

# GARDEN COVER CROPS & GREEN MANURES

Hensley's SEED CO. – DENVER · COLORADO –

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# PRESENTED BY THE HENSLEY’S TEAM

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# the original research farm

Original farm was purchased in 1976 and still functions as our “home farm”.

**Dedicated to:**

- **Breeding**—development of new vegetable and flower varieties
- **Seed production**—foundation, stock, and commercial seed productions
- **Product trialing**—field and high tunnel trials of the original source and partner products

*Every product in the original source catalog has* been field tested on the research farm.



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## The Farm

**Consists of:**

- 31 Farm Operations Staff
- Ten farm locations (3 owned, 6 leased)
- 203 acres total, 50-75 in active production
- 50% or more of acreage in cover crops annually

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# Today’s Discussion

- Understanding Cover Crops
- Selecting the Right Crops
- Cover Crops & Beneficial Insects
- Methods & Management for Cover Crops



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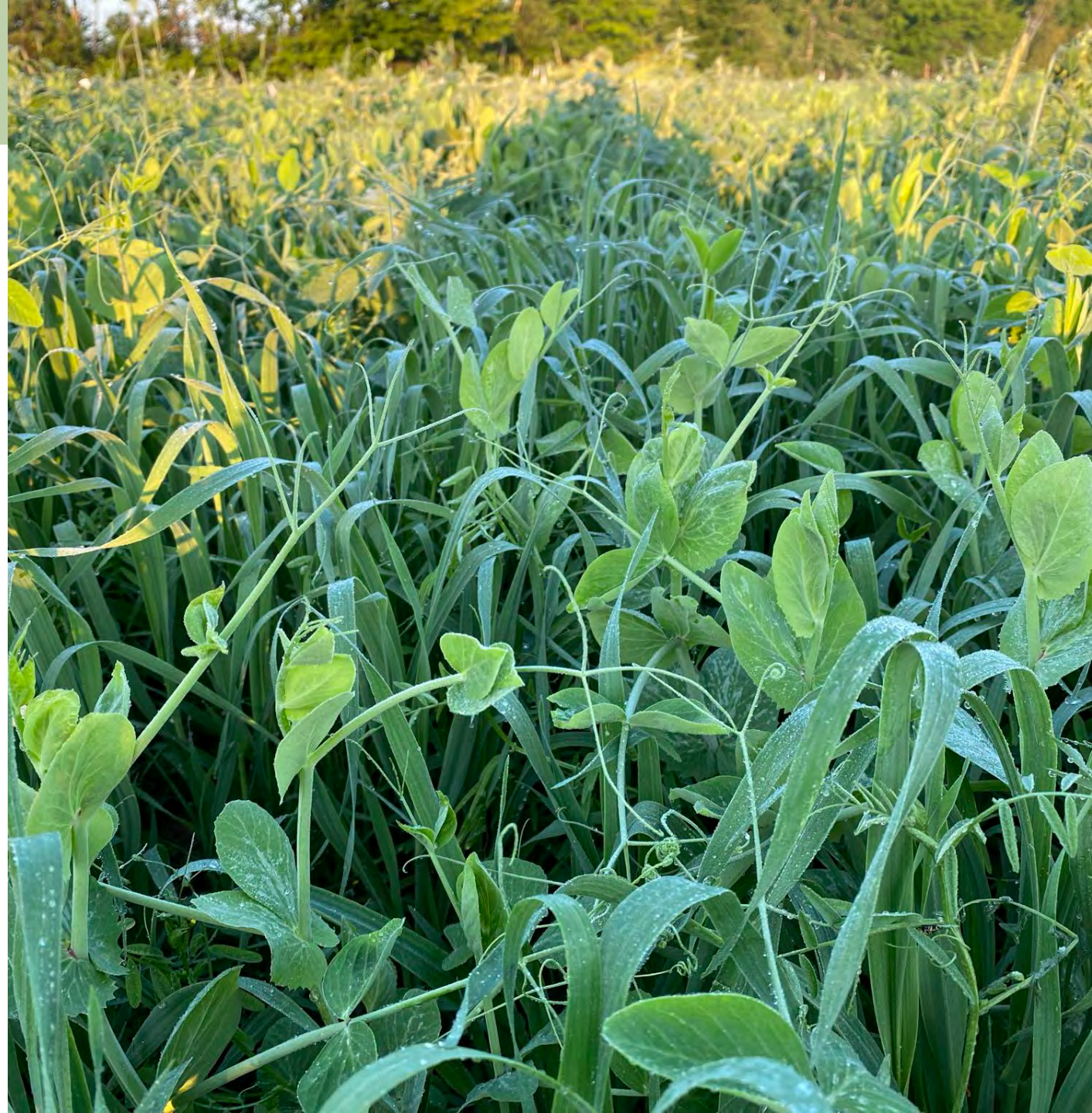


