



Cover Cropping for Cattlemen

Cover cropping mimics Mother Nature.

Story & photos by **Paige Nelson**, field editor

‘Mother Nature doesn’t like bare ground” may be the first thing you hear from a cover-crop proponent, but the rhetoric doesn’t end there. What follows will be a fairly long list of convincing evidence to support what Gabe Brown, owner of Brown’s Ranch, east of Bismarck, N.D., uses to prove his point, “Where in nature do you find bare soil? Only where there was a catastrophic event or where man imposed his will on it.”

“Cover cropping is the new hot topic in agriculture,” says Jared Cook, a crop consultant for Rocky Mountain Agronomics of Burley, Idaho. Take a quick peek at YouTube and you can see why, but cover cropping does challenge traditional agriculture’s methods of planting a field with only one crop species.

Cook explains that a cover crop is any crop that

“Animals have four legs for a reason. We don’t need to provide them with a bed and breakfast.”

— **Gabe Brown**



is used in combination with the primary crop and/or fills in the time lag between crop rotations. Cover crops are typically a forage species and can be planted using corn planter or grain drill. Cover-crop seeds can also be spread with a fertilizer truck or flown over an already-standing crop with an airplane.

There’s not simply one way to use a cover crop. They can be planted in conjunction with primary cash crops or used in a pasture setting for rotational grazing.

Cook recommends planting a cover crop — like

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► **Left:** Radishes have the ability to scavenge nutrients from deep soil depths and transfer those nutrients to the soil surface so other crops can have access, says Jared Cook, crop consultant for Rocky Mountain Agronomics. This photo was taken 25 days after seeding.

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the Tillage Radish® — right in with cereal grains like wheat or barley, and he says turnips do well planted with corn. In addition to planting covers with his cash crops, Brown plants mixes of up to 20 different plant species, which will later be grazed. Brown operates 2,000 acres of cropland.

He states, “We try and get a cover crop on all 2,000 acres every year. It may be before a cash crop, along with a cash crop, after a cash crop, or it may be seeded as a full-season cover crop, which is converted to dollars by grazing.”

Benefits of cover cropping

Both Cook and Brown claim cover cropping increases yields by increasing overall soil health.

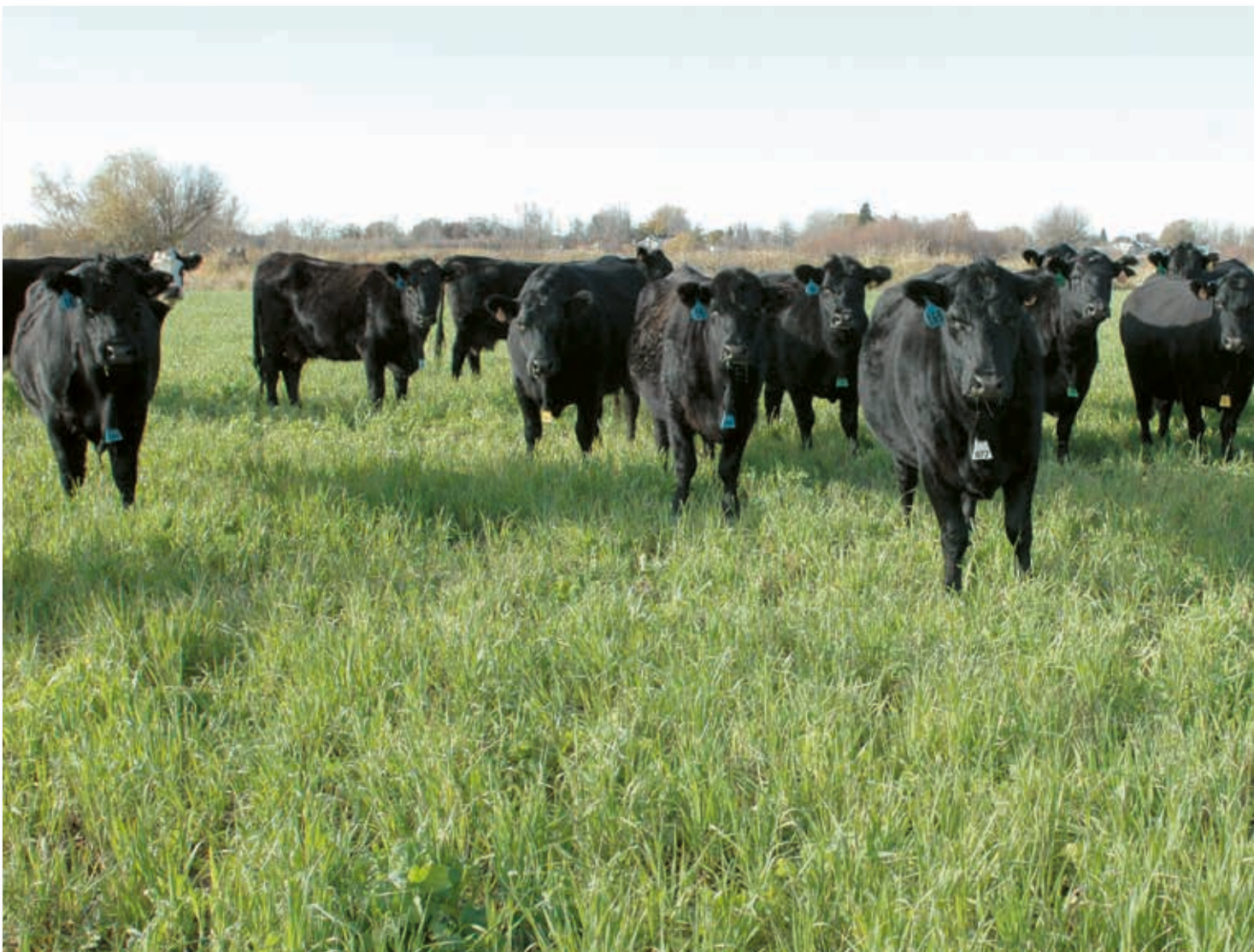
“Cover cropping is for the soil,” says Cook. “I would suspect, by and large, that throughout the U.S., most all soils could benefit from a cover crop.”

