Cover Crops for Organic Production

Dr. Gary Bates
Forage Specialist
Plant Sciences

Cover crops

- Any plant(s) grown as ground cover. Generally used to improve some condition associated with sustainable agriculture.
  - Pests
  - Soil fertility
  - Soil structure
  - Water

Cover crops

SOIL FERTILITY
- nitrogen
- phosphorous
- potassium

PESTS
- weeds
- insects
- disease

SOIL STRUCTURE
- organic matter
- soil erosion

WATER
- water infiltration

• Soil erosion
• Soil fertility
• Water

Cover Crop life cycles

Cool-season
- annuals
- perennials

Warm-season
- annuals
- perennials

Life Cycles

Annuals
- germinate, grow, bloom in 1 growing season
- usually easier to kill

Perennials
- live more than one year
- more difficult to kill

Life Cycles

Cool season plants

- Germinate, begin to grow
- Bloom
- Water infiltration
Life Cycles

**Warm season plants**

![Diagram showing life cycles of warm season plants]

Cover Crop life cycles

- Cool-season
  - Annuals
  - Perennials
- Warm-season
  - Annuals
  - Perennials

Legume species

**Perennials**
- White
- Red
- Alfalfa

**Annuals**
- Arrowleaf
- Berseem
- Persian
- Subterranean
- Crimson
- Vetch
- Austrian winter pea

Non-legume species

**Perennials**
- Rye
tall fescue
orchardgrass

**Annuals**
- Wheat
- Oats
- Annual ryegrass
- Brassicas

SOIL FERTILITY

- Nitrogen
- Phosphorous
- Potassium

Yield of KY-31 tall fescue with N or clovers

Athens, GA - 3 yr avg

![Graph showing yield with different N levels]

Tall fescue yield when overseeded with clovers - Mississippi

Yield of tall fescue overseeded with annual and perennial clovers - Mississippi

Effect of N rate on sweet corn yield, 2004

Effect of N rate on sweet corn yield, 2006

Effect of cover crop on weed biomass

PESTS
- weeds
- disease
- insects
Effect of mulch on barnyardgrass biomass

Effect of mulch on pea yield

Seeding rate effect on ground cover

Planting method effect on ground cover

Seeding rate effect on rye biomass

Planting method effect on rye biomass
Brassicas as biofumigant

Effect of Brassica leaf tissue on *Rhizoctonia solani* growth

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control   cabbage   mustard   indian mustard   kale
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Effect of leaf tissue on *Pythium ultimum* growth

```
control   cabbage   mustard   indian mustard   kale
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Effect of Indian mustard on *Sclerotium rolfsii* growth

```
0.0 0.10 0.20 0.61 1.02 2
Grams fresh wt of Indian mustard/Liter
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Species For Cover Crops

White Clover

- widely adapted
- difficult to kill
- easy to establish
- inexpensive
- living mulch
Red Clover
- widely adapted
- easy to establish
- tall growing
- more drought tolerance

Arrowleaf Clover
- annual
- good reseeder
- upright growing
- yields well
- late maturity
- limited cold tolerance

Crimson Clover
- annual
- widely adapted
- early maturity
- late winter/spring production
- crown rot potential

Subterranean Clover
- annual
- good reseeder
- limited cold tolerance
- forms thick mat

Turnips
- annual
- easy to establish
- inexpensive
- biomass
- biofumigant

Annual Grasses
- wheat, rye, oats, annual ryegrass
- maturity differences
- cold tolerance
Rye vs Annual Ryegrass

Yield of cool-season annual grasses

Considerations
- Crop to be planted
- Maturity differences between cover species
- Ease of killing
  - mowing vs rolling
- Nitrogen
- Weed control
- Disease