

COVER CROP (340) REQUIREMENTS IN TENNESSEE

2017 Environmental Quality Incentives Program (EQIP)

Purpose: To improve soil health function by controlling erosion, building organic matter, increasing available water holding capacity, and promoting nutrient retention and recycling.

Objective: To continue the growth of the cover crops for the production of biomass above and below the ground for as long as possible before the following crop is planted. Producers are encouraged to plant early maturing crops and cover crops.

Eligible Land: Cropland where annual crops are grown.

Soil Testing: Using the Soil Health Test (Haney test) is recommended for selecting the best cover crop mixes to increase soil biology. Results can also be used to determine when fertilizer inputs can be reduced. Soil samples taken at the same time (either fall or spring) and location will best document soil health trends over time. If historic yields, management and soils are similar acreage up to 50 total acres can be sampled as one.

Planting Requirements (for all cover crops):

- Cover crops and the following crop will be planted no-till. Exception: crops that have not been traditionally planted no-till (ONLY tobacco, green beans and vegetable crops) may be strip tilled at planting when meeting a STIR value ≤ 20 for each crop in the rotation. Full width tillage is not permitted for any crop. Consider using a crop roller when planting. **NOTE:** Aerial seeding is a no-till method (aerial seeding during moist conditions with follow up rain is best).
- Currently tilled cropland can convert to a no-till residue management system.
- Planting dates are to be strictly adhered to and producer is locked into a planned crop rotation.
- Cover crops are **not** to be managed as a harvested crop. P and K can be applied to cover crop for the crop following the cover crop.

Termination Requirements (for all cover crops):

- In order to benefit from nitrogen fixation by legume cover crops, allow legumes to reach early to mid-bloom stage prior to being killed.
- For pollinator crops, allow plants to reach full bloom.
- **Do not allow cover crop to go to seed.** however, in mixed species stands allowing some species to go to seed is acceptable, but realize the potential impacts on future wheat crops.
- Cover crops will serve as cover for a **minimum of 90 days.**
- At termination, the cover crop should have 90% or better ground cover and a **minimum height of 10 inches.**
- Terminate cover crops 7 to 14 days prior to planting to reduce allelopathic (toxic) activity toward the primary crop. Sorghum and cereal rye are plants that have strong allelopathic activity which may be beneficial for weed control. Typically terminate with Glyphosate at bloom stage or early head stage wait 14 days and spray gramoxone. If brassicas are in the mix spray broadleaf spray 2,4-D or Banvel 30 to 45 days prior to planting broadleaf crops like cotton, soybeans and tobacco. Always follow directions on the label and/or Univ. of TN herbicide recommendations. <https://extension.tennessee.edu/publications/Documents/PB1580.pdf>

Grazing Cover Crop Requirements:

- Only producers with a commitment to manage grazing heights are allowed to graze cover crops.
- Management technique will be to take half-leave half; allowing cover to reach 8" height then graze to 4" minimum height, maintaining 70% ground cover.
- Producer must have an area to remove livestock from the cover crop when the cover crop is vulnerable to overgrazing or excessive trampling.
- Cover crop can be grazed to a 4" minimum height prior to termination.
- No mechanical harvest (e.g. silage, balage, hay etc.) allowed.
- Base sacrifice area on feeding site assessment tool. Sacrifice area will not receive payment.

Leave an untreated area (for all cover crops):

- For all cover crops, leave a portion of the field or similar field to compare results.
- Area should be wide and large enough to get a reliable yield monitor reading.
- Only planted cover crop acres will receive payment.

Planting Options (for all cover crops):

- When planting with a drill use the lower recommended seeding rate. For broadcast (aerial) seeding, seed a minimum of 1.3 times the low rate.
- In developing mixes, seed a minimum of 70% of legume full rate in Nitrogen fixing cover or develop mix based on C: N ratio.
- Total seeding rate will equal 100% or higher. Up to 20% of mix can be a species that will be terminated by frost or heat (e.g. buckwheat with cool season mix planted in August.)
- 10% or more of the recommended full rate is required to count as a species in the 5 species mix, no more than 1.5 lb of total brassicas are recommended in a mix. If planting after Oct. 1 don't plant radish in the mix.

