



# 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





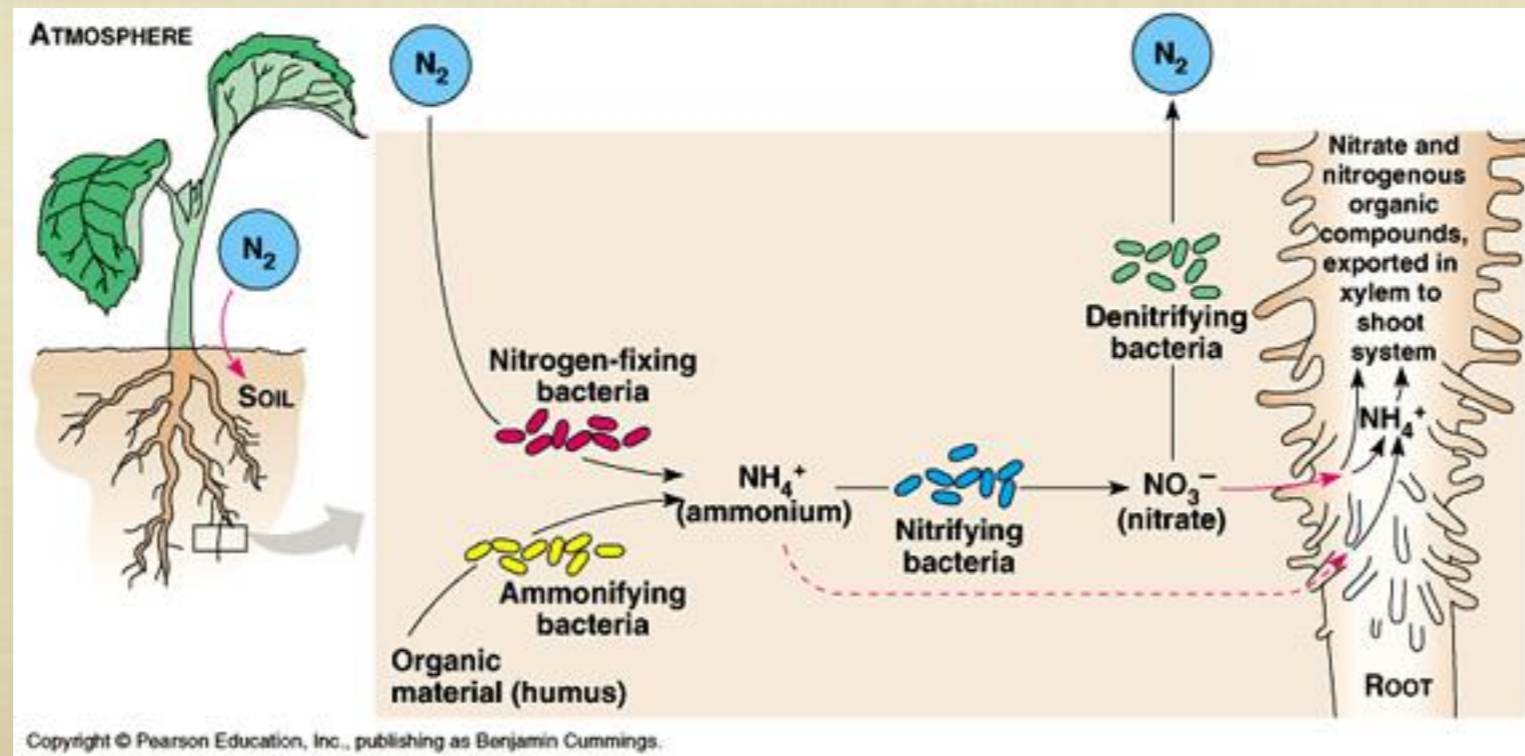
# advantages...

- 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...

