



Cover Crops

Steve Renquist



Douglas County Master Gardener Program

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

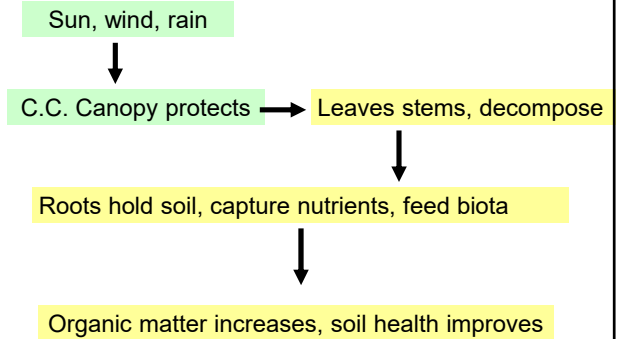
Benefits of Cover Crops to Soil Temperature

- 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

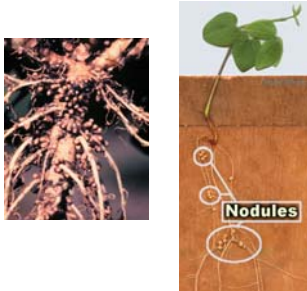
- Prepare a good seedbed by mowing and cultivating garden site (broadcast or drill)
- Small seeded legumes need a smooth seed bed
- Grasses and legumes need a light cover of compost, soil, or straw to germinate well
- Large seeded legumes need to be at least a half inch into soil to germinate

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!

