



Cover Crops

Objectives

Student will learn...

- advantages and uses of cover crops in organic and permaculture farming
- how to choose best cover crops to use in different applications
- different application methods
- different methods of incorporation

Definitions

- Cover Crop: any crop seeded primarily for the purpose of improving or holding soil
- Cash crop: a crop seeded primarily for sale
- Top Soil: the top layer of soil, usually containing the highest proportion of organic matter and nutrients
- Organic matter: nutrient-rich, biologically-derived soil ingredient

Advantages and uses of cover crops

- Cover crops are an excellent way to hold and stabilize topsoil when land is not in use



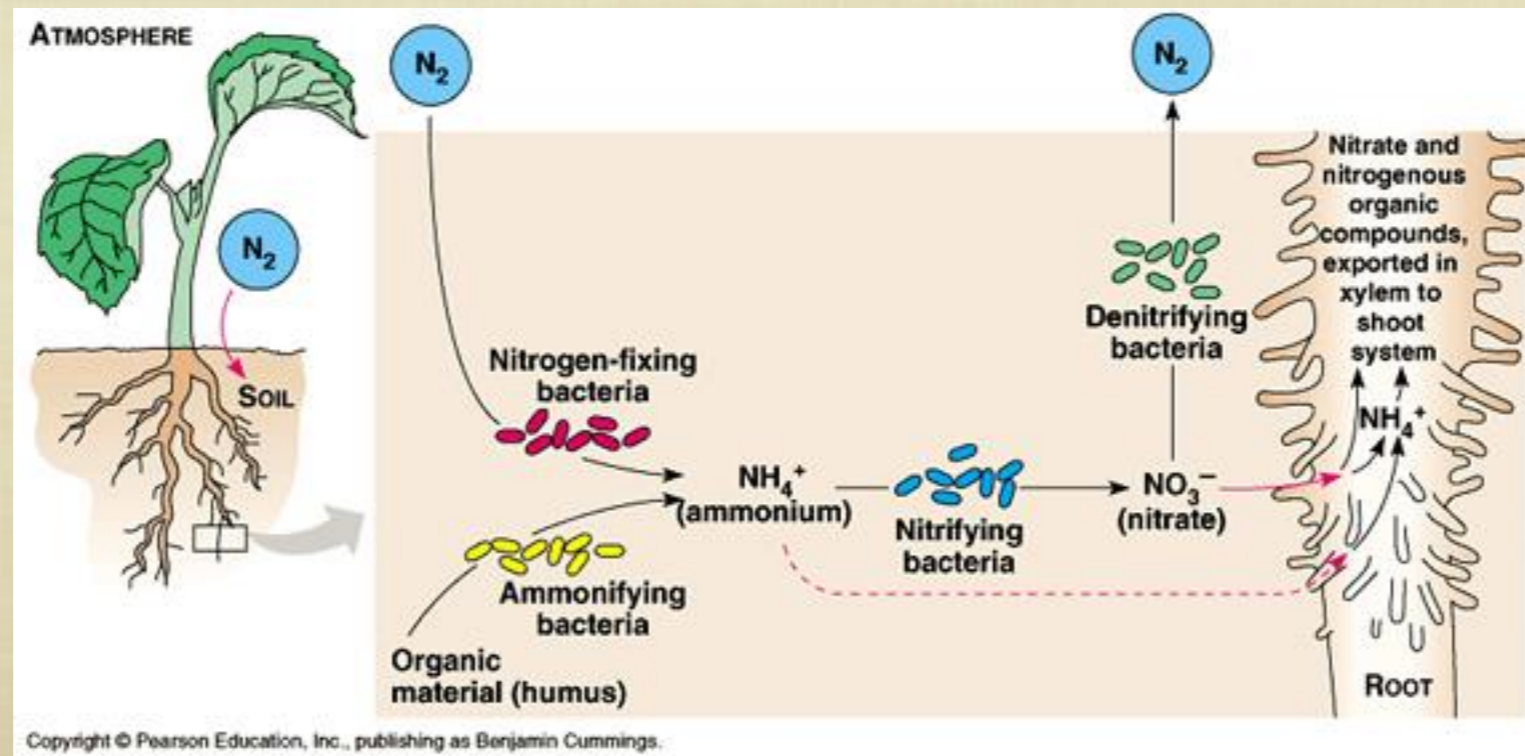
advantages...

- Cover crops with deep roots are frequently used to loosen hard soils



advantages...

- legume-family cover crops can “fix” nitrogen, i.e. make soil-bound nitrogen more available to plants



advantages...

