Cover Crops for Vegetable Growers

2012 Illiana Vegetable Growers’ School

Tristand Tucker
Specialty Crops System Specialist
Throckmorton Purdue Agricultural Center
• Cover crop choices

• Considerations for including cover crops on crop rotation

• Example vegetable rotation using cover crops
Cover Crops after July 15
(Midwest Cover Crop Council)

• Grasses
  – Oats
  – Cereal Rye
  – Annual ryegrass
  – Wheat
  – Sorghum x Sudan grass

• Brassicas
  – Oilseed radish
  – Mustards

• Broadleaf non-legume
  – Buckwheat
Cover Crops after July 15
(Midwest Cover Crop Council)

• Legumes
  – Clovers
    • Sweet
    • Berseem
    • Crimson
  – Annual Alfalfa
  – Field pea
  – Hairy Vetch
Spring/Summer Cover Crops

• Buckwheat
  – $30-40/A
  – Weed suppression
  – Fast growing
  – Easy to kill
  – Kill before seed production

• Sorghum x Sudan grass
  – $25-35/A
  – Weed suppression
  – High biomass production
  – Can be used as forage
  – Winter kills
  – N scavenger
Spring/Summer Cover Crops

• Hairy vetch
  – $35-75/A
  – N producer (90-200#)
  – Weed suppression
  – Soil builder

• Berseem clover
  – $20-40/A
  – Weed suppression
  – N producer (75-220#)
  – Winter Kills
  – Frost susceptible
Fall/Winter Cover Crops

• Oats
  – $25-35/A
  – Quick growth
  – N scavenger
  – Weed suppression
  – Winter kills

• Cereal Rye
  – $25-35/A
  – Weed suppression
  – Durable residue for no-till planting
  – High biomass producer
  – N scavenger
Fall/Winter Cover Crops

- Tillage radish
  - $25-30/A
  - Weed suppression
  - Winter kills
  - Potential bio fumigant
  - N scavenger
  - Plant later in fall
  - Increase earthworm activity
  - Break compaction
Fall/Winter Cover Crops

- **Austrian Winter Peas**
  - $50-75/A
  - N producer 90-150 lbs N
  - Weed suppression
  - Quick growth
  - Winter kills (depends on temperature and snow cover)

- **Wheat**
  - $20-30/A
  - N scavenger
  - Potential as cash crop/forage
  - Weed Suppression
  - Soil Builder
Suppliers

• Local Coop
• Cisco Seeds, IN
• Albert Lea seedhouse, MN
• Johnny’s Selected Seeds, ME
• Fedco Organic Growers Supply, ME
• Seeds of Change, CA
• many others
Management of Cover Crops and Rotations
Management

• Continue rotation standards
  – Rotate between crops with different pest
  – Rotate between growth habit/management styles
    • Plastic beds, row crops
    • Vines with upright plants

• Consider a cover crop as a ‘crop’ when making rotations
Crop Botanical Family

- **Apiaceae**
  - Carrot
  - Celery
- **Asteraceae**
  - Lettuce
- **Brassicaceae**
  - Broccoli
  - Brussel sprouts
  - Cabbage
  - Radish
  - Turnip
  - **Oilseed Radish**
- **Chenopodiaceae**
  - Beet
  - Spinach
- **Cucurbitaceae**
  - Cucumber
  - Muskmelon
  - Pumpkin
  - Squash
  - Watermelon
- **Fabaceae**
  - Green Bean
  - Peas
  - **Hairy Vetch**
  - **Clovers**
- **Liliaceae**
  - Garlic
  - Onion
- **Poaceae**
  - Sweet corn
  - **Cereal Rye**
  - **Oats**
  - **ryegrass**
- **Solanaceae**
  - Eggplant
  - Pepper
  - Potato
  - Tomato
- **Polygonaceae**
  - **Buckwheat**
Cover crops and N

• Accumulate or fix up to 200+ lbs N


• N mineralization peaks 2-4 wks after killing under ideal (warm, moist, oxygen) conditions

• Slower mineralization with grass and legume crop mix
Pest of cover and vegetable

