



# Cover Crops

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## What is a Cover Crop?

1. Farming practice that imitates nature
2. Soil armor
3. Conservation practice
4. Green manure
5. Beneficial insect habitat
6. All of the above

## What You Will Learn About Cover Crops

- The many benefits
- Possible disadvantages
- How they work
- Choosing a cover crop
- Planting a cover crop
- When to mow or incorporate a cover crop

## Benefits of Cover Crops to Soil Structure

- Increase soil organic matter content
- Better soil aggregation
- Better water infiltration
- Improved water-holding capacity
- Improved aeration
- Reduced soil erosion
- Reduced soil crusting and compaction

## Benefits of Cover Crops to Soil Fertility

- Nutrient cycling
- Nitrogen additions by legumes
- Enhanced phosphorus availability
- pH buffering
- Energy and food source for soil biota

## Benefits of Cover Crops to Pest Management

- Habitat for beneficial insects
- Weed suppression
- Some cover crop species suppress nematodes

### Benefits of Cover Crops to Environmental Quality

- Reduce erosion
- Reduce nitrogen leaching
- Reduce surface water runoff
- Some species accumulate metals

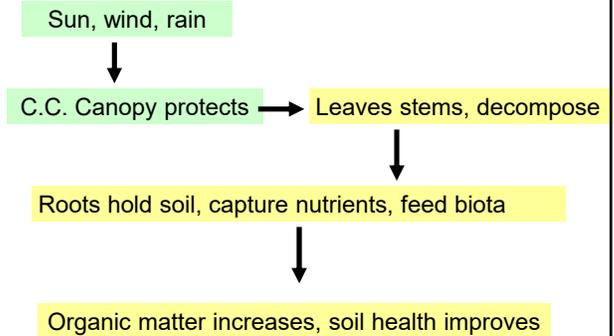
### Benefits of Cover Crops to Soil Temperature

- Soil bacteria die at 140F
- Bare soil temperature can go over 140F during summer
- 100% of soil moisture loss due to evaporation at 130F
- At 100F 15% of soil moisture used for growth and 85% evaporation and transpiration
- At 70F nearly 100% of moisture used for growth

### Possible Disadvantages of Cover Crops

- Cover crops delay soil warming and drying in spring which can delay tillage
- Waiting too late to incorporate in spring
- High C:N ratios of mature grass or cereal crop residues can limit N availability
- Cover crop can act as a host of pests
- Extra cost for seed

### How Does a Cover Crop work?



### Selecting a Cover Crop

- Identify the primary reason or function
  - Soil protection
  - Nitrogen accumulation
  - Weed reduction
  - Pathogen suppression
  - Aeration
  - N scavenging
  - Organic matter addition

### Selecting a Cover Crop

- Is the seed available
- Will it grow in our climate (max-min temps)
- Will it adapt to my soil and drainage
- Will it decompose rapidly in spring
- What is the growth habit
- Is a mix good for me

### Annual Grasses

- Annual ryegrass
- Barley
- Oats
- Triticale
- Wheat

### Ryegrass Bean Mix



### Ryegrass and Bean Mix



### Broadcast and Drill Seeding



### Triticale



### Ryegrass Cover Crop in Perennial Crop



## Legumes

- Austrian Winter Pea
- Bell Bean
- Crimson clover
- Sub clover
- White clover
- Hairy vetch

## Red Clover



## Hairy Vetch



## Field Pea



## Crimson Clover



## Austrian Winter Pea



### Crimson Clover in Perennial Crop



### Other Options

- Mustard
- Medic
- Rape seed, Canola
- Buckwheat
- Daikon (radish)

### Mustard and Fava Bean



### Annual Cover Crop

- Winter cover crop: plant early enough to get good stand, September early October
- Summer cover crop: plant when soil warms but moisture still available, May
- Cut down or till at least 3-4 weeks before planting garden crops

### Perennial Cover Crop or in Perennial Systems

- Plant to protect soil during rainy season
- Keeps alleyways clean for winter work, keeps dust down in summer
- Can compete with perennial crop for moisture

### Fertility for Cover Crop

- Cover crops need fertility to produce dry matter and big root systems
- Fertilize grasses with N as you do your lawn, and apply P, Ca, S, for legumes
- Compost is great for your garden soil and the cover crop

## Planting Cover Crops

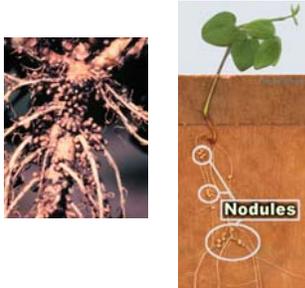
- Prepare a good seedbed by mowing and cultivating garden site (broadcast or drill)
- Small seeded legumes need a smooth seed bed
- Grasses and legumes need a light cover of compost, soil, or straw to germinate well
- Large seeded legumes need to be at least a half inch into soil to germinate

## Cover Crop Seeding Rates

- Grass and cereal grains: 1-8 lbs/1000 sq ft
- Legumes: 1-2 lbs/ 1000 sq. ft.
- Most seeds and mixes have seed rate recommendations on the bag

## Inoculate Legume Seed

- Beans, peas, vetch, alfalfa, trefoil all will fix more N with a bacterial inoculant
- Seeds and inoculants can be purchased at farm stores, or ordered from catalogs



## Cereal Grasses Forage Deeply

- Cereal root systems break soil to channel moisture, and air
- Help pull mineral nutrients from deep in the soil back toward the surface (2-4')
- Fibrous root systems help create biomass within the soil

## Ryegrass Root System



## Allelopathy in Cover Crops

- Chemical suppression from root exudates
- Can restrict weed seed germination, growth
- Ryegrass produces from roots
- Mustard and Canola root exudates inhibit harmful soil fungi in fruit tree replant

## Research Odds and Ends

- Tomatoes growing in Hairy vetch cover residue grew more vigorously and the fruit was more nutritious and better tasting
- Cover crops are “breakers” they disrupt the reproductive cycles of disease, insects, nematodes
- Cover crops provide beneficial insects with habitat and alternate food sources

## Cover Crop Used in No-till



## Cover Crop Used in Bed System



## Relay Inter-planting

- You can plant a cover crop with your vegetable garden late in summer if:
  - Your garden soil is fertile
  - You are watering enough for both crops
  - Inter-planting gives you a head start
  - Soil is still warm to germinate seed

## Interplant Cover Crop



## Use Cover Crops to Protect Your Soil!