Select Cover Crop: Small grain and legume will make up 10% or more of the full seeding rate in the mix, brassica 5% to 15% (0.5 to 1.5 lb) of the full seeding rate in the mix. Consider leaving brassicas out of the cover crop every other year.

- **Basic (up to 3 yr):** Five species minimum (e.g. Rye, oats, wheat, radish, and turnips). Target the C:N ratio to be 24:1 but less than 31:1.
- **Multiple Species (3 yr):** (small grain, legume and brassica mix 5 species minimum): see planting options.
 - Target C:N ratio prior to a high residue crop to be 30:1 or less.
 - Target C:N ratio prior to a low residue crop to be 31:1 or higher.

C:N Ratio: The C:N ratio effects residue cover and nutrient cycling. For early soil health conditions (beginning stages), the target C:N ratio is 24-30:1. After soil health is more developed, the target C:N ratio will increase to 31-50:1. Look at the soil surface, if the residue is lacking increase the C:N ratio by increasing the grass component and terminating the cover crop later. If residue is building up on the soil surface, decrease the C:N ratio of the cover crop.

Cover Crop Example Mixes

Crop Mixtures	Seeding Rate Seeding lb/ac		C:N rate at Vegetative Stage
	Drilled	Broadcast	
	(Option: If grazing is planned increase small grain seeding rate up to 100 lb/ac)		

Multiple Species Cover Crop Mix (Cool Season planted after corn)

Cereal Rye	20	26	Aug. 15 to Oct. 15	31
Oats	20	26		
Austrian W	11	14		
Crimson Clover	4	5		
Radish	1	1		
Turnip	0.5	0.5		

Multiple Species Cover Crop Mix (Cool Season planted after corn)

Cereal Rye	20	26	Aug. 15 to Oct. 15	32
Wheat	15	20		
Crimson Clover	4	5		
Radish	1.5	1.5		
Hairy Vetch	4	5		

Multiple Species Cover Crop Mix (Cool Season planted after corn)

Cereal Rye	28	36	Aug. 15 to Oct. 15	35
Wheat	28	36		
Crimson Clover	4	5		
Radish	1	1		
Turnip	0.5	0.5		

Multiple Species Cover Crop Mix (Cool Season drilled only after double crop soybeans or cotton and up to 20% of land in full season soybeans can be drilled till Nov. 1 in this mix).

Cereal Rye	20	Drilled only, up to Nov. 1		33
Triticale	20			
Turnip	0.5			
Crimson clover or hairy vetch	5			
Austrian winter peas	13			

Multiple Species Cover Crop Mix (Warm Season) Double crop soybean producers could plant a warm season cover crop to achieve 3 consecutive years of cover crops. This option is available for all producers.

Buckwheat (optional)	1	1	April 20 to July 1	21
Sunflowers (optional)	1	1		
Sudangrass	10	13		
Millet	4	5		
Cowpeas	11	14		
Soybeans	11	14		
Turnips	1.5	1.5		
Sunhemp	5	7		

Basic Cover Crop Mix 1

Cereal Rye	20	26	Aug. 15 to Oct. 15	30
Wheat	20	26		
Crimson Clover	5	7		
Austrian Winter Pea	14	18		
Radish	1	1		

Basic Cover Crop Mix 2

Wheat	25	32	Aug. 15 to Oct. 15	25
Crimson Clover	5	7		
Austrian Winter Pea	14	18		
Hairy Vetch	5	7		
Radish	1	1		