- Once tilled-in, cover crops add organic matter and build soil fertility



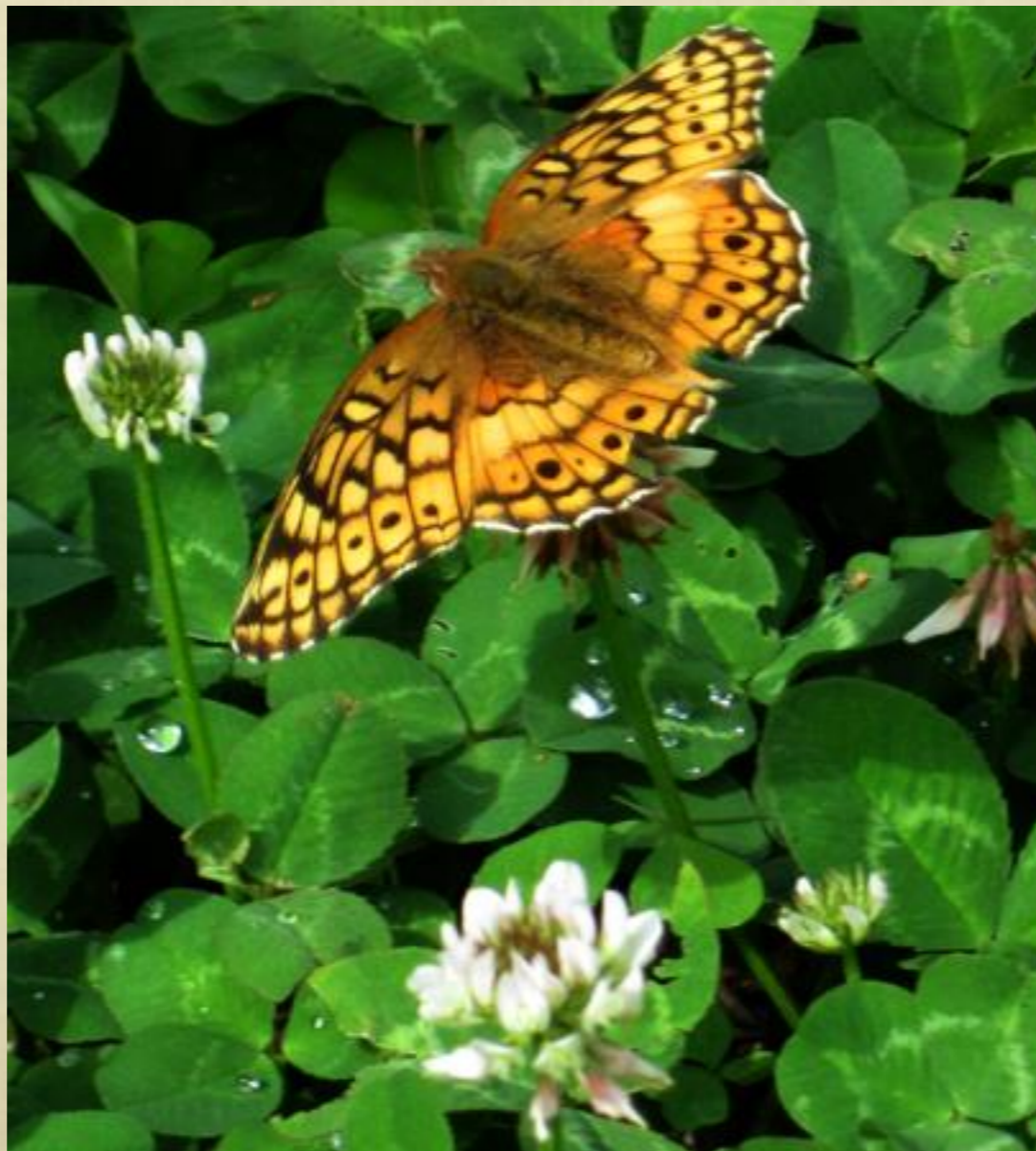
advantages...

- Cover crops are sometimes used as a weed barrier between rows of crops



Advantages...