# UNDERSTANDING COVER CROPS

# What *IS* a Cover Crop/ Green Manure?

**Put simply:**

- **Cover crops** cover the soil, protecting from erosion, reducing soil temperature, and retaining moisture
- **Green manures** are a type of cover crop that is incorporated into the soil via tillage to boost organic matter and release nutrients.



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# What *IS* a Cover Crop/ Green Manure?

**Potential benefits/uses:**

- **Improve soil structure and fertility:**
  - Increase water holding capacity
  - Improve soil texture and porosity
  - Fix nitrogen
  - Scavenge nutrients
  - Reduce erosion and nutrient leaching
- **Supress weeds**
- **Break pest and disease cycles**
- **Grow your own mulch**
- **Enhance biodiversity and support ecosystem needs**



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# SELECTING THE RIGHT COVER CROPS

# Factors to Consider

- **Climate and local growing conditions**
  - Dry? Wet? Cold? Hot? Windy?
- **Cropping system and soil conditions**
  - Vegetables? Flowers? Fruit?
  - Bare soil? Existing crops?
  - Future crops?
- **Available tools or equipment**
- **Personal goals**

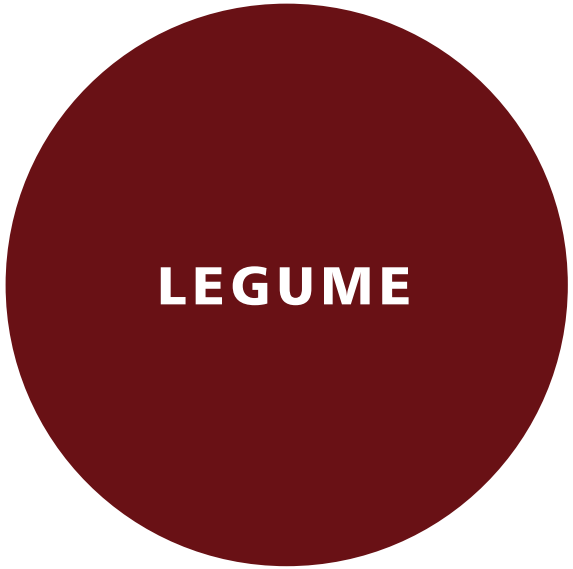


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# Cover Crop Categories




**Cereals** *(rye, wheat, oats, barley, etc)*
**Grasses** *(ryegrass, teff, millet, sudangrass)*
**Buckwheat**
**Sunflowers**
**Brassicas**




**True Clovers**
**Sweetclovers**
**Vetches**
**Peas**
**Beans**
**Sunn Hemp**
**Lentils**

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# Non-Legumes

Grasses, grains, broadleaf species, brassicas etc.

**Services:**

- SOM* production
- Weed suppression
- Nutrient accumulation
- Biomass (mulch potential)
- Pollinator/beneficial support
- Compaction relief

*Soil Organic Matter



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# Legumes

Clovers, vetches, peas, beans, sunn hemp, lentils

**Services:**

- Fix atmospheric nitrogen
- Reduce erosion
- Biomass production
- Pollinator/beneficial support

Rhizobia bacteria form a symbiotic relationship with legume plant roots, converting atmospheric nitrogen ($N_2$) to usable ammonia ($NH_3$) in exchange for sugars from the plant.



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WARM SEASON

Cowpeas
Sunn Hemp
Soybeans

Buckwheat
Sunflowers
Sudangrass
Millet
Teff



LEGUME

NON-LEGUME



Most Clovers
Vetch
Peas
Sweetclovers
Alfalfa

Rye
Wheat
Oats
Barley
Radish
Ryegrass
Mustards

COOL SEASON



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# Mixes

Mixes compound benefits from individual crops but require some planning.

Depending on time of year and field conditions, mixes will behave differently. Certain species will dominate or recede.

