

Cover Crops



Soil & Nutrient Management in Vegetable Gardens

Module III

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Crops for Soil Fertility

“Cover Crops”

Cover Crop – Grown to reduce soil erosion

Green Manure – Grown to increase organic matter and/or nitrogen availability

Catch Crop – Grown between successive crops to prevent nutrient leaching and immobilization

Benefits of Cover Crops

- Add organic matter
- Add N (legumes)
- Suppress weeds
- Reduce erosion
- Reduce leaching
- Improve soil structure
- Attract beneficial organisms



Classification of Cover Crops

Taxonomic Group

- Legumes
- Grasses (Grains)
- Other Non-legumes

Growing Season

- Winter
- Summer

Selecting Cover Crops

- Management Goals
 - Organic matter?
 - Nitrogen source?
 - Relieve soil compaction?
- Timing
- Ease of incorporation
- Mixed crops can be beneficial



Planting Cover Crops

Method

- 1) Till soil and rake level
- 2) Scatter seed thickly over soil surface
- 3) Rake in lightly
- 4) Water

Timing

- Recommended planting dates
- Following harvest of edible crops



Cover Crop Termination

- Before crop fruits ('sets seed')
- Methods
 - Scythe, string trimmer, mower
 - Herbicide
 - Crimping
- Incorporate (till) or leave on surface as a mulch (no till)



Cover Crop Termination



No-till crimping for mulch residue

Cover Crop Incorporation

- Incorporate with a fork or tiller
- Wait 3 weeks before planting



Legume Cover Crops

Legumes Capture Atmospheric Nitrogen

Nitrogen is a critical nutrient for life

- Abundant in the atmosphere as N_2
- Scarce in the soil as NO_3 and NH_4

Only bacteria have evolved enzymes to convert N_2 into NH_4

- Most plants rely on the nitrogen cycle for obtaining NO_3 & NH_4
- Legumes evolved close symbioses with bacteria in exchange for sugars



Figure 29-11a
Raven Biology of Plants, Eighth Edition
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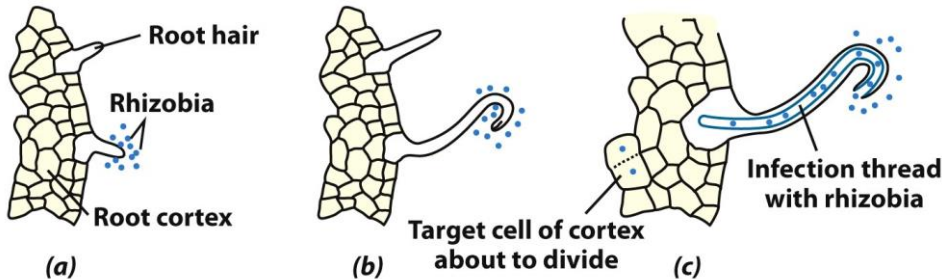


Figure 29-9abc
Raven Biology of Plants, Eighth Edition
© 2013 W. H. Freeman and Company

Raven et al. Biology of Plants 7th ed. 2005

N₂

Atmospheric nitrogen

Inoculants for Legume Cover Crops

- Add *Rhizobium* inoculants with seeds before planting
- Different crops need different bacteria

Inoculation Methods

- Slurry
- Dry Sprinkle



See: [Understanding Inoculants](#)
David Duvauchelle USDA-NRCS

Austrian Winter Pea *Pisum sativum* subsp. *arvense*

Advantages

- N source
- Erosion control
- Pollinator forage
- Grows quickly



Seeding Rate: 1-2 lbs./1000 ft.²

Planting Dates: Aug. 25 – Oct. 1

Mixes with: oats, barley, rye, or wheat

Winter Legumes

Hairy Vetch *Vicia villosa*

Advantages

- N source
- P & K scavenger
- Erosion control
- Grows quickly
- Easily terminated



Seeding Rate: 0.75 lbs./1000 ft.²

Planting Dates: Sep. – Nov.

