

COVER CROPPING
FOR FIELD AND GARDEN

Hensley's SEED CO. – DENVER · COLORADO –

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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
- 9 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

Cover Cropping Goals

Species Selection

Establishment, Management, and Termination



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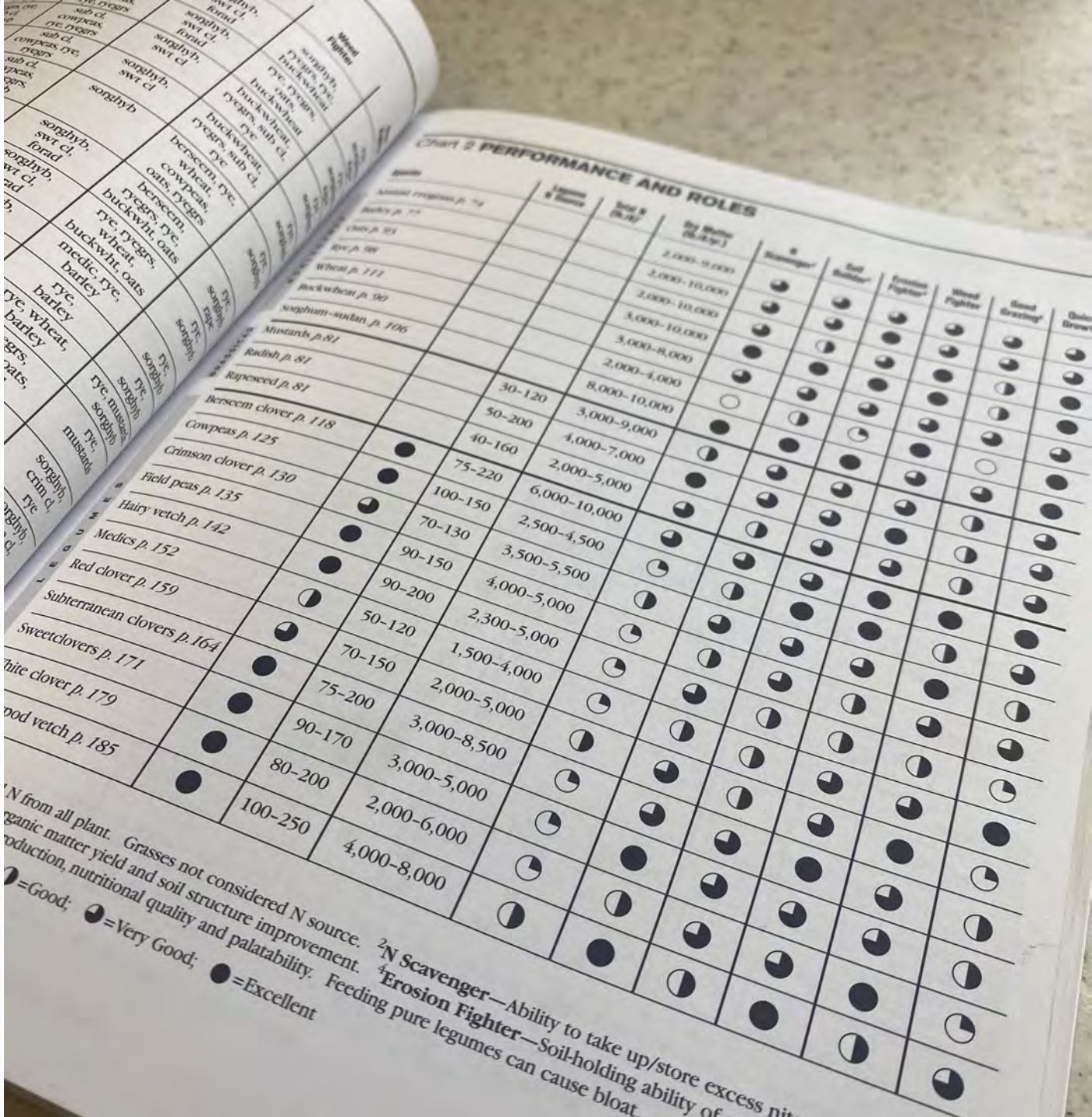


COVER CROPPING GOALS

WHAT'S IN A COVER CROP

Potential goals:

- Increase soil organic matter
- Increase water holding capacity
- Improve soil texture and porosity
- Fix nitrogen
- Scavenge nutrients
- Supress weeds
- Break pest and disease cycles
- Grow your own mulch
- Provide habitat and food source for beneficials



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WHERE TO START

Take a self-assessment:

- What are your challenges/limitations?
- What are your strengths/advantages?
- How do these help determine your cover cropping goals?