## When developing mixes, consider

- Timing/maturity of components
- Competitive nature of components
- Termination and establishment requirements

## Common mixes:

- Peas, Oats, and Vetch (Spring Green Manure)
- Rye, Ryegrass, Clover, and Vetch (Fall Green Manure)
- Rye and Vetch
- Buckwheat and Cowpea



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# COVER CROPS AND BENEFICIAL INSECTS

# Cover Crops & Beneficials

**Importance of beneficial insects:**

**Pollinators:** pollinate fruiting crops (e.g., bees, butterflies, moths)

**Predators:** help manage garden pests (e.g. ladybugs, lacewings, parasitic wasps)



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# Cover Crops & Beneficials

## Habitat and Shelter

- Cover crops provide shelter, nesting, and overwintering habitat for predators and beneficial insects.
- Diversity of vegetation provides necessary shelter for insect population growth.

## Food source

- Flowering crops provide pollen and nectar for pollinators. Larger pollinator population can also lead to improved pollination of cash crops.



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# Garden Recommendations




- Buckwheat
- Radish
- Oats
- Teff
- Rye*




- Peas
- Cowpeas
- Clovers
- Vetch*




- Buckwheat
- Phacelia
- Clovers
- Vetch*
- Alyssum
- Sunflower*




- Peas/Oats
- Rye/Vetch*
- Buckwheat/Cowpea
- Oats/Clover

● = Warm season
● = Cool season

*denotes more challenging crop for beginners

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# METHODS & MANAGEMENT

| Garden Crop | Cover Crop Planting Window(s) | Common Garden Options |
|---|---|---|
| **Spring Lettuce/Greens** | • Prior Fall<br>• Summer<br>• Fall | **Spring**<br>• Peas<br>• Oats<br>• Radish<br>• Clovers<br>• Flowering<br><br>**Summer**<br>• Buckwheat<br>• Cowpea<br>• Teff<br>• Sunflower<br><br>**Fall (winterkill zone 5)**<br>• Peas<br>• Oats<br>• Radish<br>• Some clovers<br><br>**Fall (winter hardy zone 5)**<br>• Rye<br>• Vetch<br>• Wheat<br>• Some clovers |
| **Spring Brassicas/Roots** | • Prior Fall<br>• Summer<br>• Fall | |
| **Tomatoes/Peppers** | • Prior Fall<br>• Fall | |
| **Pumpkins/Squash** | • Prior Fall<br>• Fall | |
| **Potatoes** | • Prior Fall<br>• Fall | |
| **Cucumbers/Melons** | • Prior Fall<br>• Fall | |
| **Beans** | • Prior Fall<br>• Fall | |
| **Onions/Shallots** | • Prior Fall<br>• Fall | |
| **Fall Brassicas/Roots** | • Prior Fall (winter hardy)<br>• Spring<br>• Summer | |

## Timing

- Work around garden crops, finding blocks of time when the space is inactive.
- Think about what an upcoming crop may need (soil conditions, fertility needs, residue)
- Consider ways of extending the cover cropping season, like undersowing or living mulches.

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# Planting Methods

Seeding depth will depend on cover crop species – see crop details for production guidelines.

General rule – the smaller the seed, the shallower it is planted.

- **Broadcasting:**
  - Pros – Requires few, if any, tools
  - Cons – Higher seeding rate to account for losses, less precise seed placement, often requires an additional pass to incorporate
- **Drilling:**
  - Pros – Accurate seed placement, single pass planting, lower seeding rate required
  - Cons – Requires special tools











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## Water/Irrigation

- Ideally, time seeding before a rain or provide irrigation.
- For robust plantings, irrigation can be supplied regularly, though most species do not require it.
- In dry areas or during dry periods, consider drought tolerant species, such as sorghum-sudangrass, cowpeas, sweetclovers, mustards, etc.

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# Termination

- **Critical and often overlooked**
- **Residue management can be the hardest part of cover cropping**
- **Things to consider:**
  - At what stage of growth is the cover crop?
  - What tools are available?
  - How much time is available before the next crop goes in the ground?
  - What cover crop species is being terminated?
  - Winterkill vs. winter hardy



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# Stage of Production

- Ease of termination at different stages is species dependent.
- For example, this rye would likely have regrown if we mowed one week earlier (before anthesis).
- Prevent crops from setting seed, unless you are seeking a second crop
- In mixes, termination will likely need to occur before the fastest maturing crop sets seed.
- Research individual crop requirements for effective termination.




