

Fig 1. Cover crop seeding dates, seeding rates and seeding depths.

Plant Species	Life cycle ³	Seeding rate (lb/ac) ¹						Seeding depth (in)	Planting Date Range ²	
		Pure Stand	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	Forage Stand		Northern	Southern
Cool-Season Growth										
Non-Legumes										
Winter Rye (<i>Secale cereale</i>)	nwk	50	38	25	17	13	88	$\frac{3}{4}$ to 1 $\frac{1}{2}$	7-15 to 11-1	8-1 to 11-15
Winter Triticale (\times <i>Triticosecale</i>)	nwk	60	45	30	20	15	94	$\frac{3}{4}$ to 1 $\frac{1}{2}$	7-15 to 10-22	8-1 to 11-1
Winter Barley (<i>Hordeum vulgare</i>)	nwk ⁴	59	44	29	19	15	-	$\frac{3}{4}$ to 1 $\frac{1}{2}$	7-15 to 10-22 or 3-15 to 5-1	8-1 to 11-1 or 3-1 to 4-20
Winter Wheat⁵ (<i>Triticum aestivum</i>)	nwk	64	48	32	21	16	94	$\frac{3}{4}$ to 1 $\frac{1}{2}$	9-22 to 10-22	9-30 to 11-1
Spelt⁵ (<i>Triticum aestivum</i> var. <i>spelta</i>)	nwk	64	48	32	21	16	94	1 to 1 $\frac{3}{4}$	9-22 to 10-22	9-30 to 11-1
Annual Ryegrass (<i>Lolium multiflorum</i>)	nwk ⁴	18	13	9	6	4	28	$\frac{1}{4}$ to $\frac{1}{2}$	8-1 to 9-20 or 3-15 to 5-1	8-1 to 9-30 or 3-1 to 4-20
Oats (<i>Avena sativa</i>)	wk	40	30	20	14	10	88	$\frac{1}{2}$ to 1 $\frac{1}{2}$	8-1 to 9-20 or 3-15 to 5-1	8-1 to 9-30 or 3-1 to 4-20
Oilseed Radish (<i>Raphanus sativus</i>)	wk	-	-	-	1	0.7	12	$\frac{1}{4}$ to $\frac{3}{4}$	7-15 to 9-15 or 3-15 to 5-1	7-15 to 9-30 or 3-1 to 4-20
Rapeseed/Canola/Kale (<i>Brassica napus</i>)	nwk ⁶	4	3	2	1.5	1	8	$\frac{1}{4}$ to $\frac{1}{2}$	7-15 to 9-15 or 3-15 to 5-1	7-15 to 9-30 or 3-1 to 4-20
Turnip (<i>Brassica rapa</i>)	wk	2.5	2	1	.75	.5	6	$\frac{1}{4}$ to $\frac{1}{2}$	7-15 to 9-15 or 3-15 to 5-1	7-15 to 9-30 or 3-1 to 4-20
Legumes										
Alfalfa (<i>Medicago sativa</i>) ⁷	nwk	16	12	8	6	4	-	$\frac{1}{4}$	8-1 to 8-15 or 4-1 to 5-1	8-1 to 8-30 or 3-30 to 4-25
Red Clover (<i>Trifolium pretense</i>)	nwk	9	7	5	3	2	-	$\frac{1}{4}$ to $\frac{1}{2}$	7-20 to 8-30 or 2-1 to 5-1	8-1 to 9-15 or 2-1 to 4-15
Yellow Sweet Clover (<i>Melilotus officinalis</i>)	nwk	8	6	4	3	2	-	$\frac{1}{4}$ to $\frac{1}{2}$	7-20 to 8-30 or 2-1 to 5-1	8-1 to 9-15 or 2-1 to 4-15
Crimson Clover (<i>Trifolium incarnatum</i>)	nwk	12	9	6	4	3	-	$\frac{1}{4}$ to $\frac{1}{2}$	6-1 to 9-15	6-1 to 9-30
Balansa Clover (<i>Trifolium michelianum</i> Savi)	nwk	3	2.2	1.5	1	0.8	-	$\frac{1}{4}$ to $\frac{1}{2}$	6-1 to 9-15	6-1 to 9-30
Winter Pea (<i>Pisum sativum</i>)	wk	40	30	20	14	10	-	1 to 1 $\frac{1}{2}$	7-20 to 9-20 or 3-10 to 5-1	8-1 to 10-1 or 3-1 to 4-20
Hairy Vetch (<i>Vicia villosa</i>)	nwk	15	11	8	5	4	-	$\frac{1}{2}$ to 1 $\frac{1}{2}$	7-20 to 9-20 or 3-10 to 5-1	8-1 to 10-1 or 3-1 to 4-20