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FARM CASE STUDY

Challenges:

- High weed pressure/seed bank
- Logistical challenges – multiple farm sites, spread across wide footprint
- Hyper-diverse crop plan with complicated rotations
- Short growing season
- Lots of long-season crops = late termination

Strengths:

- Skilled and hardworking team
- Land rich = more space and time for rotations
- Well-equipped



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FARM CASE STUDY

Goals:

- Reduce weed seed bank
- Continue to increase SOM and enhance microbial activity
- Break disease/pest cycles
- Provide pollinator/beneficial habitat
- Reduce overall cost of production



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SPECIES SELECTION

COVER CROP CATEGORIES

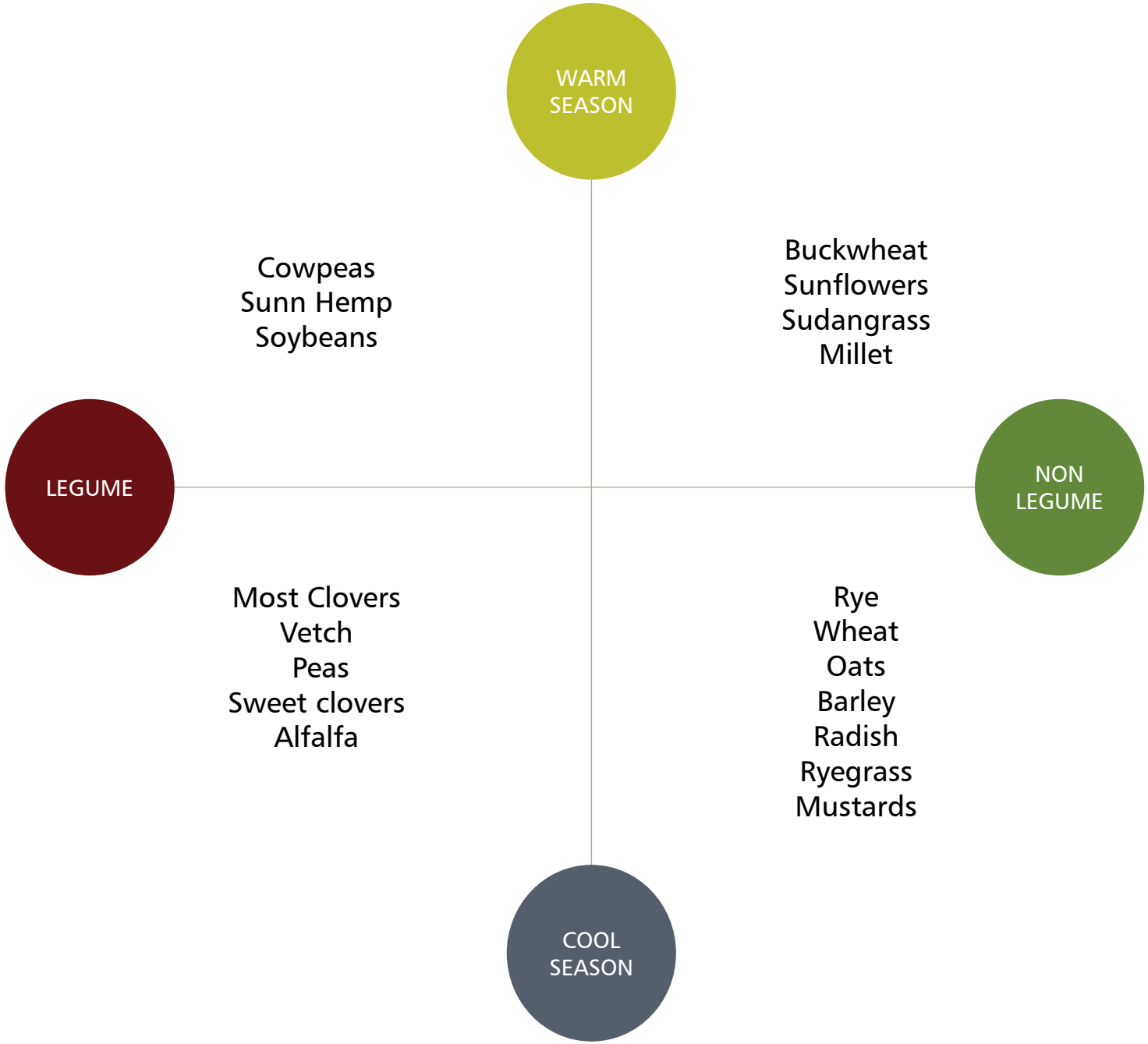


Cereals *(rye, wheat, oats, barley, etc.)*
Grasses *(ryegrass, teff, millet, sudangrass)*
Buckwheat
Sunflowers
Brassicas



True Clovers
Sweet clovers
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
    - Natural soil fumigant (mustards) against *Verticillium, Rhizoctonia, Fusarium, Pythium, Sclerotinia,* etc.
    - Compaction relief

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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 plant roots, converting atmospheric nitrogen (N_2) to usable ammonia (NH_3) in exchange for sugars from the plant.

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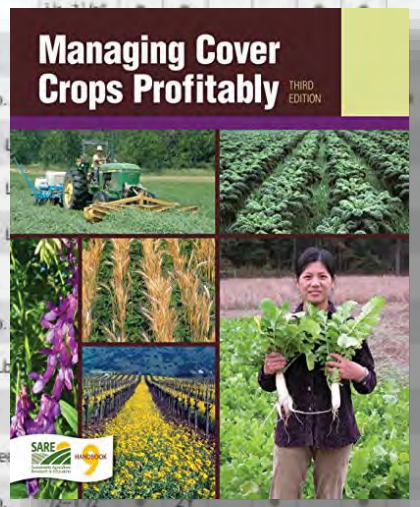


