United States Department of Agriculture

NRCS Natural Resources Conservation Service

Cover Crop Species Selection for Crop Production

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Soil Moisture Concerns

The primary crop production concern in eastern South Dakota (SD) may be moisture management and wheat residue. Decaying residue is important in building carbon in the soil and increasing organic matter levels but large amounts of wheat residue make planting corn a challenge. Producers with this as a major crop production concern should consider cover crop mixes with low carbon:nitrogen (C:N) ratios to improve residue cycling along with species that will utilize fall moisture, as well as, spring moisture. Brassica species have low C:N ratios, but they will also deplete the sulfur in the soil, so it will be necessary to apply sulfur fertilizer in the spring. Species that fit

the criteria are cool-season broadleaves like brassicas (winter canola, rape, turnips, radishes, etc.) Species with early spring growth characteristics will utilize spring moisture along with the improved trafficablity of a living root system. These species will over winter such as the winter small grains (winter wheat, winter rye, triticale); and the clovers (sweet and red clover).

Soil Salinity Concerns

Throughout eastern SD, soil salinity may be a secondary concern for a few acres in the field to a primary concern in the entire field. Species selection within a cover crop mix for salt tolerance would include species of small grains such as rye, barley, and wheat. Also, broadleaf plants with good salt tolerance would be

species such as sugar beets, rape, and canola. In salt affected fields or portions of fields with electrical conductivity (EC) readings greater than five or six, a more intensive long-term solution needs to be employed. These areas may be devoid of typical salt tolerance vegetation (i.e., foxtail barley and kochia). In these areas, long-term salt tolerant perennial cover should be planted (i.e., tall or western wheatgrass).

Nitrogen Fixation or Recovering Residual Nitrogen

The major monetary incentive for planting a cover crop may be N management. Species selection for recovering residual N may include those that have a fibrous root system to

recover N in the upper most regions of the soil profile, as well as, species with deep tap root systems to recover N below two to three feet. Warm-season grasses, like sorghum or millet, or cool-season grasses like rye, wheat, barley, or oats, may very effectively tie up available nitrate shallow in the soil profile. Other species to recover N deeper in the profile may include sunflower or cool-season broadleaves such as sugar beets, canola, or rape. Fixing N by planting legumes is not a new idea; however, a reasonably new idea is planting legumes short-term in rotation (as a cover crop) and fixing 10 to 100 pounds of N per acre. Annual legumes such as lentils and field peas, would be on the lower end of this range, while perennial or biennial species such as the clovers and vetches are on the higher end. The amount of N fixed will depend upon the species and growing conditions. Soil testing and monitoring the amount of residual N in the profile should be accomplished to verify the amount of N fixed.

Compaction

Some available statistics suggest that compaction related issues may affect 10 to 20 percent of the cropland in SD. A cover crop mixture, with deep tap roots, will break up compacted layers and improve water infiltration into the soil (i.e., radishes, turnips, canola, rape, and sugar beets, as well as, the legumes like alfalfa, clovers, and the vetches.)

Objective	Primary Cover Crop Species
Grazing	turnips, lentils, rape, radish, rye, oat, triticale, sorghum-sudan
Reducing Compaction	radish, canola, sugarbeet, sunflower, sorghum-sudan, turnip (and hybrids)
Moisture	rape, clovers, winter wheat, rye, triticale
N-fixation	clovers, vetches, lentils, cowpeas, soybean, field pea, chickling vetch
Residue Cycling	Brassicas (canola, rape, radishes, turnips, and mustards)
Nutrient Cycling	sunflower, sugarbeets, brassicas, small grains
Salinity	sugarbeets, barley, winter canola, rape

Additional Information

A full list of cover crop characteristics is available in Table 1, Common Species and Characteristics, which is attached to the NRCS Conservation Practice Standard Cover Crop (340). Also, the NRCS Cover Crop Seeding Plan and Record, SD-CPA-62, can help with possible herbicide carryover issues and calculate the pounds of pure live seed that a producer needs to plan.

Reference

USDA-ARS. Personal Correspondence.