

Pros and Cons of Different Cover Crop Mixes for late Fall, Winter or Spring Grazing

Spring Oats and Turnips

Pros

- Winter kill
- Best Fall growth of all the cover crops

Cons

- Need to be established by Sep 15 for good growth; early to mid-August is ideal for growth
- Rain and heat units are required for optimal Fall growth

Comments

Oilseed radishes (0.5 – 1.0 lbs/ac) can replace some of the turnips if you need a cover crop that does a better job of breaking up compaction. Turnips and radishes will smell like manure or a propane leak when they begin to break down after being killed by temperatures below 20 degrees. In my experience, oilseed radishes are not as palatable as turnips

Never plant Brassicas by themselves to be grazed because they don't have enough fiber for ruminant animals to be able to adequately keep the rumen working.

Crimson Clover, Oats, and Turnips (or other grazing type Brassicas)

Pros

- Same as above with the Oats and Turnip mix
- Plus, the Crimson Clover should survive the winter and begin growing in the Spring
- Clover produces nitrogen, plus will absorb any N released by the decaying turnips or radish.

Cons

- Will get very little growth out of the Crimson Clover in the Fall

Comments

Don't graze really hard or the cattle will eat the crimson clover significantly reducing its ability to survive the winter

Oat residue also provides winter cover to help the Crimson Clover overwinter

Cereal Rye (or Triticale, or Wheat), Oats, and Turnips (or other grazing type Brassicas)

Pros

- Same as above with the Oats and Turnip mix
- Plus, the Cereal Rye will overwinter and begin to grow in the Spring
- Cereal Rye is more winter tolerant and grazing tolerant than Crimson Clover
- Cereal Rye can provide forage for grazing or hay in the Spring; or additional mulch for weed control
- Cereal Rye can be terminated with mowing, although typically cannot be terminated with grazing

Cons

- Cereal Rye will not contribute to Fall grazing biomass
- Cereal Rye can go from highly digestible to straw within a few days in the Spring, therefore if it isn't used as forage at the appropriate time it might not be useable as forage
- Soil conditions are typically wetter in the Spring, therefore, Spring grazing or haying may not be a viable option
- Cereal Rye can tie up soil Nitrogen, so be careful if the next crop is corn.

Comments

Information about harvesting Cereal Grains as forage can be found in University of Kentucky Publication, Managing Small Grains for Forage, AGR-160, <http://www2.ca.uky.edu/agcomm/pubs/agr/agr160/agr160.pdf>

Cereal Rye (or Triticale, or Wheat), Crimson Clover, Oats, and Turnips (or other grazing type Brassicas)

Pros

Can be the ideal mix for Fall Growth and Spring Growth

All other Pros above

Cons

Sometimes if there is too much Fall Growth of the Oats or Turnips, then they will smother out the Crimson Clover.

Soil conditions are typically wetter in the Spring, therefore, Spring grazing or haying may not be a viable option

Cereal Rye can tie up soil Nitrogen, so be careful if the next crop is corn.

Comments

Information about harvesting Cereal Grains as forage can be found in University of Kentucky Publication, Managing Small Grains for Forage, AGR-160, <http://www2.ca.uky.edu/agcomm/pubs/agr/agr160/agr160.pdf>

All the mixtures below will do well even if there is very limited rain in the Fall because they have predominately Spring growth.

Cereal Rye and Winter Pea or Crimson Clover

Pros

Both will survive the winter

Winter pea likes to vine up the Cereal Rye

This mix works well in front of corn as long as the Cereal Rye is terminated prior to rye getting 18 inches tall

Cons

Probably the most expensive mix in this group of cover crops

Winter peas must be drilled or incorporated to get good seed-to-soil contact

Will provide very little Fall or Winter grazing, especially compared to Oats and Turnips

Annual Ryegrass and Crimson Clover

Pros

They both grow together very well

Ryegrass roots deep and crimson roots shallow

Some nitrogen is produced by Crimson and nitrogen is scavenged by Annual Ryegrass

Both fit very well in front of corn

Cons

Neither of these species produce much biomass in the Fall. The exception would be if the Annual Ryegrass is planted in early August, although this early planted Ryegrass is easier to winter kill if not grazed prior to a killing freeze (several days in the low twenties).

Sometimes Annual Ryegrass can be harder to kill with herbicides if it has been grazed or hayed.

If you want maximum N production from the Crimson Clover, then the annual ryegrass is going to be hard to kill. Some individuals have been successful using herbicides to kill Annual Ryegrass early and the Crimson Clover later.