- Some cover crops can attract beneficial insects



Select cover crops' uses

Cover Crop Chart		Key to Symbols														
		= Excellent = Very Good = Good = Fair = Poor														
	Species	When To Plant	Min Germ Temp	Seeding Depth Inches	Seed Per 1000 sq ft	Pounds Of Seed Per Acre	Hardness To Zone	Legume N Source	Nitrogen Recycler	Chokes Out Weeds	Pounds Organic Matter Per Acre	Forage Or Hay	Attracts Beneficial Insects	Erosion Control	Nematode/Symphylian Control	Soil Builder
Legumes	Summer Alfalfa	Late Summer	45°F	¼-½	½ lb	12-15	5				2000-4000					
	Hairy Vetch	Early Autumn, Spring, Summer	55°F	1½-2½	1 lb	25-40	4				2300-5000					
	Common Vetch	Early Autumn, Spring, Summer	55°F	1½-2½	1 lb	25-40	4				2300-5000					
	Austrian Field Peas	Autumn	40°F	1-3	2-4 lbs	75	7				4000-5000					
	Crimson Clover	Anytime	45°F	¼-½	1-2 lbs	30-40	7				3500-5500					
	Mammoth Red Clover	Early Autumn	40°F	¼-½	½ lb	20	4				4000-6000					
	New Zealand White Clover	Spring/Autumn	40°F	¼-½	¼ lb	6-10	4				2000-6000					
	Berseem Clover	Early Autumn	42°F	¼-½	1 lb	15-20	8				6000-10,000					
	Medic Mix	Autumn-early Spring	45°F	¼-½	1 lb	15	8				1500-4000					
	Fava Beans	Autumn	55°F	1-3	5 lbs	200	7				3500-7000					
Brassicas	Mustard	Early Autumn & Spring	40°F	¼-¾	¼ lb	6-10	7				5000-12,000					
	Radish	Autumn	45°F	¼-½	½ lb	10-12	8				4000-7000					
	Turnips	Autumn	45°F	¼-½	¼ lb	4-6	6				8000-12,000					
Cereal Grains & Grasses	Annual Rye Grass	Early Autumn	40°F	0-½	1 lb	20-30	5				2000-9000					
	Winter Rye Grain	Autumn	34°F	½-2	4-5 lbs	50-125	3				3000-10,000					
	Winter Barley	Late Summer to Autumn	37°F	¾-2	2-3 lbs	75-125	7				2000-10,000					
	Winter Triticale	Autumn	34°F	1½-2	2-3 lbs	60-120	6				6000-8000					
	Winter Wheat	Autumn	38°F	½-1½	3-4 lbs	70-150	4				3000-8000					
	Winter Oats	Autumn	38°F	¾-2	1-2 lbs	50	8				2000-10,000					
	Buckwheat	After last frost	48°F	½-1½	2-3 lbs	50	Not Frost Tolerant				2000-4000					

For holding a soil...

Consider:

How long until you plan to use the soil again for cash crop?

- for short-term (less than 3 months), use buckwheat, oats, tillage radish, sudangrass, turnips, wheat
- for medium-term (3-6 months), use red clover, winter rye, vetch
- for long-term (6 months-several years), use clovers, forage grasses

to loosen hard soils...



- Choose a cover crop with deep tap roots: tillage radish, turnips, clovers
- for permaculture farms, these crops can replace to work of deep tillage machines

To fix nitrogen...

- Choose a cover crop in the legume family: summer alfalfa, clovers, field peas
- Note: these can be used alone or mixed with other crops crops, for example:
 - mix red clover with winter rye to hold a field over winter

To add organic matter...

- Choose a cover crop with high bio-mass, such as sorghum-sudangrass, winter rye, crimson clover
- considerations: the larger a crop, the more difficult it is to incorporate



As a weed barrier...



- In open fields... Oats, vetch, clover
- For between rows of crops... undersow with clover, or ryegrass (could require mowing)

To attract beneficial insects

- Choose cover crops with colorful flowers: crimson clover, vetch, turnips



Cover Crop Application...

Small Scale



<http://youtu.be/uTlhEgUeUK4>

For permaculture and small-scale (less than 1/2 acre) farms, cover crop can be spread easily by hand. Use a quick wrist flick to spread evenly, then rake in...similar to sowing seed for a lawn

Application...medium-size farm

- For larger plots, a hand-held broadcast seed spreader helps spread seed evenly
- Then cultipack seeds to ensure good soil-to-seed contact



<http://youtu.be/jjqIN2mwchY>

Application... larger farms

- Option 1: mount 3-point a drop spreader behind tractor, then cultipack seeds
- Option 2: Purchase or rent a commercial seed drill



<http://youtu.be/quEp60g29Dg>

How to incorporate your cover crop...small scale



<http://youtu.be/0mqFI86BOck>

- Option 1: Use a hand scythe to cut the crop. Then use a shovel to “plow” it in.
- Option 2: Use a walk-behind tiller to till in the crop (works best on smaller crops)

