N greater in longer rotations
  - Perennials help – weed competition, N, deep roots improve water infiltration
  - Reduce tile nitrate concentrations and reduce N loss in tile drainage water



Alfalfa

"A Review of Long-Term Organic Comparison Trials in the U.S."  
Sustainable Agriculture Research, 2015



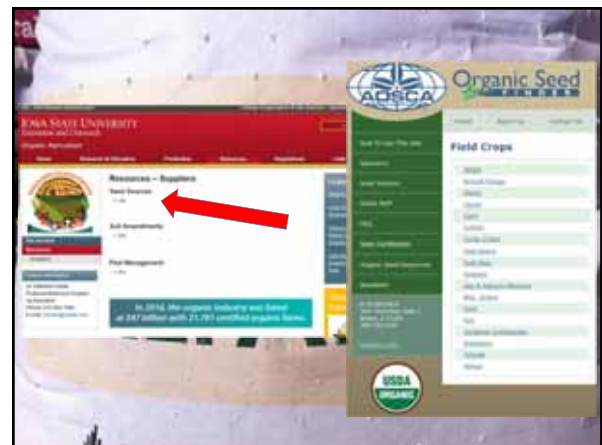
## Organic & Soil Health

- Series of webinars and publications
- Review relevant research
- MANY webinars: [conservationwebinars.net](http://conservationwebinars.net)



<http://ofri.org/news/register-now-free-webinar-series-soil-health>





### Cover Crop Considerations

- Many purposes – weed control, nutrient management, soil health, etc
- If using as key weed control tool, consider higher seeding rates for weed suppression (1.5-3x)
- Ensure inoculants are not GMO and OK with certifier



## Interseeding

- Earlier seeding for more canopy cover, weed suppression to help reduce tillage
- Consider higher seeding rate to overcome light, nutrient competition (clover, rye can tolerate some shade)
- Red clover, radish into corn?  
Last cultivation? V5 (WI)?



"Interseeding cover crops into V5 corn." University of Wisconsin

## Termination



## Termination

- Varies based on crop, equipment and objective (ex: N, pollinators, etc)
- Opportunities to reduce tillage in organic?
- Mowing, frost, grazing, zone/strip tillage



## Organic "no-till"



## Termination: Roller Crimper

- Big focus in organic nationally
- Mulch on surface to protect against erosion and rain impacts (ex: soybeans into rye)
- Timing important to prevent regrowth: early flowering for effective termination



## Termination: Roller Crimper

### Challenges:

- early season termination with sufficient biomass (ex: 8-10 k lbs biomass/acre), plant by end of Sept?
- 'Aroostook' rye matures early?
- direct seeding (based on equipment),
- fertility (ex: rye, grains better for weed control),
- on-going weed control



Rolled rye, later mowed 1 time, pic in Aug











## Insect Pest Management

- (1) Augmentation or introduction of predators or parasites of the pest species;
- (2) Development of habitat for natural enemies of pests;
- (3) Nonsynthetic controls such as lures, traps, and repellents.



## Insect Management: Prevention

- Crop rotation
- Crop health & variety
- Sanitation
- Materials – most temporary, cost?



<https://attra.ncat.org/attra-pub/biorationals/>



## Weed Management

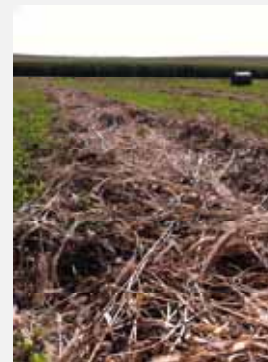
- (1) Mulching with fully biodegradable materials;
- (2) Mowing;
- (3) Livestock grazing;
- (4) Hand weeding and mechanical cultivation;
- (5) Flame, heat, or electrical means; or
- (6) Plastic or other synthetic mulches:

*Provided, That, they are removed from the field at the end of the growing or harvest season.*



## Weed Management

- Often cited as top barrier to organic production
- Goal is to reduce weed competition and reproduction to acceptable level. *NOT* completely eliminate weeds.
- Integrated/multiple tools approach



## Weed Management: Prevention

- **Crop rotation** - vary crop, growth periods, perennials v annuals
- **Cover crops** – suppress weeds, allelopathic chemicals to reduce weed emergence & growth
- **Mulch**
- **Competitive, healthy crops** – not excessive fertility, spacing
- **Minimize weed seed production**



## Weed Management – Reduce Tillage?



## Flame Weeding

- Better on broadleaf v. grasses & immature (<2in)
- Corn and soybean can tolerate flame weeding - visual crop injury doesn't necessarily imply yield loss
- Corn was tolerant at each V2, V4 and V6
- Soybean was tolerant at VC and V5 stages
- Combination of flaming and cultivation?



Professor Dr. Stevan Knezevic, University of Nebraska



## Innovations in Weed Management

### Grit

- Many materials (coffee, walnuts, olive pits)
- Similar cost to flame (more than tillage, but no soil disturbance)
- Focusing on in-row weed control
- Use in vegetables/high value crops?







