



COVERCROP

VEGETABLE PRODUCTION TRAINING

Session 6

Cover crops in vegetable systems, Part I

UofA DIVISION OF AGRICULTURE
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Outline

- Plasticulture vs. No-till vs. Strip-till
- High tunnels
- Pollinators importance
- Cover crops are required for organic production systems



Cover Crops for Vegetable Production

- High values crop production
 - Returns of >\$4,000-20,000/acre
 - Can afford the cost of cover crops
 - Little year round production so can fit cover crops into system of production
- **Summer vs. winter** cash crops
- Small to large scale of horticultural production
 - Ability to rotate crops on small plots
 - What equipment do growers have on hand




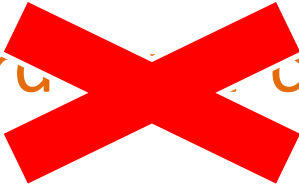



Planning for Cover Crops in Horticultural Production

- **Choose cover crops that fit in the existing cropping system**
 - Members of the *Brassicas* and *Legumes* are also horticultural cash crops.
 - Use drive rows for cover crops
 - Use marginal land for beneficial habitat
 - Use cover crops that fit the crop timing
 - EX. The market demands that watermelons be ready before July 4th
- Example

Plan to use cover crops in a no-till watermelon system. Need a grass to head out early enough in the spring to easily roller terminate and be able to plant on time in late-March to early April. Will the soil be warm enough at that time?



Crop Rotation Examples

- Clover + Cereal Rye cover crop (Winter) -> Tomato 
(Summer) -> Mustard  crop (Late summer)->
Fall Kale Crop 
- Clover + Cereal Rye cover crop (Winter) -> Tomato 
(Summer) -> Japanese millet (45 days)(Late
summer)-> Fall Kale Crop 
- Avoid the same plant families one after the other.



Cover Crops in Plasticulture Vegetable Systems

- Cover crops will be used for Nitrogen and soil organic matter contributions under the plastic and/or weed control in the row middles.
- **Time:** Cover crops can be integrated into crop rotations between cash crops
- **Soil Management:** cover crops should be incorporated into the soil prior to laying plastic.
 - **Tillage or Strip-tillage**
 - Generally 2-4 weeks is enough time for the biomass to break down



Cover Crops in No-Till Vegetable Systems

- **Why?** Reduce reliance on plastic and soil disruption via tillage and cut input costs associated with laying and removing plastic
- **Time:** Success is dependent on the biomass produced if the cover crops is to be used as a weed mat/ green mulch before cash crops
- **Soil Management:** cover crops should be terminated and allowed to die down before the cash crop is transplanted, Preference for rye as wheat has been shown to break down more quickly ²



Cover Crops in No-Till Vegetable Systems

- No-till mulches rarely result in season long weed control -> Challenge for organic producers
- Cool soil temperatures under the biomass -> Use transplants to help with delays and achieve more rapid canopy closure (not feasible with all crops)
- Must wait for appropriate crop timing to terminate, which may delay planting
- Use drip irrigation to combat possible moisture competition between the cover crop and cash crop
- May need to supplement Nitrogen to compensate for high C:N cover crop residues
- May need to reduce between row spacing so the crop canopy can close and help shade out weeds



Strip-Tillage

Combines no-till and plasticulture production

- *Cover crop is left standing in the row middles*
- *Cover crop is mowed and tilled into the soil where the beds will be laid*

(+) Weed coverage in row middles, warm soil to transplant into

(+) Reduced tillage across the field.

(-) Will need to supplement weed control next to the beds where soil is disrupted.

Example: Watermelons

- *Winter cover crops planted to precede spring planted melons*
- *Cover crop in row middles provides a wind-break and weed control. The grass will die down naturally or can be rolled after plants establish*



High Tunnels

- **High Tunnels extend the growing season**
 - Accumulation of salts in the soil
 - Very hot temperatures in mid-summer
 - Too cold or short days in mid-winter
- **Cover crops grown in high-tunnels**
 - Can accumulate salts
 - Crop can be removed
 - Can withstand hot temperatures
 - Opportunity for crop rotation
 - May require specialized equipment
 - Will require irrigation



Pollinator Strips

- Cucurbits in particular require pollinators for good fruit set
 - Native pollinators have been demonstrated to be as or more effective pollinators than honeybees for certain crops.
- Pollinator strip flowering should be synchronized with cash crop flowering
 - Mixes preferable due to differences in pollinator preferences
- Opportunity for Agritourism operations
 - Some cut flower production
 - Sunflowers are good at smothering weeds and salt accumulators



Organic Requirements for Cover Crops

The National Organic Program Rule: Soil fertility and crop nutrient management practice (§205.203)

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

- Required crop nutrient and soil fertility management practices:
 - Crop rotations (perennials as an exception)
 - Cover crops
 - Application of plant and animal materials
- Organically grown seeds must be used, unless the producer can demonstrate lack of commercial availability or prohibitive cost ([CFR 205.204](#)).
- If a grower can demonstrate a lack of availability, they may use conventionally-grown, untreated seed.
 - *Should consult their certifier prior to proceeding*
 - Must have support documentation
 - **GMO seed is never allowed**



Take Home Message

- Cover crops can benefit horticultural crop production
- There are specific considerations unique to vegetable production systems that require careful planning to successfully integrate cover crops



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Resources and Sources

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**Free SARE guide
for organic farms
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rotations**