- All mixes are only examples of mixes that can be used. Other mixes can be approved for use.
- Seed needs to meet the state seed law. It can be variety not stated (VNS) or certified seed or seed harvested from producer's farm.
- Seeding rate can be increased on all species but be aware that early production species can shade and reduce the stand of slower growing species. E.g. radish or turnips could reduce the stand of other species.
- Some producers have reported a corn yield drag after cereal rye. If it is a concern, other small grains can be substituted. Most likely the issue is too much carbon in mixture causing a higher C:N ratio.
- Recommend not use brassicas preceding cotton.
- Brassicas are heavy feeders and caution needs to be taken when using them. Maintain good fertility for the following crop.
- Mixes can be developed using the Green Cover Seed Smart mix calculator. No more than 1 ½ lbs of brassicas is typically recommended in a mixture. Turnips and more so rape (canola) can be difficult to kill. http://www.greencoverseed.com/smartmix_web/smartmix_web.htm
- High biomass cover crops, like cereal rye, have worked best in control of palmer amaranth.
- Annual Ryegrass has allelopathic (toxic) nature too but is only recommended for those who have experience using it. Annual ryegrass especially Italian ryegrass can be hard to kill and become a weed.
- Sorghums are warm season annuals with some reported allelopathic nature.
- Buckwheat is a succulent fast growing annual that winter kills very easy; it or other warm season cover crop species can make up 20% of the mix. Buckwheat is a very good attractant of beneficial insects.
- Legumes are typically coated and pre-inoculated if not order fresh inoculant and inoculate seed at seeding.

Producer

District Conservationist

Additional seeding options (full rates listed)					
Plant Species	Peak Bloom Period	Seeding Rate Lb/Ac <u>Drilled</u> Broadcast		Seeding Date	Note
Buckwheat (WSA)	21 day after planting	35	42	June 1 to Aug 15	Quick warm season cover, can be added as a minor component of fall cool season mix
Clover, crimson (CSA) (ss)	May	17	21	Aug 15 to Oct 15 Feb 20 to April 1	Tap root, late spring growth
Clover, berseem (CSA) (ss)	June	11	14	Feb 20 to April 1	Tap root
Clover, red (CSP) (ss)	July	8	10	Aug 15 to Oct 15 Feb 20 to April 1	Tap root
Cowpea (WSA) (ss)	July	56	70	May 20 to June 20	Tap root, High N producer
Millet, Browntop (WSA)	August	17	21	May 1 to July 1	Quick cover
Oats (CSA)	May	100	140	Sept 1 to Oct 1 Feb 20 to April 1	May freeze out
Radish, forage (CSA) (ss)	-	8	10	Aug 15 to Oct 15 best sown before Sept 15 Feb 20 to April 1	may freeze out at 25 degrees F, tap root, 1.5 lb/ac is enough
Rye, cereal (CSA)	May	90	112	Aug 15 to Nov 20	Allelopathic to palmer amaranth, plant small seeded crops 2 wk after rye termination
Sudangrass (WSA) (ss)	July	28	35	May 1 to June 20	Strong roots
Sunflower (WSA)	July - Aug	9	11	April 15 to May 15	Fast establishment
Sun hemp, (WSA) Tropical (ss)	-	20	25	May 1 to July 20	Need 60 days minimum growth high biomass and N producer
Sweet clover (CS Biennial) (ss)	July	13	17	Aug 15 to Oct 15 Feb 20 to April 1	Allelopathic to thistle and green foxtail, 1 lb/ac
Turnips (CSA) (ss)	-	3	4	Aug 15 to Oct 15 Feb 20 to April 1	Very small seed (electric seeder or carrier like pelletized lime or crimson clover, 1.5 lb/ac
Vetch, hairy (CSA) (ss)	May	22	28	Aug 15 to Oct 15 Feb 20 to April 1	Can be invasive, late spring growth, tolerant of low fertility, High N producer
Wheat (CSA)	June	90	112	Sept 15 to Nov 10 Feb 20 to April 1	Low cost quick cover, reduced vigor following sorghums
Winter Peas, Austrian (CSA)(ss)	May	40	50	Aug 15 to Oct 15 Feb 20 to April 1	Slow to establish

Note: CSA = Cool Season Annual, CSP = Cool Season Perennial, WSA = Warm Season Annual, WSB = Warm Season Biennial, ss = subsoiler crop