



Agronomic Spotlight

Establishing Cover Crops

- Cover crops can include legumes, grasses, and brassicas.
- Primary seeding methods are aerial and ground based broadcasting, and drilling.
- Timely termination is important to avoid later complications in the cash crop.

Selecting a Cover Crop for Seeding

Depending on an area's growing season and environment, several cover crop species are available for seeding (Table 1). An excellent tool to help determine which cover crop is best suited for a field is The Cover Crop Decision Tool - Field Crops, which is available from the Midwest Cover Crops Council (www.mccc.msu.edu/index.htm).

Cover crops can include legumes (red, berseem, mammoth red, white, alsike, crimson, and sweet clovers, annual medics, cowpea, hairy vetch, alfalfa, birdsfoot trefoil), grasses (annual ryegrass, cereal rye, oats, wheat, sorghum-sudangrass, triticale, barley, rye), brassicas (oilseed radish, mustards, forage turnips, rape, canola) and other broadleaves such as buckwheat (Figures 1 and 2). Each species has benefits, such as quick establishment, growth in shade, and/or adsorption of nitrogen, and disadvantages, such as termination difficulty. An advantage of the legumes is the potential for adding nitrogen to the soil profile (Table 1).

Seeding Methods

Aerial and ground-based broadcasting and drilling are the most used methods for seeding cover crops. Cover crop seeds can vary greatly in weight and size; therefore, the seeding equipment and management practices should be matched with the seed.¹ If possible, a light incorporation after broadcasting can help establish a better stand.



Figure 1. Aerially seeded annual ryegrass and radish.

- **Aerial Broadcasting** - Best adapted to larger seeded species, allows for overseeding or interseeding in existing crops, and seeding when soils are too wet for ground seeding (Figure 1).
- **Ground-based Broadcasting** - Most used seeding method and generally very accurate. Spinners, drop tubes, or air pressure equipment can be used. Heavier seeds travel farther than lighter seeds; therefore, metering systems should be set appropriately to develop the desired seeding pattern.
- **Drilling** - In the central Corn Belt, drilling after harvest is the preferred time and type of seeding. The legume/grass box on a drill

works well for small-seeded cover crops while the standard box is best adapted to larger seeds. Drills work well in no-till operations.

Regardless of the seeding method, seeder calibration is necessary for each type of seed. Seeding rates for various cover crops are provided in Table 1. In many situations, combinations of two or more cover crop species are seeded together; therefore, the rate of each species within the combination is generally less than their single rate recommendations. The steps to follow for ground-based calibration are:



Figure 2. Annual ryegrass and radish roots can help reduce compaction.

- Determine the application rate in lbs/acre.
- Fill the seeder.
- Determine the spread width knowing the spread width will be less than the actual width the seeds are spread. Allow for consistent overlap.
- Set the seeder opening to the desired setting.
- Operate the seeder in a stationary location and collect seed being applied for one minute.
- Calculate the area that would have been seeded (if moving) and use the formula: length in feet of area seeded (tractor speed converted to distance traveled in one minute) X spread width in feet/43,560 = acres seeded.
- Divide the pounds collected by the area seeded to obtain the actual seeder output in lbs/acre.
- Make adjustments to tractor speed and/or seeder setting and repeat steps 5-7 to change application rate to the desired amount.¹

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Table 1. Cover Crop Seeding Rates and Depths, Nitrogen Values, and Life Cycle.

Species	Seeding Rate (lb/acre)	Seeding Depth if Planted (Inches)	Nitrogen Value ^a (lb/acre)	Life Cycle
Annual medic	10 - 39	.25 to .5	40 - 100	Summer annual
Berseem clover	9 - 20	.25 to .5	60 - 90	Summer annual
Crimson clover	12 - 20	.25 to .5	50 - 60	Summer annual
Field peas	70 - 150	1.0 to 2.0	30 - 100	Summer annual
Hairy vetch	25 - 40	.5 to 2.0	60 - 180	Winter annual
Mammoth red clover	8 - 15	.25 to .5	60 - 70	Biennial
Sweetclover (yellow) (SC)	8 - 15	.25 to .5	70 - 90	Biennial
Alfalfa	9 - 25	.25 to .5	50 - 150	Perennial
White clover	5 - 7	.25 to .5	60 - 100	Perennial
Medium red clover (MRC)	10 - 15	.25 to .5	60 - 70	Perennial
Alsike clover	4 - 10	.25 to .5	60 - 70	Biennial/ Perennial
Birdsfoot trefoil	5 - 10	.25 to .5	40 - 100	Perennial
60/40 Mix MRC/SC	8 - 15	.25 to .5	60 - 90	Biennial/ Perennial
Buckwheat	36 - 60	.25 to .5	NA	Summer annual
Forage turnips	3 - 5	.25 to .5	NA	Summer annual
Oats	34 - 68	1.0 to 2.0	NA	Summer annual
Oilseed radish	15 - 25	.25 to .5	NA	Summer annual
Rape	3 - 8	.25 to .5	NA	Summer annual
Annual ryegrass	15 - 25	.25 to .5	NA	Winter annual
Barley	48 - 96	1.0 to 2.0	NA	Winter annual
Cereal rye	28 - 112	.5 to 1.0	NA	Winter annual
Triticale	60 - 120	.5 to 1.0	NA	Winter annual
Wheat	60 - 120	.5 to 1.0	NA	Winter annual

^aDepends on cover crop density and rate of decomposition.

Source: Mutch, D.R. and Martin, T.E. Michigan field crop ecology - cover crops. What are cover crops? (Managing Cover Crops Profitably. Sustainable Agriculture Publications - USDA.

When to Seed

Cover crop seeding can occur in the fall, winter, or spring. However, crops planted in the fall have the best opportunity to provide the potential benefits of erosion control, nitrogen sequestration, and compaction reduction. Late summer or fall overseeding or interseeding should occur when there is enough available light for the cover crop seed to germinate and become established, but late enough that it does not compete with the growing crop. In Canada and northern U.S., research has demonstrated that legumes should be seeded between the corn growth stages of V-4 and V-6, while annual ryegrass should be seeded between V-6 to V-8.² In the central Corn Belt, overseeding in corn generally occurs at black layer as the crop begins to senesce. In soybean, overseeding is best accomplished when leaves begin to turn yellow. Overseeding may not be recommended if soils are too dry to adequately establish a stand.

Frost-seeding occurs when the cover crop is seeded in late winter to very early spring such as red clover being seeded into wheat in March or earlier depending on geographical location. Seeding can also be accomplished pre- or post-season when the cover crop is seeded before a late-season crop or after the prior crop has been harvested.

Terminating the Cover Crop

Cover crops can become weeds in the future cash crop if not adequately controlled or properly terminated. Environmental conditions can automatically terminate cover crop species such as oat and oilseed radish through freezing temperatures. Tillage can also be an alternative termination method except in no-till operations.

Chemical control with a tank mix of a Roundup® brand agricultural herbicide product and 2,4-D ester can provide effective control. Applications should be made to the cover crop when its stage of growth is best for control. Depending on the future cash crop, plant-back restrictions may apply. Individual state recommendations should be followed.

Sources

¹Mutch, D.R. and Hill, E.C. Cover Crops. Michigan State University. http://www.msue.anr.msu.edu/topic/info/cover_crops.

²Mutch, D.R. and Martin, T.E. Michigan field crop ecology - cover crops. What are cover crops?

Web sites verified 7/25/16. 160722124001

For additional agronomic information, please contact your local seed representative. Developed in partnership with Technology Development & Agronomy by Monsanto.

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