



October 1, 2020

FOR IMMEDIATE RELEASE

CONTACT: Stan Wise, Communications Coordinator

PHONE: 605-368-4091

EMAIL: stan.soilhealth@sdconservation.net

Put cover crops to work for you

By Lura Roti for South Dakota Soil Health Coalition

There's no one-size-fits-all cover crop mix. So, selecting the right cover crop mix may seem a bit overwhelming. To provide guidance as farmers begin planning for the 2021 season, South Dakota Soil Health Coalition reached out to several experts.

Begin with a goal

Depending on the mix, cover crops can provide many benefits below the soil's surface and above – it just depends on what your goals are, explained Anthony Bly, SDSU Extension soils field specialist.

"Understanding what you want to do with cover crops is very important," Bly said. "By identifying your goals, landowners are able to select the most appropriate mix that will provide the greatest benefit and comply with herbicide laws without spending more than necessary or having a negative impact on next year's crop."

Read on to learn experts' suggestions depending on your cover crop goal.

Goal: Build organic matter

Overall, cover crops enhance soil health because they extend the amount of time a living root is on the landscape, Bly explained. "The living root is probably the most important reason to plant cover crops."

Living roots, he explained, are essential to maintaining soil health because they decrease soil compaction and increase water infiltration, and soil biology depends upon living roots for food.

In a typical cropping system – corn, soybeans, wheat or oats – there is a segment of time when there is no living root in the soil. By extending the timeframe a living root is in the soil, cover crops also increase soil organic matter, explained Jason Miller, conservation agronomist for South Dakota Natural Resources Conservation Service.

"Plants harvest sunlight. When you grow plants longer, it increases organic matter on the surface and in the soil," Miller said.

What to consider

- It takes time: “This does not happen overnight. We don’t increase organic matter by 1 percent a year. So, your goal to increase organic matter needs to be a long-term goal,” Miller said.
- Full-season cover crops tend to build soil organic matter quicker – *as long as they are not hayed off*: “Anytime we remove residue with machinery, we are likely going backward in the overall system from the standpoint of organic matter,” Miller said.

However, results differ if cattle graze cover crops. Miller explained that in most cases cattle recycling cover crops increases the amount of organic matter built up in a season.

Goal: Improve/motivate soil biology

Living roots motivate soil biology, Miller and Bly explained.

“There is a whole food chain in the soil,” Bly said. “Thousands and thousands and thousands of species of microbes, fungi and bacteria. The living root encourages their activity and supplies them with a food source.”

This root-derived food source is called exudates. “Exudates build the soil biology population and potentially expand it,” Miller said.

As microbes feed on living root exudates, they help plants take up unused nitrogen and convert fixed forms of phosphorus into plant-available forms.

What to consider

- Keep it diverse: “Different species of plants produce different exudates. Like us humans, soil microbes prefer a buffet to eating the same thing over and over. They want a diverse food source,” Miller said.
- The upcoming crop: When selecting a cover crop mix, consider the upcoming crop. If it’s a warm season crop, like corn, prevent pest or disease pressure by limiting the warm season species in the mix.
- Fertilizer placement: “Because of residue on the soil’s surface, how fertilizer is placed is critical,” Miller said. “Place fertilizer within 2 to 3 inches of the seed so it is readily available.” Also, Miller encouraged landowners to consider carbon and nitrogen ratios of the cover crop species.

Goal: Break up soil compaction

Although it may seem like tillage breaks up compaction, the weight of the implement combined with the physical force of iron dragging through the soil actually creates compaction, explained Bly.

Cover crops help break up the “tillage pan” and more. “As the roots grow through the tillage pan, they fracture it,” Bly said. “As aggregation takes place along the living root, it offsets the negative effects of compaction.”

Bly explained that the aggregation, or clumping of soil caused by living roots, allows for increased water infiltration and air movement through the soil.

What to consider

Although all cover crops aid in breaking up soil compaction, Bly said some are better at breaking up compaction than others.

“We tend to think of tap roots as doing a good job with defined compaction layers,” Bly said. “The radish has the largest tap root, but others to consider include sunflowers and other oil seeds like rapeseed, canola, soybeans as well as clovers.”

He added that fibrous root systems do well with soil with thicker compaction layers near the soil surface. “Sorghum Sudan grass is probably the best. Other millets are good as well as cereal rye and triticale.”

Goal: Weed suppression

To understand how cover crops aid in weed suppression, Eric Barsness, conservation agronomist for SD NRCS said it is a good idea to take a few minutes to consider where weeds flourish. “During the growing season they germinate and grow where the crop canopy is open, allowing sunlight to get to the soil, or after harvest if residue is not covering the ground.”

Cover crops suppress weeds by providing soil cover.

What to consider

- Weed suppression after small grain harvest: Plant cover crops within two days of small grain harvest. If small grains are harvested before August 5, Barsness considers planting a warm season mix that includes species like Japanese or German millet.

If small grains are harvested after August 5, Barsness suggested planting a cool season mix that includes legume, grass and brassicas such as: rapeseed, turnip, radish, oats and common vetch.

- Weed suppression in a corn/soybean rotation: Cereal rye is Barsness’ top recommendation for a cover crop species to suppress weeds in a corn/soybean rotation. “In addition to providing quick soil cover, this species also has some weed control tendencies,” Barsness said.

