



Cover Crop Mix with excellent establishment.

Factors affecting establishment of cover crops:

Success is dependent on several factors: seeding date, weather (temperature and moisture) after seeding, seedbed conditions, fertility, depth and volume of previous crop residues, planting depth, seed soil contact, seeding rate, seed quality (germination and % purity), time of freeze after seeding, insects and diseases.

The benefits of a cover crop will be greatest when a good stand is established with as little soil disturbance as possible. The seeding tool or method should have a calculated Soil Tillage Intensity Rating (STIR) rating of 20 or less according to Revised Universal Soil Loss Equation (RUSLE2)

Seeding depth guidance		
groups	optimum	maximum
Brassicas, clovers, small seeded legumes, small seeded grasses	¼"	¾"
Vetches, sorghums, wildryes	½"	1"
Cereal grains	¾"	1 ½"
Beans, peas	1 ½"	2"

The following are recommended seeding methods and tools which optimize the above factors.

No-Till Drilling: Use a no-till drill that is designed to handle heavy crop residues and the type of seed being planted (especially important for small seeded species). Set the no-till drill to provide good seed-to-soil contact and a planting depth preferred for the desired species to be planted. Depth control for most drills is not precise, so it is important to set it for the optimum depth, and check often to assure placement doesn't exceed the maximum depth for selected species. Soils that are too wet or too dry can also cause improper seed placement.



No-Till Drilling (heavy or light residue crops)

Harrow Seeding: Rotary harrows, coulter harrow type vertical tillage tools or similar tools can be used to aid in fluffing or cutting residue to allow improved contact with the seed and soil. Air delivery seeders can be mounted to these tools to deliver the seed to the soil as the residue is lifted or cut. The implement shall be set to run no deeper than 1" and not be designed to invert the soil or to bury the crop residue. Coulters will be set to run straight and not be cupped or concave. Tools with multiple operation gangs should only utilize the coulters with the rear harrow gangs raised or detached. This prevents excessive soil disturbance that will reduce the benefit of the cover crop. This shall be a single pass operation.



Rotary Harrow Seeding - mounted air delivery seeder in light residue crops



Rotary Harrow Seeding - seed delivery ports



Rear harrow gang should be raised

Coultter Harrow (vertical tillage tool) Seeding - air delivery seeder on a coultter harrow in heavy residue crops

Narrow Row Planting: Many split-row or narrow row planters (15" row width or less) can be equipped with seed plates, such as are used for sugar beets or sorghum, which works well for many cover crop species. Additional adaptation and or calibration may be necessary due to variation of seed size among cover crop species and varieties. Since a planter is capable of much more precise spacing and depth control, it is possible to reduce overall seeding rates to 50% of drilled rates. To meet criteria for soil erosion and soil quality at least two species of cover crops should be planted either in alternating rows or combined together. This method will not be used if weed control is the primary purpose.



Narrow Row or Split-Row Planter



Two species of Cover Crops in alternating 15" rows

Broadcast Seeding: Seed may be broadcast into light residue crops, without a seedbed preparation, if completed in a uniform manner. Heavier seed such as cereal grains are more adapted to this method when seeding into freshly harvested crop residues. Seeding rates should be adjusted up by at least 15%. Pre-mixing the seed with 200 lbs. per acre of pelletized lime or blended with the fertilizer intended for the subsequent crop is acceptable if using an airflow applicator. Seed blended with Fertilizer should be immediately spread to prevent damage to the seed. Wind speed should be 15 m.p.h. or less when broadcasting light seed such as annual ryegrass. A harrow, meeting the same specifications as **Harrow Seeding** above, may be used immediately following the spreader to improve seed to soil contact.



Aerial Inter-Crop Seeding



Airflow Applicator

Aerial Inter-Crop Seeding: Broadcast via a plane, helicopter or high clearance spreader into existing vegetation or residues. This method relies on rain, freeze/thaw cycles, or snow to incorporate the seed. Timing in the fall should be just prior to leaf drop or crop maturity for most cover crops. Some shade tolerant species may be adapted to earlier seeding. It does not include a seedbed preparation. Earlier seeding is desirable when cover crop is to be used for fall forage. An attempt should be made to seed just ahead of predicted rain. Seeding rates should be adjusted up by at least 15%. Only seed mixes of species with similar density should be considered. Aerial applicators should be knowledgeable of the spreading width and the weight of the planned species. Wind speed should be 15 m.p.h. or less when broadcasting.



Aerial Inter-Crop Seeding - established in standing soybeans