## Soil fertility & nutrient management



## Soil Fertility & Nutrient Mgt

- a) ...minimize soil erosion
- b) ...(use) rotations, cover crops, and the application of plant and animal materials
- c) ...manage plant and animal materials to maintain or improve soil organic matter content



## Manure Standard

- Crop for human consumption—raw manure incorporated at pre-harvest intervals:
  - 90 days if edible portion does not have contact with soil
  - 120 days if edible portion does have contact with soil particles
- “Conventional” manure
- No PHI if composted to 131 for 3 days



## Micronutrients

- Before applying micronutrients (ex: zinc, magnesium and boron), soil deficiencies must be documented through soil tests, plant tissue tests, observing the condition of plants, or evaluating crop quality at harvest.



## Nutrient Management

- Maintaining soil fertility and replacing nutrients removed at harvest are inherent challenges in organic production.
- Focus on maintaining / building soil nutrient pool.
- High soluble synthetic sources not available



## Nutrient Management

- Most organic N sources have lower N % than synthetic and release less of total N in first season
- Well-composted amendments=slow decomposition and <PAN
- Organic fertilizers such as blood meal and feather meal are higher in N and will provide ~75% of their N in the first year

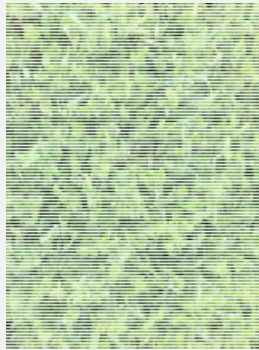
Table 2. Typical nitrogen availability for uncomposted animal manures.

Type	Typical Nitrogen Content percent dry weight	Nitrogen Availability <sup>a</sup> percent
Broiler with litter	4-6	40-70
Laying hens	4-6	40-70
Sheep	2.5-4	25-50
Hatibull	2.5-5.5	20-40
Beef	2-3	20-40
Dry stock dairy	1.2-2.5	20-40
Squealed dairy	1-2	0-20
Horse	0.8-1.6	0-30

<sup>a</sup> Nitrogen available in the first growing season after application.

## Nutrient Management

- Credit contributions from cover crops and mineralization from previous applications of manure/compost
- Cover crops can address N-P “challenge” when manure used
- If not using manure for P – rock phosphate, bone meal



## Natural Resources & Biodiversity

- “maintain or improve the natural resources of the operation, including soil and water quality.”
- “natural resources of the operation” defined as *soil, water, wetlands, woodlands, and wildlife.*”
- Guidance: Natural Resources and Biodiversity Conservation (NOP 5020)
- Examples that demonstrate compliance with this broad section

Topics	NRCS Assistance May Be Available	Examples of Activities <sup>1</sup>
Examples Relevant to All Types of Organic Certification:		
Soil Stability and Water Quality	<input checked="" type="checkbox"/>	Creating, conserving, and restoring vegetative covers (forests, shrublands, woodlands, grasslands, riparian areas, and wetland areas) that control erosion and filter nutrient, pesticide, and pathogen pollutants. Minimizing disturbances, maximizing diversity, living roots and cover.
	<input checked="" type="checkbox"/>	Using no-till or permanent cover, conservation tillage, terracing, contour farming, micro-irrigation, windbreaks, cover crops, grass waterways and soil health practices.



## Natural Resources & Biodiversity

- Categories covered: soil composition, soil stability & water quality, water quantity, wildlife benefits, native species & natural areas.

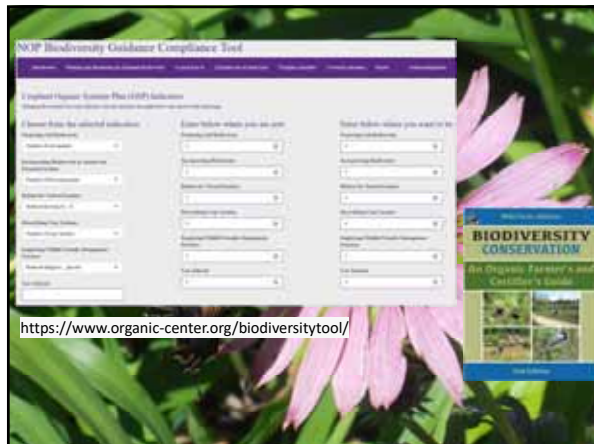


## Natural Resources & Biodiversity

- Link with NRCS
- Producers can refer to NRCS conservation plan or contract in OSP to show compliance

	<b>NATURAL RESOURCES</b>	Section <b>C6</b>
Electronic versions available at <a href="http://www.nrcs.org">www.nrcs.org</a>   Page 1 of 2		
<b>5.1 CONSERVATION AND NATURAL RESOURCE MANAGEMENT</b>		
1) Do you have a current conservation plan or contract with the USDA Natural Resources Conservation Service (NRCS), or other conservation agency? <input type="checkbox"/> Yes <input type="checkbox"/> No (proceed to question 2)		
If yes, please list the conservation practices that you are implementing from your plan on your operation:		
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## Avoid Contamination

- Precautions (protocols, records) are important in split operations, REALLY important in parallel.
- Considerations:
  - Custom work/contracted
  - Seeding equipment – clean out (compressed air?) especially treated seed
  - Harvest equipment (purge combine with row of organic?)
  - Transportation equipment and storage

## Post-Harvest

- Harvest, storage bins, other containers clean and free of any residue from conventional crops (soap & water, chlorine (at safe drinking levels) & water to sanitize)