For best results, Barsness said to aerial seed cereal rye into standing corn the last week of August/first week in September at a rate of 60-pounds-per-acre. Drill soybeans into rye the following spring. Spray down the rye right after planting.

“The rye allows for a nice mellow seedbed.”

- Weed suppression on prevent plant acres: Begin by spraying down existing weeds. If planting early in the season, Barsness suggested planting warm season cover crop species like sorghum Sudan grass.

Goal: Extend grazing season and increase available forage

Certain cover crop mixes work well to extend the grazing season and increase available forage, explained Soil Health Technician and Garretson, S.D., farmer Austin Carlson.

“Prior to utilizing cover crops, we were always running short on grass mid-to-late August,” Carlson said. “Cover crops allow us to rest our pastures and put our cattle to work spreading their manure for us.”

What to consider

- Planting into prevent plant acres: Due to increased spring moisture, Carlson has been planting full season cover crops on prevent plant acres. “Ideally, we are able to graze the full season cover crop twice.”

A full season cover crop contains a diverse mixture of warm and cool season grasses, small grains and brassicas.

- Planting after small grain harvest: “The biggest return I have seen with cover crops is when I plant them after a small grain because the growing window is longer than when you plant after corn or soybeans,” Carlson said.

The mix Carlson planted after small grain harvest included both warm and cool season plant species – (cool season) peas, kale, rapeseed, radish, Ethiopian cabbage, flax, turnips, wheat and rye; (warm season) Sudan grass, millet.

- Consider the growing season: “Match the season with the cover crop mix,” Carlson said. “Why plant a warm season cover crop in the late fall?”

Goal: Nitrogen fixation

Nitrogen fixation occurs when legumes absorb nitrogen (N₂) gas from the air and with the help of rhizobium bacteria, their root nodules convert the N₂ gas from the atmosphere into a readily available form plants can utilize.

What to consider

Because each legume depends upon a specific rhizobium bacteria to convert atmospheric nitrogen into a form that is readily available to plants, Bly encouraged growers to consider purchasing inoculated cover crop seed.

“Our soils are full of native rhizobium, but not necessarily specific to the legumes you are planting. The rhizobium bacteria allows the biochemistry process to take place in the root nodule,” Bly explained.

He added that seed companies selling legume cover crops, like clovers, sun hemp, cow peas and vetches, will also have inoculants available.

Goal: Wildlife habitat

Habitat loss is a big issue for South Dakota’s wildlife – especially pheasants and other birds. Cover crops can help, explained Barsness.

“Certain cover crop mixes can provide that needed habitat for birds to nest, catch insects and seek refuge from prey and weather extremes,” Barsness said.

What to consider

- Stalk strength: When selecting cover crop mixes for wildlife habitat, Barsness said it is important to select a mix with an abundant mix of plants with strong stalks. “You want them to stand up over the winter and not lay down flat,” he said. Examples include Ethiopian cabbage, millets and flax.

- Timing: Because some of the stronger-stalk plants are warm season species, Barsness said the ideal planting window is late July early August (thru Aug. 5). Cool season plants like oats, barley, and Ethiopian cabbage can be planted into late August.
- Ground cover: In addition to taller, strong-stalk species, ground cover is also important to ensuring plentiful insects and nesting habitat. “Cereal rye, winter wheat and triticale go deeper into the fall, provide good cover and grow nicely in the spring.”
- Diversity: “Some think that if they have a diverse cover crop mix it becomes more expensive and complicated. I have found just the opposite,” Barsness said. “The more species in a blend, the better the blend does because the species complement each other.”

SDSHC is here to help

Whatever your goal, introducing cover crops into your crop rotation and landscape provides multiple soil health benefits.

“It all goes back to the soil health principles – cover crops keep the ground covered, they allow for a living root to be out there as long as possible, and soil aggregates build up around those living roots to improve water and air exchange,” Bly said.

To learn more about cover crops and what mix will work best on your acres to achieve your goals, reach out to SDSHC staff at <https://sdsoilhealthcoalition.org/>, your local conservation office or SDSU Extension.

South Dakota added to Cover Crop Decision Tool

The Midwest Cover Crop Council has added South Dakota and North Dakota to its Cover Crop Decision Tool.

To use the tool producers just need to input their state, county, cash crop planting and harvest date, field drainage conditions and goals for the cover crop, and the tool will give them a range of cover crop species to fit their needs.

Visit <http://mccc.msu.edu/covercroptool/> to use the tool.



Courtesy of Austin Carlson, SDSHC Soil Health Technician

Cow/calf pairs graze on a full season cover crop mix planted into prevent plant acres in spring 2020. The mix includes Sudan grass, millet, cowpeas, sunflowers, cereal rye, turnip, radish and clovers.

[\(Click here to download high-resolution photo.\)](#)



Courtesy photo

Eric Barsness, conservation agronomist for SD NRCS.

[\(Click here to download high-resolution photo.\)](#)



Courtesy of SD NRCS

Depending on the mix, cover crops can provide many benefits below the soil's surface and above – it just depends on what your goals are, explained Anthony Bly, SDSU Extension soils field specialist. "Understanding what you want to do with cover crops is very important. By identifying your goals,

landowners are able to select the most appropriate mix that will provide the greatest benefit and comply with herbicide laws without spending more than necessary or having a negative impact on next year's crop."

[\(Click here to download high-resolution photo.\)](#)