Plant Species	Life cycle ³	Seeding rate (lb/ac) ¹						Seeding depth (in)	Planting Date Range ²	
		Pure Stand	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	Forage Stand		Northern	Southern
Warm-Season Growth										
Non-Legumes										
Sorghum-Sudangrass (<i>Sorghum bicolor</i> x <i>S. 2udanese</i>)	wk	24	18	12	8	6	35	$\frac{1}{2}$ to 1 $\frac{1}{2}$	5-15 to 8-1	5-1 to 8-15
Sorghum (<i>Sorghum bicolor</i>)	wk	5	3.7	2.5	1.6	1.2	8	$\frac{3}{4}$ to 1 $\frac{1}{2}$	5-15 to 8-1	5-1 to 8-15
Sudangrass (<i>Sorghum bicolor</i>)	wk	20	15	10	7	5	25	$\frac{1}{2}$ to 1	5-15 to 8-1	5-1 to 8-15
Pearl Millet (<i>Pennisetum Glaucum</i>)	wk	12	9	6	4	3	23	$\frac{1}{2}$ to 1	5-15 to 8-1	5-1 to 8-15
Japanese Millet (<i>Echinochloa frumentacea</i>)	wk	14	11	7	5	4	28	$\frac{1}{2}$ to $\frac{3}{4}$	5-15 to 8-1	5-1 to 8-15
Teff (<i>Eragrostis tef</i>)	wk	7.5	5.5	3.8	2.5	1.9	12	$\frac{1}{8}$	5-15 to 8-1	5-1 to 8-15
Sugarbeet (<i>Beta vulgaris</i> subsp. <i>Vulgaris</i>)	wk	-	-	1.3	0.8	0.6	-	$\frac{1}{2}$ to 1	5-15 to 8-1	5-1 to 8-15
Sunflower (<i>Helianthus annuus</i>)	wk	-	-	-	1.3	1	-	1 to 1 $\frac{1}{2}$	5-15 to 8-1	5-1 to 8-15
Buckwheat (<i>Fagopyrum esculentum</i>)	wk	-	-	12	8	6	-	$\frac{1}{2}$ to 1	7-15 to 8-15	7-1 to 9-1
Flax (<i>Linum usitatissimum</i>)	wk	-	-	9	6	4.5	-	$\frac{1}{2}$ to $\frac{3}{4}$	7-15 to 8-15	7-1 to 9-1
Legumes										
Cowpea (<i>Vigna unguiculata</i>)	wk	60	45	30	20	15	-	1 to 1 $\frac{1}{2}$	6-15 to 8-1	6-1 to 8-15
Sunn Hemp (<i>Crotalaria juncea</i>)	wk	12	9	6	4	3	-	$\frac{1}{4}$ to $\frac{1}{2}$	6-15 to 8-1	6-1 to 8-15
Soybean (<i>Glycine max</i>)	wk	54	40	27	18	13	-	1 to 2	6-15 to 8-15	6-1 to 8-30
Faba Bean (<i>Vicia faba</i>)	wk	15	11	8	5	4	-	1 to 2	6-1 to 8-1	5-15 to 8-15
Berseem Clover (<i>Trifolium alexandrinum</i>)	wk	10	7.5	5	3.3	2	-	$\frac{1}{4}$ to $\frac{1}{2}$	5-15 to 8-15	5-1 to 8-30

