HOW COVER CROPS CAN BENEFIT YOUR SMALL ACREAGE

By Roger Hybner

A cover crop is a crop planted in a garden or field to provide benefits such as reducing weed growth and subsequent seed production, feeding beneficial soil-building microorganisms, and generally improving soil health.

Cover crops are cool-season or warm-season crops. Cool-season cover crops are planted in early spring when soil temperatures reach 50F degrees. They include barley, canola, peas, vetches, radishes, and turnips.

Warm-season cover crops are planted after soil temperatures reach 60F degrees. Examples include beans, corn, lentils, millet, and sunflowers.

Mixing it Up

Cover crops are often planted in mixes, which may contain many different cultivars and species. These mixes, which can also be custom blended for landowners, are available in 50-pound bags. An example would be a deep-rooting mix that contains species such as radishes, safflower, soybean, and sunflowers, which can penetrate heavy clay hardpans, loosen the soil to improve water infiltration, and mine mineral nutrients from deep in the soil and deposit them closer to the soil surface for subsequent crops.

Soil microbes (bacteria, fungi, etc.) and earthworms are basically invited to a picnic basket of organic matter (decaying plant material) when a diverse mix of species is planted. Strong competition for space, nutrients, sunlight, and water by a healthy cover crop suppresses weeds.

Cover crops reduce wind and water erosion, add organic nitrogen to the soil, increase soil water holding capacity, and, depending on the cover crop used, can provide a banquet for insect pollinators in the hot summer months when many other plant species are well past the flowering stage.

Target Biggest Concern

The cover crop mix should address the most significant problem facing the landowner. For example, if a crop monoculture, like wheat, has been used for years on a field, the soil may not be very rich in microorganisms, nutrients, and organic matter. It may take several years of cover crop plantings to increase soil health to the desired level. A diverse crop mix containing radish, turnip, pea, vetch, sunflower, safflower, millet, and sorghum-sudangrass can help

boost soil microorganism diversity. A good rule of thumb for cover crop mixes is to have the legumes comprise 1/3 to 1/2 of the seed varieties in the mix. Legume crops "fix" nitrogen by pulling it out of the air and depositing it in the soil as organic fertilizer for use by other plants. The final makeup of a cover crop mix will also depend upon seed availability.

The planting method can also improve soil tilth and condition. Use a no-till drill or a single or double disk drill to minimize soil disturbance when planting a cover crop. Excessive tillage can be detrimental to soil microbes, especially fungi. When soil is heavily tilled, soil structure can be harmed, organic matter and soil nutrients depleted, water holding capacity reduced, and the land made susceptible to wind and water erosion.

Although there can be large differences in seed size in a mix, planting all seeds at a ¾-inch depth allows the larger seeds to open a path to the soil surface for the smaller-seeded species to follow. For suggested planting rates, contact local Natural Resources Conservation Service county offices or UW Extension educators.

A warm-season mix at the MSU Eastern Agricultural Research Center near Sidney, Montana.

A radish root ls bent but still penetrated a soil hardpan at the Bridger Plant Materials Center.

Keep in mind that maximum forage or seed yields are not the most important goals when growing cover crops. Instead, shading the soil surface from the hot summer sun and out-competing weeds are the highest priorities.

An earthworm enjoys a cool-season crop.

Watch for Seedheads

Since the diversity in cover crop mixes prohibits any herbicide application for weed control, monitoring for weed and crop seed formation is critical. As soon as weeds begin to form seedheads, the cover crop must be terminated by light tillage for green manure by using a crimper (a piece of equipment like a roller that breaks the stems in several places and stops vascular flow), by grazing it with livestock, or by applying a burn-down herbicide, such as glyphosate, that kills all green vegetation.

Termination prevents weed seed production and some cover crop species, such as hairy vetch, ryegrass, and sweet clover, from becoming weedy in crops planted in following years. A warm-season cover crop mix can then be planted within a few days after terminating the cool-season cover crop if irrigation or rainfall is adequate for establishment and there are 30 days before the first expected killing frost.

Manage the warm-season crop as you would the cool-season crop, terminating growth when weed seedhead formation begins if frost doesn't do it for you. Since warm-season crops are planted late in the growing season when rains are rare in Wyoming and Montana, these crops are best suited for irrigated sites.

There are many sources of information on cover crop species detailing their description, specific uses, selection for mixes, seeding rates, and water and pest management requirements. A good publication is *Managing Cover Crops Profitably*, 3rd edition, which can be downloaded for free at http://bit.ly/managecover.

USDA-Natural Resources Conservation Service Bridger Plant Materials Center

RESEARCH YIELDING PLANTING, SOIL, WEED, FERTILIZER INFORMATION

Cover crop research is entering its second year at the USDA-Natural Resources Conservation Service, Bridger Plant Materials Center (BPMC) in south-central Montana. Thirty cool- and warm-season mixes are being studied for use as crop rotations to:

- determine the best planting dates,
- optimize establishment practices,
- maximize soil organic matter,
- produce the highest forage yield before termination,
- increase mycorrhizal activity,
- reduce weed seeds in the soil, and
- add organic nitrogen to the soil to reduce fertilizer expenses.

In addition, production costs are being recorded for an economic analysis upon study completion. Results are applicable throughout the region. One positive soil health component was observed after only one growing season. When baseline soil samples were taken in spring 2012, few, if any, earthworms were noted. Several weeks after the cool-season cover crop plots were crimped with a cultipacker and sprayed with a burn-down herbicide, significant earthworms numbers were noted beneath the protective plant layer on the soil surface under a hot August sun.

The public is invited to call about these studies or come to the BPMC and tour them firsthand. Our contact information is at http://bit.ly/bridgerplant. Landowners can also contact their local NRCS office for information on conservation practices such as cover crops to improve soil health.

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