

HOW COVER CROPS CAN BENEFIT YOUR SMALL ACREAGE

Cover crops can provide a forage resource while improving soil health.

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The benefits of cover crop mixes, specifically how they improve soil health, have received a lot of attention lately, but are they a tool that can benefit small acreage? With so many species to choose from, how do I plan a cover crop mix, and what is the best mix for my circumstance? Before answering these questions, it is important to understand soil health and how to improve it.

Soil Health and Cover Crops

Soil health is defined as the “capacity of the soil to function.” Soil microbes play a critical role in soil functions such as water availability, nutrient availability to plants, pest control, and residue decomposition. Building healthy soil is simply about taking care of these microbes, the “underground herd.” One acre of healthy soil contains more soil life, by weight, than a cow-calf pair!

As with any living creature, soil microbes need food, shelter, and water to survive and flourish. Soil microbes’ primary food comes from plants, whose roots exude the sugars that microbes feed on, creating a food chain from the smallest organism (bacteria) to relatively large organisms like earthworms. In return, soil microbes make nutrients available to plants. Think of soil microbes as workers in a factory that produce what your plants need to thrive. If the factory is destroyed, the workers will leave or die, and the plants will suffer. For soil microbes to improve soil health, four principles are important:

1. minimize disturbance,
2. maximize diversity,
3. keep living roots in the ground,
4. keep the soil covered.

Cover crop mixes, if planted with a no-till drill, can do all of these things. Most importantly, these crops will feed the underground herd, resulting in soil health improvements such as increased water infiltration and storage, improved soil structure, and improved nutrient cycling, all of which reduce inputs, such as fertilizer and irrigation. There is additional value if the cover crop is grazed, both to the producer’s bottom line, as well as to the soil. Keep in mind that it is important to leave at least 50% vegetative residue behind when applying grazing so the soil remains covered and the residue is available to feed the soil organisms. Cover crops can also provide excellent food and shelter for pollinators.

Designing Cover Crop Mixes

The first question to ask before designing a mix is, “What are my goals?” Once goals are established, additional questions will arise. What problems can the mix solve? Is it compaction, lack of nitrogen, weeds, or a shortage of forage? A mix that will be grazed will be quite different than a mix that will break up compaction and add nitrogen, although they may share some of the same species. When will I plant the mix? What crop was before it and what will come after it? How will I seed it?

For example, let’s say you want to rejuvenate a poorly producing alfalfa field that has annual weeds starting to creep in. Your goal is a productive, diverse hayfield of perennial plants. After taking out the alfalfa (preferably without tillage – remember the first soil health principle to minimize soil disturbance), a cover crop mix, which could be grazed, could be used for one to two years to clean up weed problems and enhance diversity quickly. What would go in the mix? In this case, the time of grazing would determine the species chosen. If you want to graze in June or July, plant a cool-season mix early in the spring. Options include small grains (wheat, barley,

triticale), brassicas (mustard, radish, turnip), legumes (peas, lentils, hairy vetch, various clovers), and broadleaf plants such as flax or safflower. Notice that these species have different root types; some are fibrous (small grains), while others are tap-rooted (brassicas, safflower). Having diverse root types helps build soil structure. A mix for early season grazing might include forage barley, triticale, turnips, forage collards (a brassica), peas, flax, and safflower.

If you want to graze in the fall or winter, plant a predominately warm-season mix in late spring-early summer after all danger of frost has passed. Millet, sorghum-sudan, and corn all add grazing value. If you want winter grazing then add more sorghum-sudan because it holds its nutritive quality longer than millet. Warm season legumes include soybeans, cowpeas and mung beans. You can also add tap-rooted sunflowers and brassicas, which can help break up compaction and are also good for grazing. If wildlife are something you want to promote, then add grain sorghum and proso millet. Ground birds will benefit, but there will still be forage for grazing. For this use, a good mix might include German millet, sorghum-sudan, grazing corn, cowpea, soybean, sunflower, forage collards and turnips.

Note that radishes were not mentioned for the above mixes, even though this species has received considerable attention in the farming press. Radish is an excellent choice for mixes as its taproot can break through compaction layers and scavenge residual nitrogen. However, it is best planted after June 22 since it will flower if planted before that, which means it will not produce much of a taproot and it will produce seed, leading to volunteer radishes the following year that you may not want. Radish is best used in mid-to-late summer mixes, when it will produce a taproot. If you want tap-rooted species earlier in the year consider other brassica species such as forage collards or turnips.

Seeding rates are an important consideration in designing mixes. Too much seed will make the mix expensive. Too little

seed will result in not enough plants to cover the ground. Some companies selling cover crop seed have “mix calculators” on their web sites, which show the percentage of broadleaf plants, grasses, and legumes as the mix is being created.

No matter what kind of mix is planted, there are some considerations to keep in mind:

- Control weeds before planting in order to give the mix the best chance to thrive.
- Use the proper inoculant(s) for the legume(s) used.
- Be aware of herbicide history on the field, as some products have long residuals that may harm some species of cover crops.
- Understand some species are toxic to livestock. One example is the potential for prussic acid poisoning from sorghum, sudangrass, and sorghum-sudan hybrids.

Everyone’s goals and situation are different and cover crop mixes should reflect that. There is not a “one size fits all” mix and mixes should be tailored to meet specific goals and conditions. Some areas in Montana are too cool for most warm-season species, so cool season species would be most appropriate. What grows naturally in your area will often provide insight into what species might be well-adapted on your land. In eastern Montana, for example, wild sunflowers are common, suggesting cultivated sunflower might grow well, which it does, and many producers grow it as a cash crop or use it in cover crop mixes.

Cover crops are a useful tool for building soil health if you understand how to use the tool. Talk to other landowners who have grown cover crop mixes. There are many “tricks of the trade” that can help avoid problems or even failure. Your local Conservation District is also a good source of information, and some even rent no-till drills for planting your mix with minimal soil disturbance. If you have questions, contact your local NRCS (Natural Resources Conservation Service) or your local MSU Extension office for assistance. ■



FIGURE 1: Hairy vetch.
FIGURE 2: Sunflowers.