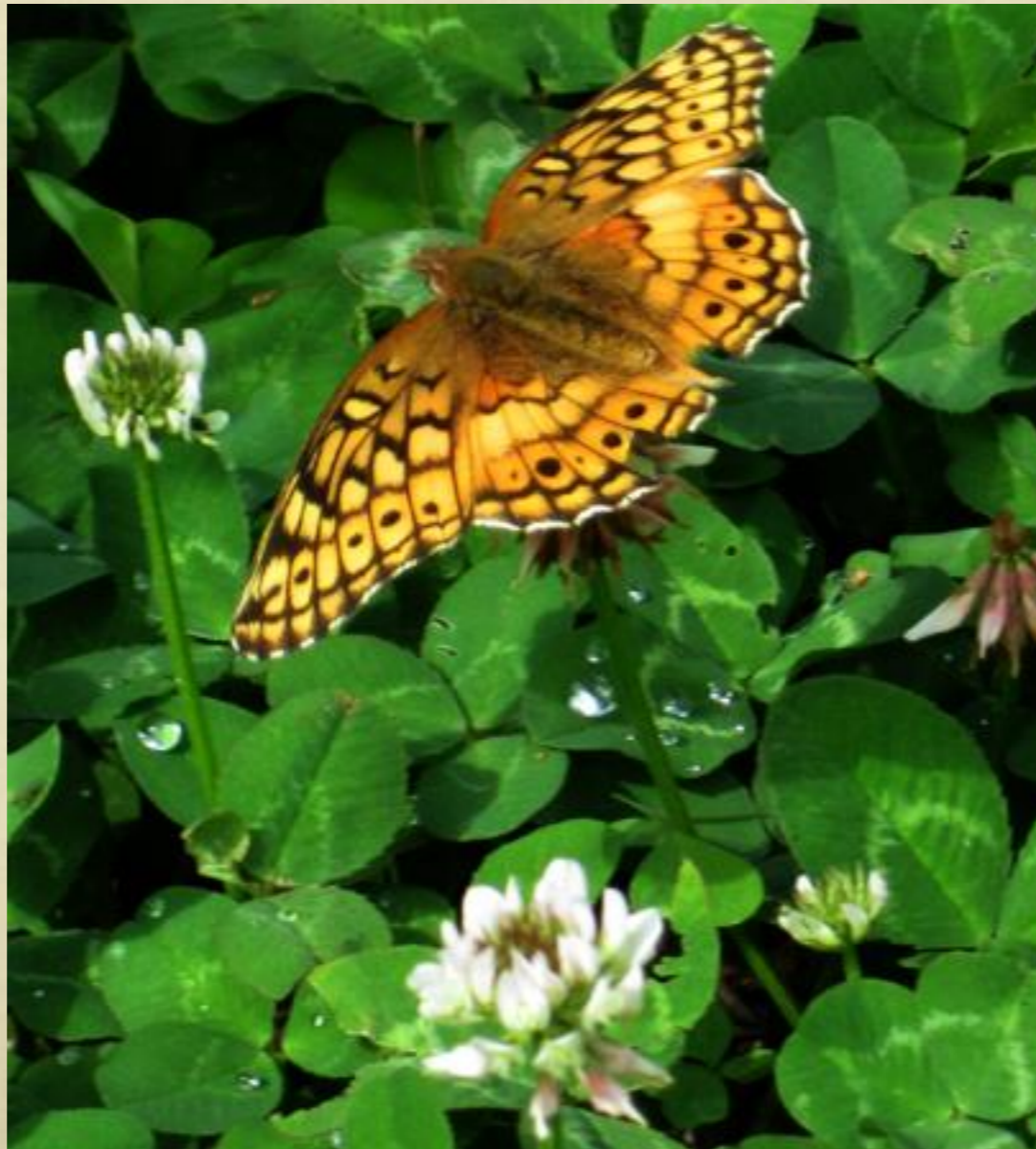
- Cover crops are sometimes used as a weed barrier between rows of crops





# Advantages...

- Some cover crops can attract beneficial insects





# Select cover crops' uses

		Cover Crop Chart										Key to Symbols				
		Species	When To Plant	Min Germ Temp	Seeding Depth Inches	Seed Per 1000 sq ft	Pounds Of Seed Per Acre	Hardiness 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
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



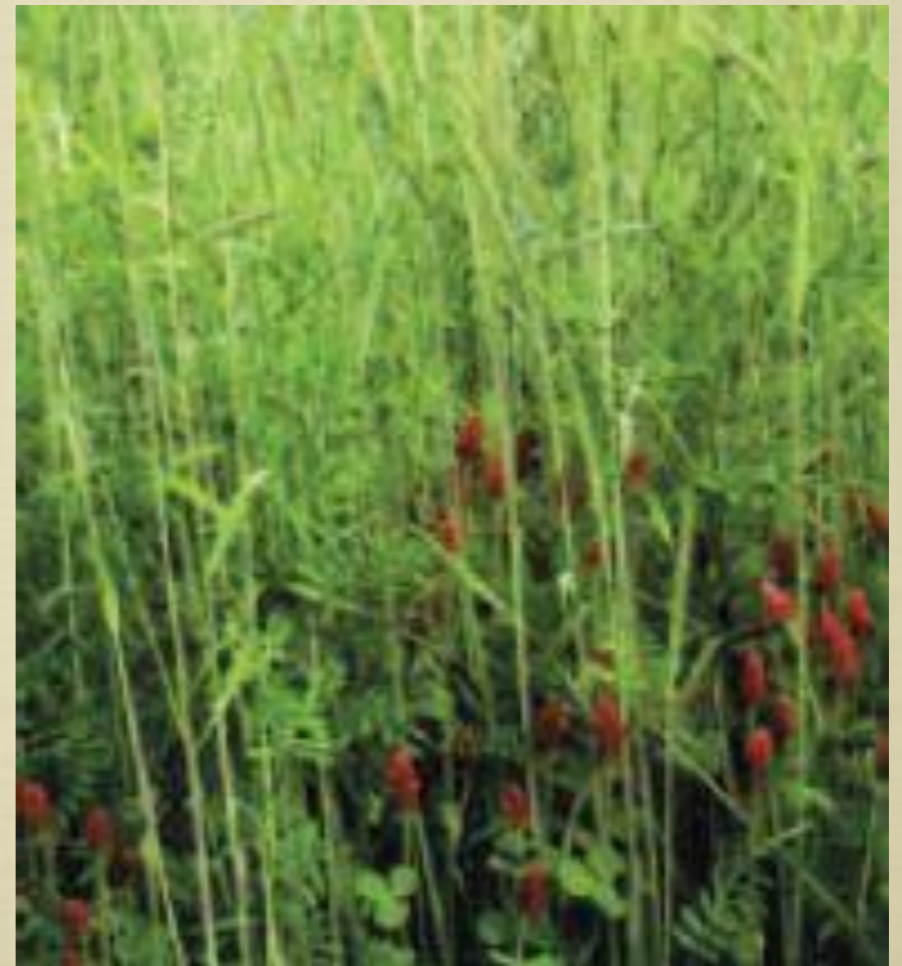
# Cover Crop Combinations...Spring



- 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](http://www.organicgardening.com/learn-and-grow/cover-crop-basics)