Other individuals have had a hard time killing the Crimson Clover if it has not completely broken dormancy, which sometimes can be 2 weeks later than when Annual Ryegrass breaks dormancy

Other Species that can be added to mixes if seeded by mid-September

Sorghum-sudangrass

Pros: High forage value, excellent early growth, Brown Mid Rib (BMR) varieties available

Cons: goes dormant at a warmer temperature than Oats, therefore less late Fall growth; can have Prussic Acid poisoning issues after a killing frost

Pearl Millet

Pros: High forage value, excellent early growth, no Prussic Acid issue, BMR varieties available

Cons: goes dormant at a warmer temperature than Oats, therefore less late Fall growth

Corn

Pros: High forage value, excellent early growth, no Prussic Acid issue, BMR varieties available

Cons: goes dormant at a warmer temperature than Oats, therefore less late Fall growth; Seed cost is higher than Sorghum-sudangrass or Pearl Millet

Soybeans

Pros: High forage value, excellent early growth, produces its own nitrogen

Cons: goes dormant at a warmer temperature than Oats, therefore less late Fall growth; doesn't hold it's forage value after a killing freeze as long as the grasses do. Can be a high seed cost.

Cowpeas

Pros: High forage value, excellent early growth, produces its own nitrogen; most of the time cowpeas are more economical than soybeans

Cons: goes dormant at a warmer temperature than Oats, therefore less late Fall growth; doesn't hold it's forage value after a killing freeze as long as the grasses do. Can be a high seed cost.

Sunflowers

Pros: Moderate forage quality, excellent early growth, if planted in August will produce flowers for pollinators, different root structure for soil biology and soil health

Cons: Livestock may not eat them, if weather stays dry sunflowers can pull moisture from the forage crop

Buckwheat

Pros: Excellent early growth, makes soil phosphorus more available to other plants, early flowering for pollinator habitat, if planted early enough it will produce seed that livestock will eat

Cons: It can out compete other plant species because of excellent early growth, therefore, make sure seeding rate is 2 lbs per acre or less. It doesn't provide any forage value and some animals will not eat it. It produces viable seeds very quickly, therefore, can become a weed in later crops

This information was put together by Robert Zupancic, NRCS SE Area Grazing Specialist, 2021.

This is not intended to be a comprehensive list of cover crop species that can be used for grazing, but as a representation of the typical species that are used in Southern Indiana for Fall or Spring forage growth.

Cover Crop Mixes for Supplemental Forage (Fall, Winter, Spring)

(all seeding rates are based upon Pure Live Seed (PLS)¹)

Fall Grazing or Fall Baleage (These mixes could also be seeded March 1 – 30 for forage in May or June)

Spring Oats and Turnips (seed by Sep. 15; if seeded in August the yield potential is higher)

Spring Oats 30 - 45 lbs/ac (Oats weigh 32 lbs/bu)

Turnips 1.5 – 2.5 lbs/ac

* Excellent forage quality as long as it rains to germinate the seed.

** If following wheat or corn silage; add 20 - 40 units of Nitrogen to increase yield

Spring Oats, Turnips, and Cereal Rye (seed by Sep. 15; if seeded in Aug the yield potential is higher) Spring

Oats 25 - 40 lbs/ac (Oats weigh 32 lbs/bu)

Turnips 1.0 – 2.0 lbs/ac

Cereal Rye 20 – 40 lbs/ac

* If following wheat or corn silage; add 20 - 40 units of Nitrogen to increase yield

** Cereal rye will provide very little forage in the Fall, but will provide forage in late-winter

*** Triticale can be substituted for Cereal Rye if the producer wants higher forage quality

Spring Oats, Turnips, and Annual Ryegrass (seed by Sep. 15; if seeded in Aug the yield potential is higher)

Spring Oats 20 - 30 lbs/ac (Oats weigh 32 lbs/bu)

Turnips 1.2 – 2.0 lbs/ac

Annual Ryegrass 7 – 10 lbs/ac

* If following wheat or corn silage; add 20 - 40 units of Nitrogen to increase yield

** Ryegrass will provide very little forage in the fall, but will provide forage in late-winter

Spring Grazing or Spring Baleage (Most of the yield from these mixes will be April 15 – early June)

Cereal Rye or Triticale (Seed by Oct 1 for most yield; latest seeding date is Nov. 15)

Cereal Rye 60 - 90 lbs/ac (Cereal Rye weighs 60 lbs/bu)

* If following wheat or corn silage; add 20 - 40 units of Nitrogen to increase yield

* * Cereal Rye will mature earlier if planted earlier

Cereal Rye and Winter Pea or Crimson Clover (Seed by Oct 1 for the winter pea or Oct 15 for Crimson)

