Cropping Practices that Influence Weed Management

John Cardina
Ohio State University
cardina.2@osu.edu

Two goals:
1. Don’t let weeds emerge.
2. Don’t let escaped weeds produce seeds.

Crop Rotation
Changing crop sequences to create an unstable and inhospitable environment for weed establishment and survival –

- resource availability
- allelopathic effects
- soil disturbance
- soil fertility
- mechanical damage

X time

Easy to cultivate
Fibrous roots
Competitive cultivar
Fast seedling growth
Dense canopy

Smother seedlings
Allelopathy
Mixed root structure
Crop Rotation Impacts:

**UNSTABLE CONDITIONS**
- Crop type - canopy shape, shading etc
- Chemical environment - fertility, allelopathy
- Physical environment - temperature, light, moisture
- Timing of all field operations - planting, tillage, cultivation, harvest etc.

**Crop Competition**
- 50% of weed control
- Variety selection
- Resources - fertility, water, row spacing, seeding rate
- Soil management

**Allelopathy**
- Leaching from leaves
- Transformation by microorganisms in the soil
- Emission from roots
- Decomposition of plant litter
- Release or transformation

**Cover Crops**
- Physical & chemical suppression
- Rye
- Hairy vetch
- Grass-legume

**Cover Crops**
- Killed, mowed
- Incorporated
- Surface residue
- Buckwheat
- Crimson clover
- Mustard

**Smother Crops**
- Red clover
- Winter-pea
- Sorghum-sudangrass
- Oats
| Mustard smoother crops | Prevent weed emergence:  
| Corn                  | physical suppression  
| Soybean               | shade                 
|                       | allelopathy           

Prevent weed emergence:  
- cover & smoother crops  
- crop competition  

Prevent weed seed production:  
- crop competition