Mixes with: Winter grasses

Winter Legumes

Crimson Clover *Vicia villosa*

Advantages

- N source
- P & K scavenger
- Erosion control
- Attracts pollinators, beneficial insects



Seeding Rate: 0.5-1.0 lbs./1000 ft.²

Planting Dates: Sep. – Nov.

Mixes with: Winter grasses, fall veggies

Summer Legumes

Southern Pea *Vigna unguiculata*

Advantages

- N source
- P Scavenger
- Deep taproot
- Weed & erosion control
- Attracts beneficials



Seeding Rate: 2-4 lbs./1000 ft.²

Planting Dates: May - Aug

Mixes with: Sorghum-Sudan, Millet

Summer Legumes

Sunn Hemp *Crotalaria juncea*

Advantages

- N source
- Reduces compaction
- Lots of biomass
- Weed and nematode control



Seeding Rate: 0.5—1.0 lbs./1000 ft.²

Planting Dates: May - July

Mixes with: Sorghum-Sudan, Millet

Summer Legumes

Velvet Bean *Mucuna pruriens* var. *utilis*

Advantages

- N source
- Erosion, weed, nematode control
- Lots of biomass
- Decomposes quickly



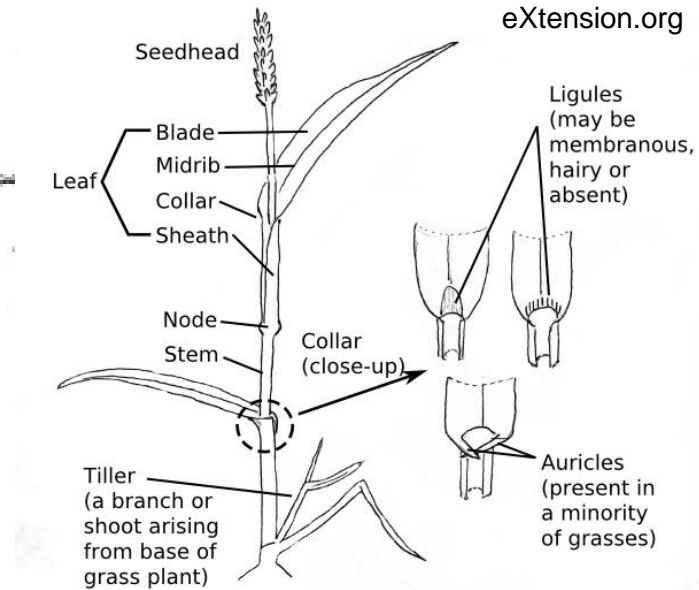
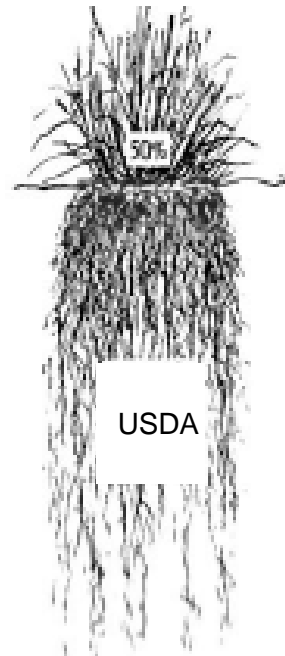
Seeding Rate: 1 lb./1000 ft.²

Planting Dates: May - June

Mixes with: Sorghum-Sudan, millet

Grass Cover Crops

- Poaceae
- Nutrient scavengers
- High biomass & organic matter production
- Weed suppression



Winter Grasses

Winter Wheat *Triticum aestivum*

Advantages

- Nutrient scavenger
- Erosion control
- Weed suppression
- High organic matter



Seeding Rate: 3 lbs./1000 ft.²

Planting Dates: Late Sep. – Early Dec.

Mixes with: Crimson clover

Winter Grasses

Cereal Rye *Secale cereale*

Advantages

- Nutrient scavenger
- Reduces compaction
- Erosion control
- Weed suppression
- High organic matter



Seeding Rate: 2-3 lbs./1000 ft.²

Planting Dates: Sep. – Oct.