Cereal Rye 35 - 60 lbs/ac (Cereal Rye weighs 60 lbs/bu)

Winter Pea 20 – 40 lbs/ac or Crimson Clover 4 – 8

lbs/ac

* If following wheat or corn silage; add 20 – 30 units of Nitrogen to increase yield

* * Cereal Rye will mature earlier if planted earlier

Annual Ryegrass (Seed by Oct 10)

Annual Ryegrass 15 - 25 lbs/ac

* If following wheat or corn silage; add 20 – 40 units of Nitrogen to increase yield

** Grazing or haying annual ryegrass will make it more difficult to kill with herbicides.

Annual Ryegrass and Crimson Clover (Seed by October 1)

Annual Ryegrass 12 - 25 lbs/ac

Crimson Clover 3 – 5 lbs/ac

* If following wheat or corn silage; add 20 units of Nitrogen to increase yield

** Grazing or haying annual ryegrass will make it more difficult to kill with herbicides.

Annual Ryegrass and Red Clover (Seed by September 10)

Annual Ryegrass 12 - 25 lbs/ac

Red Clover 1 – 2 lbs/ac

* If following wheat or corn silage; add 20 – 30 units of Nitrogen to increase yield

** Grazing or haying annual ryegrass will make it more difficult to kill with herbicides.

1. PLS = Pure Live Seed (PLS = % Seed Germination X % Seed Purity)
% Seed Germination and % Seed Purity should be on the seed tag

Summer Cover Crop Mixes seeded late-May or after Wheat harvest

Recommendations are ranges of seeding lbs/ac. For grazing or very poor soil health sites seed the higher rates. Ranges can also be adjusted if certain species are not available or considerably more expensive

Example of this: If sorghum-sudangrass is \$3/lb instead of \$1/lb, then decrease Sorghum-sudangrass seed rate and increase either the Millet or Oats seeding rate.

Additional species can be added to these mixes for more diversity. Seeding rates should be adjusted lower if additional species are added.

Typically the legumes don't compete very well with the grasses, therefore if wanting more legumes significantly reduce grass rates and increase legume seeding rates.

All Winter Kill Species

<u>Species</u>	lbs/acre (PLS) *		seeds / square ft **		\$ / acre ***	
	min	max	min	max	min	max
Sorghum - sudangrass	6	8	4	5	\$6.00	\$8.00
Pearl or Foxtail Millet	1	4	2	8	\$1.00	\$4.00
Sunflower (Black Oilseed) ****	2	5	0.6	1.4	\$1.00	\$2.50
Soybean *****	5	10	0.3	0.7	\$4.00	\$7.00
Turnip, forage or purple top	1	2	3	6	\$2.00	\$4.00

Estimated Price per acre = \$20.13 \$35.36

Mostly Winter Kill Species

<u>Species</u>	lbs/acre (PLS) *		seeds / square ft **		\$ / acre ***	
	min	max	min	max	min	max
Sorghum-sudangrass	6	8	4	5	\$6.00	\$8.00
Sunflower, Black Oilseed ****	2	5	0.6	1.4	\$1.00	\$2.50
Soybean *****	5	10	0.3	0.7	\$4.00	\$7.00
Turnip	1	2	3	6	\$2.00	\$4.00
Cereal Rye	10	20	4	9	\$3.50	\$7.00
Crimson Clover	3	6	10	20	\$6.00	\$12.00

Estimated Price per acre = \$25.88 \$46.58

* Pure Live Seed = % Germination X % Purity (example: 95% Germination X 99% Purity = 94% PLS)

** Seeds /sq ft; this is an estimation of the number of seeds. Not all these seeds will germinate.

*** Estimated from average seed costs; significant yearly variations in seed cost will change this value

**** Can use bird seed from local store, although % PLS will not be on the bag so assume 60-75% PLS

***** Substitutes for soybeans are Cowpeas (warm-season) and Winter Peas (more cold tolerant)

SEEDING WINDOWS FOR COVER CROPS IN INDIANA

NOTE: Northern and southern Indiana seeding dates for the tables below are divided on a general line along US 36 from Illinois to Indianapolis and US 40 from Indianapolis to Ohio.