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FARM SEED COMPARISON CHART

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)	NFT	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.	5–15 Lb.	¼–½"	•	2Y		•	•	•	•	
Clover, Sweet	Spring to Summer	42°F (6°C)	4	Medium	½ Lb.	10–20 Lb.	¼–1"	•	2Y	•	•	•	•	•	•
Manure Mix, Fall Green	Summer to Fall	45°F (7°C)	Various	Medium	1½ Lb.	50 Lb.									•
Manure Mix, Spring Green	Spring to Summer	38°F (3°C)	Various	Medium	5 Lb.	200 Lb.									•
Mustard	Spring to Summer	40°F (4°C)	7	Fast	1 Lb.	15–20 Lb.									•
Oats, Common	Spring to Summer	38°F (3°C)	8	Medium	4 Lb.	110–140 L									•
Oats, Hulless	Spring	38°F (3°C)	8	Medium	4 Lb.	110–140 L									•
Peas and Oats Mix	Spring or Fall	41°F (5°C)	8	Medium	5 Lb.	120–200 L									•
Peas, Field	Spring or Fall	41°F (5°C)	7	Fast	3 Lb.	120 Lb.									•
Radish, Oilseed	Late Summer	45°F (7°C)	6	Fast	1 Lb.	10–20 Lb.									
Rye, Winter	Anytime (Fall for Grain)	34°F (1°C)	3	Medium	4 Lb.	60–120 Lb									•
Ryegrass	Anytime	40°F (4°C)	6	Fast	1 Lb.	40 Lb.									•
Sunflower	Spring	70°F (21°C)	NFT	Medium	1,500 seeds	20,000 se									•
Vetch, Hairy	Anytime	60°F (16°C)	4	Slow	1 Lb.	25–40 Lb.									
Wheat, Spring	Early Spring	38°F (3°C)	7	Fast	4 Lb.	60–150 Lb.	½–1½"				•	•			



TOOLS TO HELP

- The original seed company 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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NORTHEAST COVER CROPS COUNCIL