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# Termination Methods

- **Mowing/cutting** – lawn tractor, push mower, weed whacker, scythe, clippers
- **Crimping** – Requires correct timing and appropriate crop selection. Multiple tools available, as well as DIY options. Residue acts as a mulch.
- **Tarping** – Often used after cutting or crimping to ensure termination, often in no-till systems.
- **Tillage** – Rototillers or other garden tools that work cover crops into the soil. Can be harder with high-residue crops but can lead to faster breakdown and more usable nutrients.



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# Timing/Crop Type

- More carbonaceous/lignified material will take longer to break down (i.e. wood chips vs. grass clippings).
- Smaller particles and incorporated residues will break down faster.
- Deep tillage that buries residue is fastest but creates the most soil disturbance.
- **Plan ahead!**



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# Tools to Help

- the original source Grower's Library
  - Cover Crop Uses & Benefits
  - Farm Seed Comparison Chart

- **SARE *Managing Cover Crops Profitably***

- **Cooperative Extension resources**

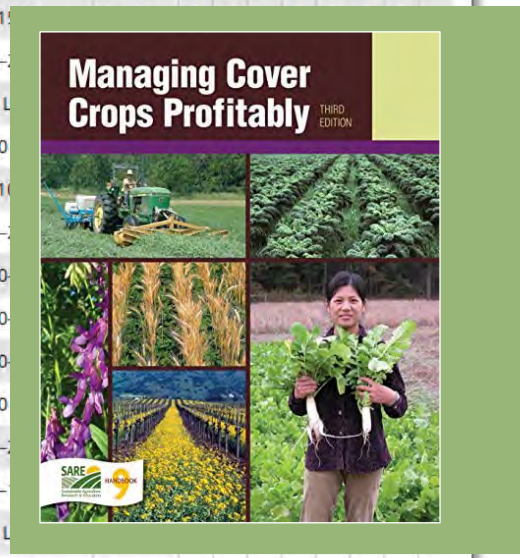
- **Northeast/Midwest/Southern Cover Crops Council Decision Tool and Resources**

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support@hensleyseeds.com

## FARM SEED COMPARISON CHART

| Crop Type | Sowing Season | Minimum Germ. Temp. | Hardiness Zone | Growth Rate | Sow Per 1,000 sq.ft. | Sow Per Acre | Seeding Depth | Nitrogen Fixation | Bees/Beneficial Insects | Compaction Control | Erosion Control | Weed Suppression | Green Manure | Forage | Biomass (Organic Matter) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alfalfa, Summer | Early Spring to Late Summer | 45°F (7°C) | 5 | Fast | ½ Lb. | 15–25 Lb. | ¼–½" | • | • | • | | • | | • | • |
| Barley | Early Spring to Late Summer | 38°F (3°C) | 7 | Fast | 2 Lb. | 80–125 Lb. | ¾–2" | | | | | • | • | | • |
| Buckwheat | Spring to Summer | 50°F (10°C) | NFT | Fast | 2–3 Lb. | 50–90 Lb. | ½–1½" | | • | | | • | • | | |
| Clover, Crimson | Anytime | 45°F (7°C) | 7 | Medium | ⅔ Lb. | 22–30 Lb. | ¼–½" | • | • | | • | • | • | • | |
| Clover, Mammoth Red | Anytime | 41°F (5°C) | 4 | Fast | ½ Lb. | 5–15 Lb. | ¼–½" | • | • | • | • | • | • | • | |
| Clover, Medium Red | Anytime | 41°F (5°C) | 4 | Medium | ½ Lb. | 5–15 Lb. | ¼–½" | • | • | • | • | • | • | • | |
| Clover, New Zealand White | Spring to Summer | 40°F (4°C) | 4 | Slow | ¼ Lb. | 5–1 | | | | | | | | | |
| Clover, Sweet | Spring to Summer | 42°F (6°C) | 4 | Medium | ½ Lb. | 10– | | | | | | | | | |
| Manure Mix, Fall Green | Summer to Fall | 45°F (7°C) | Various | Medium | 1½ Lb. | 50 L | | | | | | | | | |
| Manure Mix, Spring Green | Spring to Summer | 38°F (3°C) | Various | Medium | 5 Lb. | 200 | | | | | | | | | |
| Millet, Pearl | Summer | 60°F (16°C) | NFT | Fast | ¼ Lb. | 6–1 | | | | | | | | | |
| Mustard | Spring to Summer | 40°F (4°C) | 7 | Fast | 1 Lb. | 15– | | | | | | | | | |
| Oats, Common | Spring to Summer | 38°F (3°C) | 8 | Medium | 4 Lb. | 110 | | | | | | | | | |
| Oats, Hulless | Spring | 38°F (3°C) | 8 | Medium | 4 Lb. | 110 | | | | | | | | | |
| Peas and Oats Mix | Spring or Fall | 41°F (5°C) | 8 | Medium | 5 Lb. | 120 | | | | | | | | | |
| Peas, Field | Spring or Fall | 41°F (5°C) | 7 | Fast | 3 Lb. | 120 | | | | | | | | | |
| Radish, Oilseed | Late Summer | 45°F (7°C) | 6 | Fast | 1 Lb. | 10– | | | | | | | | | |
| Rye, Winter | Anytime (Fall for Grain) | 34°F (1°C) | 3 | Medium | 4 Lb. | 60– | | | | | | | | | |
| Ryegrass | Anytime | 40°F (4°C) | 6 | Fast | 1 Lb. | 40 L | | | | | | | | | |
| Sudangrass | Early Summer | 65°F (18°C) | NFT | Fast | 1 Lb. | 30–40 Lb. | ½–1½" | | | • | • | • | • | • | • |
| Sunflower | Spring | 70°F (21°C) | NFT | Medium | 1,500 seeds | 20,000 seeds | ½–1" | | • | | | | | | • |
| Vetch, Hairy | | | | | | | | | | | | | | | |