1. Seeding rates are listed as “pure stand” with the assumption to be seeded with some seed depth control; if a method is used that does not have seed depth control such as broadcast or aerial seeding a 20% increase in the seeding rate should be included to account for increased risk of poor emergence. The $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ seeding rates are to be used in creating mixes. The forage stand rate are to be used if the cover crop is to also serve as a livestock forage. If a rate is not listed (-) the seeding selected is generally not recommended.
2. Northern Ohio is generally north of I70 and Southern Ohio is generally south of I70.
3. wk = winter killed cover crops; nwk = non-winter killed cover crops
4. Non-winter killed only when planted during the fall dates.
5. Do not plant until after the Hessian fly free date; dates varies from Sept 22 in northern Ohio to Oct 5 in southern Ohio. Wheat and spelt cover crops can be planted up to 20 days past the fly free date. See the Ohio Agronomy Guide for specific county dates.
6. Fall planted varieties planted in the fall are “non-winter killed”; spring planted varieties planted in the fall or spring are winter killed.
7. In order to meet the intent and definition of cover crops (seasonal vegetative cover) alfalfa must be terminated and managed as an annual. Alfalfa planted to provide forage for multiple seasons should be implemented under forage and biomass planting (512).

Fig 2. Cover crop plant species suitability ratings to support practice purposes (Midwest Cover Crops Field Guide, 2nd edition, 2014).
Ratings: 0= no information, 1= Poor, 2=Fair, 3=Good, 4=Excellent

Plant Species	Practice Purposes						
	Reduce Erosion ¹	Increase soil health & organic matter ¹	Utilize (scavenge) excess nutrients ²	Suppress weeds/pests	Minimize Compaction ³		N fixation ⁴
					Subsoil	Surface soil	
Cool-Season Growth							
Non-Legumes							
Winter Rye	4	4	4	4	2	3	N
Winter Barley	4	3	3	3	3	3	N
Winter Wheat	4	3	3	3	2	2	N
Winter Triticale	4	3	3	3	2	2	N
Spelt	4	3	3	4	0	3	N
Annual Ryegrass	4	4	4	2	4	4	N
Oats	4	3	3	4	3	3	N
Oilseed Radish	1	3	4	3	4	3	N
Rapeseed/Canola/Kale	1	2	3	2	2	3	N
Turnip	1	1	3	3	0	3	N
Legumes							
Alfalfa	3	4	1	2	4	2	Y
Red Clover	3	4	1	3	2	3	Y
Yellow Sweet Clover	3	4	1	3	4	4	Y
Crimson Clover	3	4	1	2	2	3	Y
Balansa Clover	3	4	1	2	2	3	Y
Winter Pea	2	2	1	2	1	3	Y
Hairy Vetch	2	3	1	3	2	3	Y

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Plant Species	Practice Purposes						
	Reduce Erosion ¹	Increase soil health & organic matter ¹	Utilize (scavenge) excess nutrients ²	Suppress weeds/pests	Minimize Compaction ³		N fixation ⁴
					Subsoil	Surface soil	
Warm-Season Growth							
Non-Legumes							
Sorghum-Sudangrass Hybrid	4	4	4	4	2-4 ⁵	2-4 ⁵	N
Sorghum	4	4	4	3	2-4 ⁵	2-4 ⁵	N
Sudangrass	4	4	4	3	1-3 ⁵	2-4 ⁵	N
Pearl Millet	4	3	4	3	2-3 ⁵	1-3 ⁵	N
Japanese Millet	4	3	4	2	1-3 ⁵	1-3 ⁵	N
Teff	4	3	4	2	1-3 ⁵	1-3 ⁵	N
Sugarbeet	2	2	1	2	3	3	N
Buckwheat	1	2	1	4	0	3	N
Sunflower	3	3	4	3	3	1	N
Flax	1	3	2	2	2	2	N
Legumes							
Cowpea	4	2	1	4	2	3	Y
Sunn Hemp	3	3	1	3	3	3	Y
Berseem Clover	3	4	1	2	1	3	Y
Faba Bean	2	2	1	3	2	2	Y
Soybean	4	2	1	4	2	2	Y

1. Cover crops effect on soil erosion and soil organic matter will be evaluated with current NRCS prediction tools (RUSLE 2).
2. Cover crops that utilize (scavenge) excess nutrients may not address water quality if there is a lot of time between when they are killed and the next crop's utilization of the nutrients.
3. Cover crops can be used to minimize soil compaction but should be planned with other practices and/or management techniques to minimize the future damage.
4. All legume cover crops should be inoculated with the proper inoculant to maximize growth.
5. For Warm-Season grasses, subsoil and surface soil compaction depends upon management factors like mowing and grazing which increase root mass and decrease soil compaction.