Cover Crop Decision Support Tools
October 5, 2022

COVER CROP EXPLORER | SPECIES SELECTOR TOOL

FILTER

PLANT HARDINESS ZONE

Zone 4 | Zone 5 | Zone 6 | Zone 7

Cover Crop Name

Search by cover crop name

COVER CROP TYPE

ENVIRONMENTAL TOLERANCES

SEEDS

SEEDING METHODS

GROWTH

ROOTS

TERMINATION METHODS

WEEDS



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













ESTABLISHMENT & MANAGEMENT



ANOTHER SELF-SURVEY:

- What types of soil am I working with? How wet is it?
- What are my tillage practices?
- What kind of acreage am I managing?
- What was most recently grown and what kind of residue is present?

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GROUND PREP

- Some species of cover crops can be more forgiving, but…

What you put in = what you get out

- Smaller seeded crops need finer soil texture (e.g., teff)

- Larger seeded crops can take more residue (e.g., field peas)

- For the field:
    - Plow (maybe) > disc > field cultivator
    - Additional stale bedding passes for weedy fields
- For the garden:
    - Broadfork > rake or rototiller/Tilther

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SEEDING

- 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 – Scalable, requires little to no equipment at a small scale, fast
  - Cons – Higher seeding rate to account for losses, less precise seed placement, typically requires an additional pass to incorporate
- Drilling:
  - Pros – Accurate seed placement, single pass planting, lower seeding rate required
  - Cons – Requires special equipment

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IRRIGATION/CROP CARE

- 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, sweet clovers, mustards, etc.
- Weed and pest control as needed, though oftentimes not required

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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 equipment is available?
  - How much time is available before the next crop goes in the ground?
  - What cover crop species is being terminated?



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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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EQUIPMENT

- Mowing – flail mower preferred, though rotary mowers work. Push mowers, weedwhackers, or hand cutting work at a small scale.
- Crimping – requires correct timing, equipment/tools available for different scales
- Tarping – effective at a smaller scale, requires more time, but can be a great tool
- Tillage – many types of equipment available, depending on scale



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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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PUTTING IT TOGETHER



CASE STUDY - ROTATION

Year One – Main Season

- CC – Teff/Clover/Buckwheat
- Tomatoes
- CC – Teff/Clover/Buckwheat
- Tomatoes
- CC – Teff/Clover/Buckwheat
- Tomatoes

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CASE STUDY - ROTATION

Year One – End of Season

- CC – Winter Rye
- CC – Winter Rye
- CC – Winter Rye
- CC – Winter Rye
- CC – Winter Rye
- CC – Winter Rye

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CASE STUDY - ROTATION

Year Two – Main Season

- CC – Terminated Winter Rye
- Squash
- CC – Terminated Winter Rye
- Squash
- CC – Terminated Winter Rye
- Squash

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CASE STUDY - ROTATION

Year Two – End of Season

- CC – Winter Rye, FS Clover
- CC – Winter Rye, FS Clover
- CC – Winter Rye, FS Clover
- CC – Winter Rye, FS Clover
- CC – Winter Rye, FS Clover
- CC – Winter Rye, FS Clover

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CASE STUDY - ROTATION

Year Three – Main Season

- CC – Clover/Summer Mix
- CC – Clover/Summer Mix
- CC – Clover/Summer Mix
- CC – Clover/Summer Mix
- CC – Clover/Summer Mix
- CC – Clover/Summer Mix

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CASE STUDY - ROTATION

Year Three – End of Season

- CC – Winterkill/Rye, FS Clover
- CC – Winterkill/Rye, FS Clover
- CC – Winterkill/Rye, FS Clover
- CC – Winterkill/Rye, FS Clover
- CC – Winterkill/Rye, FS Clover
- CC – Winterkill/Rye, FS Clover

THEN REPEAT…

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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 farm and garden.
- Planning for all stages can make your cover cropping experience more successful (and enjoyable).
- There are many tools available to help you make decisions, but your own experience will provide the best guidance.
- Have fun and be creative!



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Q&A

Moderated by the Hensley’s team



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SOME HELPFUL RESOURCES

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



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