Mixes with: Hairy vetch

Winter Grasses

Barley *Hordeum vulgare*

Advantages

- Nutrient scavenger
- Erosion control
- Weed suppression
- High organic matter



Seeding Rate: 4-6 lbs./1000 ft.²

Planting Dates: Aug. – Oct.

Mixes with: Legumes, other grains

Summer Grasses

Millets

German Millet
Setaria italica



Pearl Millet
Pennisetum glaucum



Japanese Millet
Echinochloa frumentacea



Seeding Rate: 11 oz./1000 ft.²

Planting Dates: May- Aug.

Seeding Rate: 11 oz./1000 ft.²

Planting Dates: Apr.-July

Seeding Rate: 11 oz./1000 ft.²

Planting Dates: Apr.-July

Buckwheat *Fagopyrum esculentum*

Advantages

- Fast growing
- Lots of biomass
- Scavenges P, K, Ca
- Weed suppression
- Attracts beneficials



Seeding Rate: 1.5 lbs. /1000 ft.²

Planting Dates: Mid-Apr. – Sep.

Mixes with: Sorghum-sudangrass

Forage Radish *Raphanus sativa*



Advantages

- Alleviate compaction
- Weed suppression
- Nematode suppression
- Scavenge P & K



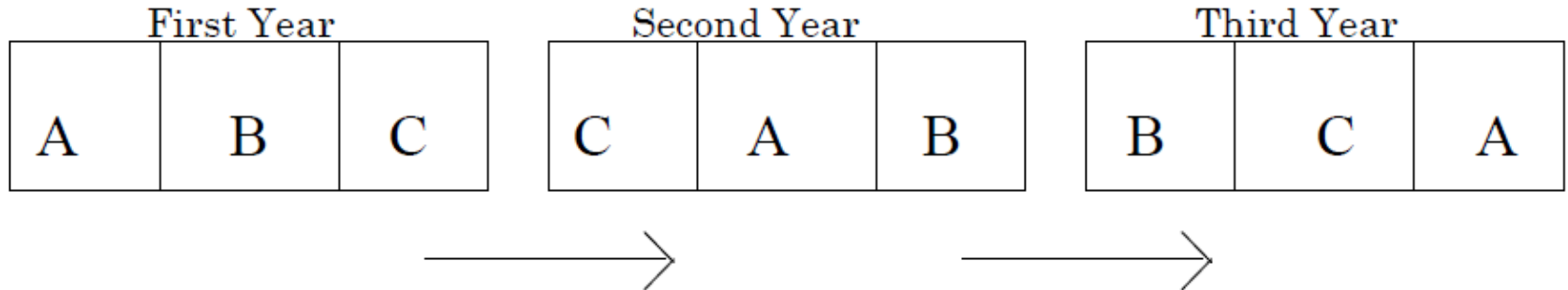
Seeding Rate: 12 oz. /1000 ft.²

Planting Dates: Sep-Oct

Mixes with: Winter grasses

Crop Rotation

- Avoid planting crops in the same family in the same location year after year
- **Minimum 3 year** rotation ideal
- Include **cover crops** in rotation
- Requires **planning and record keeping!**



The Cover Crop Pledge

“ I pledge I will not leave garden plots bare by incorporating cover crops into my rotation, so say we all, and so mote it be!”



Questions from this class?

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Other gardening questions?

NC STATE EXTENSION

Master Gardener | Chatham County

Plant Clinic: MW 1:00-4:00, F 9:00-12:00

chathamemgv@gmail.com

919-545-2715 (Except during COVID-19)

NC STATE

EXTENSION

Vegetable Gardening Resources

- **For this class:** <https://go.ncsu.edu/chathamveggies>
- **Gardening Portal:** <https://gardening.ces.ncsu.edu/>
- **Extension Gardener Portal:**
<https://extensiongardener.ces.ncsu.edu/>

Please Complete the Evaluation!

<https://go.ncsu.edu/veggie-evaluation1>