How to incorporate cover crop... larger farms

- Option 1: Use a tractor-mounted tiller to till in the cover crop
- Option 2: Use a flair mower to chop the crop into small pieces, then plow under



<http://youtu.be/IY7g3CBwnZA>

When to plant cover crops... Spring

- Good cover crops for Spring planting...peas, oats, hairy vetch, clover, radish, turnips

When to plant cover crops... Summer

- For summer cover crops...buckwheat, sorghum-sudangrass

When to plant cover crops... Fall/Winter

- Fall/winter cover crops... clovers, winter rye, peas, vetch, radish, turnips

When to incorporate

- “2/3 bloom”... for maximum organic matter, incorporate when 2/3 of the flowers have appeared
- Don't wait too long! the cover crop will develop seeds and become a weed
- Don't till too soon! the cover will not contribute a maximum amount of organic matter

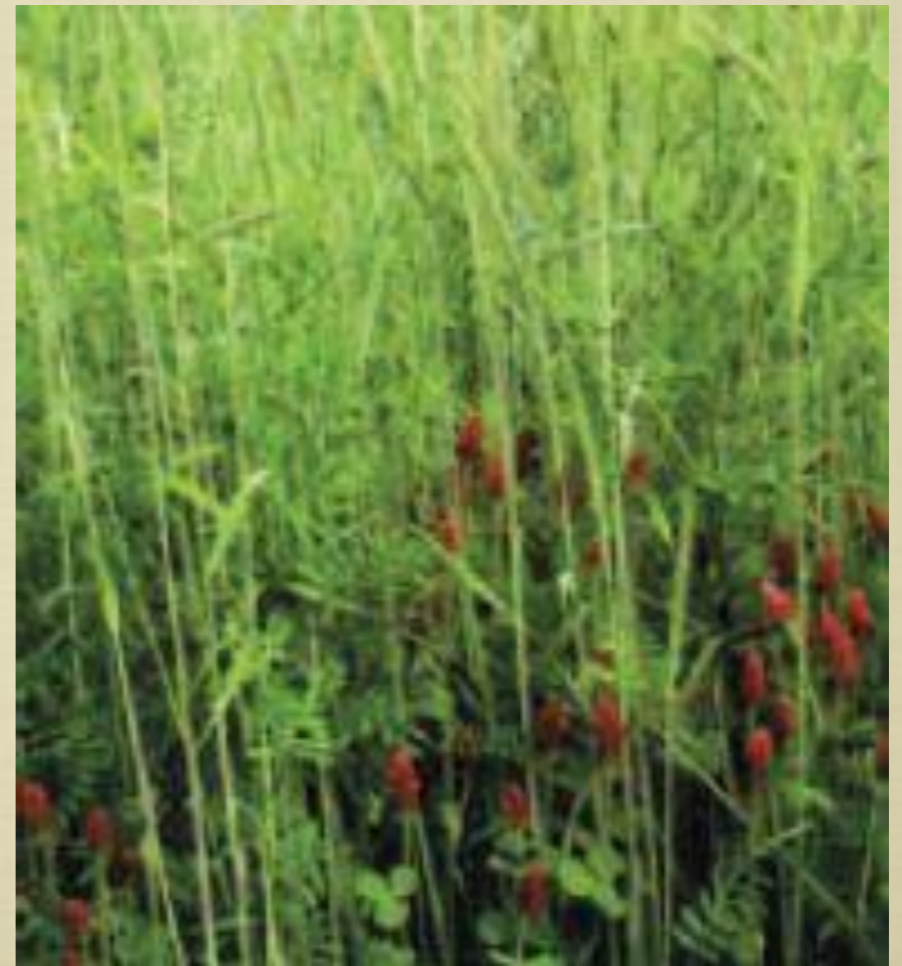
Cover Crop Combinations...Spring



- Combining cover crops can give farmers the benefit of multiple crops in one season
- Spring crops to combine: field peas, oats, hairy vetch, clovers

Cover Crop Combinations...Fall

- Crops to combine for a fall sowing: winter rye, field peas, ryegrass, crimson clover, hairy vetch



Self-Review Questions

- What farming objectives can be met with cover crops?
- What cover crops are best for loosening soil?
- What benefits do clover and vetch offer?

Resources

- johnnyseeds.com
- covercropsolutions.com
- www.organicgardening.com/learn-and-grow/cover-crop-basics