

## Sustainable Ground Cover Crops

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Cover Crop: grown mainly to prevent soil erosion by covering the ground with living vegetation and roots.

Green Manures: usually grown to help maintain soil organic matter and increase nitrogen availability.

Catch crop: grown to retrieve available nutrients still in the soil following a marketed crop, prevents nutrient leaching.

These 3 terms are used somewhat interchangeably.

Cover crops are multifunctional:

Add organic matter, enhance mycorrhizal numbers, add N (legumes), suppress weeds, suppress nematodes, reduce erosion, increase infiltration of water, decrease nutrient loss, and attract beneficial insects.

Cover crops can break up crop rotations.

### Soil Building Rotation

Year 1	Immature grain and legume combination for Nitrogen Accumulation in the crop biomass and nodules	Interplant a mixture of cold weather grains & legumes harvest while still immature	Main Season Crop planted in time to go to maturity	Oats & field Peas	Vegetable Crop
Year 2	Mature Grain crop for calories & mature biomass	Cold weather grain planted and harvested at maturity	60 day catch crop planted and harvested afterwards	Cereal Rye or Wheat	Fast maturing Beans or immature compost crop
Year 3	Mature Legume for Soil Nitrogen Resting	Legume planted and harvested at maturity	60 day catch crop planted and harvested afterwards	Fava Beans or Soybeans	Amaranth or immature pearl millet

Cover Crops can also be grown to feed carbon to your compost pile.

Crop	Pounds Carbon per 100 Sq ft
Alfalfa- Perennial 5-6 cuttings	44
Sorghum	25
Clover, medium red	25
Field Corn	24

Fava Beans	18
Quinoa	18
Rye	12
Oats	12
Barley	12
Sweet Corn	12

## Types of cover crops:

Winter vs. Summer

Legume vs. non-legume

Annual, Biennial, or Perennial

Intercropped

Covercrop mixtures (often a legume & non-legume grass)

## Legumes:

Annuals: Field peas & Cow peas

Biennials: Sweet clovers

Perennials: Alfalfa, Red & White clovers, Medics

- Fix Nitrogen
- Reduce Erosion
- Less residue, shorter time to grow
- Less organic matter accumulates

Vetch

Field Peas

Clovers

Inoculant

Non-legume cover crops: Grasses, Brassicas / Mustards, Buckwheat

- Reduce erosion
- Produce large amounts of biomass
- Scavenge nutrients
- May immobilize nitrogen
- Do not add nitrogen to the soil

Grasses:

Oats

Barley

Sorghum Sudangrass

Winter Rye

Buckwheat

Tillage / Oilseed Radish

Green manure & cover crops growing options:

- Overwintering cover crop = Early harvest of main crop followed by late cover crop planting
- Early cover crop = late planting of main crop
- Main crop cover crop = Green Fallow
- Undersown / Interseeded cover crop = growing with your main crop, helps prevent weed pressure (usually planted around July 1<sup>st</sup>)

For resistance to foot traffic: dwarf white clover or vetch

Under corn: soybeans, sweet or red clover

Before potatoes: soybeans or sweet clover

Soil Protection that winter kills: Spring oats, spring barley

For the latest fall planting in cold climates winter wheat or winter rye

Smother crops: Winter rye & Buckwheat

Cover Crop considerations:

- Timing
- Time of incorporation
- Rotational fit
- Feed value (with livestock)
- Beneficial insect habitat
- Cost ex.

Vetch 250# of N / Acre fixed

- Vetch \$60 (30# at \$2/#)
- Compost \$800 (at \$20/yd and 1% N)
- Re-Vita Pro (Fancy Compost Amendment) \$1800 (at \$18/50#)
- Poultry Litter (4-3-2) \$540 (at \$180/ on)

Establishment considerations:

Broadcast seeding vs. Drilling

Water Management: Irrigation? Timing?

Termination & Incorporation

Biennial & Perennial crops will need to be terminated in order to stop their growth, usually so you can plant a main crop

Options:

- Chemical (not recommended)
- Mechanical: Tillage, Roller Crimper or Mowing

Crop residue will need to be managed, one usually needs to wait 7-14 days after a cover crop has been terminated before re-planting

Cover crops that winter kill (terminated by winter):

- Field Peas
- Cow Peas
- Oats
- Buckwheat
- Oilseed Radish
- Spring Wheat

## Drawbacks of using cover crops:

- More time & management
- Spring & fall workload
- Weed potential
- Potential to harbor pests
- Soil Moisture use
- How to kill / timing of killing

## Tools:

### Power Harrow

- Can be used to terminate crops
- Can also be used in place of a seed drill, spread cover crop seed on the surface and then go over with the power harrow to incorporate seed into the soil

### Scythe

### Flail mower

### Roller Crimper

### Cornercopia Case Study: White Dutch Clover

- Low growing (8-12" tall)
- Competes well with weeds when mowed regularly
- Nitrogen fixing when inoculated = adding nitrogen to the soil
- Small white flowers are great habitat for beneficial insects and pollinators
- Can be walked on when wet or right after it rains with minimal compaction

## Favorite Resources:

UC Davis cover crop database: <http://asi.ucdavis.edu/programs/sarep/research-initiatives/are/nutrient-mgmt/cover-crops>

Managing Cover Crops Profitably <http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition>

Green Manure Cover Crops for Minnesota <http://www.extension.umn.edu/garden/yard-garden/vegetables/green-manure-cover-crops-for-minnesota/doc/M1228.pdf>

Cover Crop Options from MN extension <http://www.extension.umn.edu/agriculture/soils/cover-crops/docs/umn-ext-cover-crop-options.pdf>

Cover Crops for home gardeners

<https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/fs304.pdf>