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PLANT HARDINESS ZONE

ZONE
Zone 6

Cover Crop Name

FILTERS

- WEEDS
- ENVIRONMENTAL TOLERANCES
- GROWTH TRAITS
- SOIL CONDITIONS
- PLANTING
- TERMINATION



GRASS
**Barley, Spring**
*Hordeum vulgare*
VIEW CROP DETAILS
ADD TO LIST



GRASS
**Barley, Winter**
*Hordeum vulgare*
VIEW CROP DETAILS
ADD TO LIST



BRASSICA
**Brassica, Forage**
*Brassica oleracea*
VIEW CROP DETAILS
ADD TO LIST



BROADLEAF
**Buckwheat**
*Fagopyrum esculentum*
VIEW CROP DETAILS
ADD TO LIST



GRASS
**Cereal Rye, Spring**
*Secale cereale*
VIEW CROP DETAILS
ADD TO LIST



GRASS
**Cereal Rye, Winter**
*Secale cereale*
VIEW CROP DETAILS
ADD TO LIST



LEGUME
**Clover, Balansa**
*Trifolium michelianum*
VIEW CROP DETAILS
ADD TO LIST



LEGUME
**Clover, Berseem**
*Trifolium alexandrinum*
VIEW CROP DETAILS
ADD TO LIST



LEGUME
**Clover, Crimson**
*Trifolium incarnatum*
VIEW CROP DETAILS
ADD TO LIST



LEGUME
**Clover, Red**
*Trifolium pratense*
VIEW CROP DETAILS
ADD TO LIST



LEGUME
**Cowpea**
*Vigna unguiculata*
VIEW CROP DETAILS



GRASS
**Millet, Japanese**
*Echinochloa esculenta*
VIEW CROP DETAILS



GRASS
**Millet, Pearl**
*Pennisetum glaucum*
VIEW CROP DETAILS



BRASSICA
**Mustard**
*Brassica juncea*
VIEW CROP DETAILS



GRASS
**Oats, Black**
*Avena strigosa*
VIEW CROP DETAILS



## Be Flexible…

- Sometimes conditions don’t fit into a tidy rotation
- Weeds, weather, seed quality, etc. can all lead to poor results.
- Reevaluate and try again, learning from the mistake
- Don’t be afraid to try new species, timing, mixes!

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# SUMMARY

# Summary

- Cover crops can provide many benefits to your garden.
- Understanding management requirements and having a plan for cover cropping will yield a more resilient, productive, and biologically diverse garden.
- There are many tools available to help you make decisions, but your own experience and trialing will provide the best guidance.
- Have fun and be creative!



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Q&A

# Helpful Resources

- the original source Farm Seed & Cover Crop Library
- USDA Cooperative Extension System Directory
- Northeast Cover Crop Council
- Midwest Cover Crop Council
- Southern Cover Crop Council
- Western Cover Crop Council
- SARE Managing Cover Crops Profitably



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