- Root-knot nematodes,
- Soybean cyst nematodes
- Pin nematodes
- Root lesion nematodes
- Sting nematodes
- Cutworms

- Potato leaf hopper
- Pea weevil
- Club root disease
- Cabbage root maggot
- Aphids
- Flea beetles
- Others
Seeding

- Drill
  - Best method

- Aerial
  - Great for earlier seeding into standing crops prior to harvest

- Broadcast
  - Fast, cheap, can be combine with fertilizer application
  - Establishment issues
Broadcast Seeding

• Work at Meigs fall 2011, and in USDA-ARS Salinas, Ca (Brennan, Eric; Leap, Jim.)
• Broadcast seeding followed by lightly covering soil works best
• Rough till prior to seeding, heavy rain, culti-packer, harrow after seeding
Management

- Killing
  - Allow 2-4 weeks between killing and planting cash crop
  - Kill after goal is accomplished and prior to cover crop becoming a problem.
  - Burn down with nonselective herbicide (glyphosate, mix with 2-4D for broadleaves)
- Tillage
  - Moldboard plow
  - Rotary tiller
  - Disc
  - Some covers can be difficult to complete kill with tillage unless there is complete burial or pulverization of crop
    - Moldboard Plow
    - Multiply rotary tiller passes
Killing method depends of Cash crop planting method

– Plastic
  • Completely bury (moldboard plow) residue
  • Till 2-4 weeks ahead of plastic laying to allow decomposition of residue
  • Residue to cause problems when laying plastic

– Direct seeding, bare ground transplanting
  • Seed corn maggots can be a problem
  • Allow for sufficient decomposition prior to planting.

– No-till
  • Early Burn down
  • Mowing
  • Rolling
Other considerations

• Results vary from year to year and farm to farm
• Kill at correct time
• Additional management required
• Consider crops needs and limitations
• Pay attention to crop and pest interactions
• Start small, try different covers see what works for you
Example Rotations Using Cover Crops
Staggered Crop planting dates

• Winter killed cover for early planting dates
  – Oats, Radish, Annual Clover, Sorghum Sudan Grass, Annual Alfalfa

• Winter hardy or quick cycle following winter killed for later planting dates
  – Cereal Rye, Hairy Vetch, Wheat, Annual ryegrass, Clovers
  – Buckwheat, Oats
Vegetable/Grain Crop Rotations

• Vegetables
  – Oats/Tillage Radish
• Corn
  – Cereal rye
• Soybeans
  – Hairy Vetch/Cereal rye
  – Berseem Clover/Oats
  – Oats/Tillage radish
Short Season Crop Rotations

• Spring crop
  – Cabbage, Lettuce, Carrots, Peas

• Summer Cover
  – Buckwheat
  – Sorghum/Sudan

• Fall Cool Season
  – Cabbage, Broccoli, Carrots, Peas
  – Interseed annual ryegrass, cereal rye, clover
Intensive Vegetable Crop Rotations

- Solanacea-Tomatoes/Peppers
  - Plastic beds
  - Oats/Radish, Rye/vetch
- Sweet Corn
  - Cereal rye/winter killed legume after harvest
- Cucurbits-Melons/Squash
  - Plastic beds
  - Oats/Radish, Oats/Berseem Clover after final harvest
- Cabbage/Broccoli/Spring-Fall Crops
  - Buckwheat between crops in summer
  - Ryegrass, Wheat, Rye, Oats after harvest or seeded prior to harvest
- Green Beans/Peas
  - Sorghum x Sudan and Pea, Vetch, Clover
Austrian Winter Peas
Cereal Rye/Radish
Oats/Radish
Austrian Peas/Sorghum Sudan Grass
11-8-2011
Austrian Peas/Sorghum Sudan Grass
11-8-2011
Additional Information

• Knotts Handbook for Vegetable Growers
• Managing Cover Crops Profitably
• Northeast Cover Crop Crop Handbook
• http://www.sarep.ucdavis.edu/ccrop/
• http://www.mccc.msu.edu/
• http://mcccdev.anr.msu.edu/
References