Best window of opportunity and greatest benefit for various cropping scenarios

IN After harvest
A/I Aerial or interseed

A/I after corn
A/I after soybeans
 after seed corn
 after silage corn
 after vegetable crops

after wheat
 after early veg crops

Plant Species	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec-Feb.
Barley, Winter										S-3
Buckwheat			S	IN	IN	IN	IN	IN	R	
Clover, Balansa	R-2	IN	IN							
Clover, Berseem				IN	IN	IN	IN	S		
Clover, Crimson			S	IN	IN	IN	IN	IN	R	
Clover, Red	R-2	S	IN	IN	IN					F-2 F-2
Collards		R	S	IN	IN	IN	IN	M	M	M
Cowpea/Soybeans			S	IN	IN	IN	IN	M	M	3
Flax		R	IN	IN				M	IN	IN
Kale		R	S	IN	IN	IN	IN	M	M	M
Millet, Japanese/Pearl			S	IN	IN	IN	IN	IN	3	
Oats, (Spring & Black)	R-2	S	IN	IN	IN	IN	M	M	M	M
Pea, (Field/Spring/Winter)	R-2	S	IN	IN	N			N	IN	IN
Phacelia		R	IN					M	IN	IN
Radish, Oil Seed								M	IN	IN
Rapeseed								M	IN	IN
Rye, Winter Cereal	R-2							N	IN	IN
Ryegrass, Annual	R-2	S	IN	IN	IN	N		N	IN	IN
Sorghum-Sudangrass /Sudangrass /Milo				IN	IN	IN	IN	IN	IN-3	S-3
Soybean, (Forage & Field)			S	IN	IN	IN	IN	IN	IN-3	S-3
Sunflowers			S	IN	IN	IN	IN	IN	S	
Sunn Hemp			S	IN	IN	IN	IN	S		
Teff (Coated Seed)			S	IN	IN	IN	M	M	S-3	
Triticale, Winter								N	IN	IN
Turnips/Pasja	S-4	IN-4	IN-4					M	IN	IN
Vetch, Hairy		S	IN					IN	IN	IN
Wheat, (Winter & Spelt)								N	IN	S-3

¹ Risk for Hessian Fly-Free Dates Recommended

² Dormant/Frost/Early seeding from December thru March. Increase seeding rates by 25%.

³ Expect lower biomass and production (dwindling quantity)

⁴ Bolting risk

Legend

IN	Suitable seeding dates for all of Indiana
S	Additional suitable seeding dates for Southern IN (~South of I-70)
N	Additional suitable seeding dates for north Northern IN (~North of I-70)
R	Riskier Establishment (Season/Weather/Variety Dependent)
F	Frost/Dormant Seeding
M	If sufficient moisture

Grazing Cover Crop Resources

Midwest Cover Crop Council Decision Tool, <http://www.mccc.msu.edu>

Midwest Cover Crop Field Guide, <https://ag.purdue.edu/agry/dtc/Pages/CCFG.aspx>

Managing Cover Crops Profitably, <http://www.sare.org>

Purdue University Forage Extension website, <https://www.agry.purdue.edu/ext/forages/>

University of Kentucky Forage Extension website, <https://forages.ca.uky.edu/>

University of Kentucky, Master Graziers, Grazing Cover Crops
<https://grazer.ca.uky.edu/content/grazing-cover-crops>

Indiana NRCS, www.in.nrcs.usda.gov

Economics of Grazing Cover Crops, Ed Ballard, Univ. of IL, retired,
https://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1081&context=forage_kca

Cover Crops/Annuals and Grazing, Roger Staff, NRCS Illinois,
https://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1148&context=ky_grazing

Oats as a late summer forage crop, Ohio State University, Ohio BEEF Cattle Letter,
<https://u.osu.edu/beef/2020/06/24/oats-as-a-late-summer-forage-crop/>

Hoosier Ag Today and Conservation Cropping Systems Initiative Podcasts:

Can be found at www.hoosieragtoday.com , Apple Podcasts, and other podcast sites

Fall and Winter Grazing Considerations, Oct 28, 2019; Season 2

Grazing and Warm Season Cover Crops, July 30, 2018; Season 1

Harvesting Cover Crops for Forage, June 30, 2020; Season 3

Conservation Webinars about Grazing Cover Crops, www.conservationwebinars.com

Integrating Warm Season Annuals into Cool Season Perennial Grazing Systems

<http://conservationwebinars.net/webinars/integrating-warm-season-annuals-into-cool-season-perennial-grazing-systems>

Alternative Strategies for Grazing Annual Crops

<http://conservationwebinars.net/webinars/alternative-strategies-for-grazing-annual-crops>

Integrating Grazing into Cropping Systems

<http://conservationwebinars.net/webinars/integrating-grazing-into-cropping-systems>

Integrating Livestock into a Cropping System for Sustainability and Soil Health

<http://conservationwebinars.net/webinars/integrating-livestock-into-a-cropping-system>

Soil Health and Production Benefits of Mob Grazing

<http://conservationwebinars.net/webinars/soil-health-and-production-benefits-of-mob-grazing>