According to Brown during his “Five Keys to Soil Health” presentation at the 2014 Sustainable Agriculture Symposium hosted by the Idaho Center for Sustainable Agriculture, “Soil carbon is the key driver for the nutrition status of plants. Soil carbon is the key driver for soil-moisture-holding capacity. Therefore, soil carbon is the key driver for profit.”

Cover crops increase overall soil health by:
► **Armoring the soil surface.** “We want that soil covered at all times. If the soil is covered, it will be more difficult for weeds to germinate,” says Brown. He adds that reduced weed presence saves on herbicide application. Live growing plants, as well as plant residue, help to buffer heat, which, in turn, protect the microbes in the soil.

On his ranch, Brown measured soil

► **Right:** This photo was taken 56 days after a barley and forage radish cover crop was seeded.





►According to Gabe Brown, farmer and rancher from North Dakota, animals are an important part of a healthy ecosystem. Brown allows his cattle to graze one-third of the forage and leave two-thirds as residue for the soil microbes to break down.



temperature for both covered soil and bare ground. He says at 100° F air temperature, the soil under his cover crop registered 87.6° compared to the bare soil that was 107°. According to Brown, at 70° soil temperature, 100% of soil moisture is used for plant growth. At 100° soil temperature, only 15% of soil moisture is used for plant growth. The other 85% is evaporated or transpired.

►**Providing diversity.** “All of our lives we’ve been told, ‘You have to seed monocultures, otherwise plants are going to compete for moisture,’” says Brown. “We have found multispecies combinations tripled dry-matter production. When we seed multispecies, the Mycorrhiza fungi (which forms a symbiotic relationship with plant roots) transfers nutrients and benefits multiple plants. The roots on different plants have different root types and depths. They’re bringing nutrients and moisture from different areas of the soil profile.”

By planting up to 20 different cover-crop species in one field, Brown says he is accelerating biological time. “If I would seed these as monocultures, it would take me 20 years to accomplish (in soil health) what I am able to do in one year,” he asserts.

In addition to its impact on soil health, diversity provides a several-fold benefit to the operation. Cover crops provide nutritional diversity to grazing livestock, optimize solar energy collection and provide protection from pests.

“Cover crops add a realm of diversity to your forage mix, so from a nutritional point of view, each crop has some unique nutritional aspect that gives your cattle a smorgasbord of different nutrients. It seems to me, the more diversity you have out there, the better the overall nutrition is for that animal,” Cook explains.

With a monoculture, says Brown, there is only one leaf size throughout the field. However, by using a cover-cropping system, many different leaf sizes, shapes and heights are employed in capturing visible light. The process of photosynthesis sequesters carbon and feeds soil biology.

In a good diverse mix, different cover crops will flower at different times during

the growing season. Brown says the flowers attract both the pollinator insects and the predator insects.

Referencing his earlier statement, Brown concluded that monocultures are, in fact, a detriment to soil health. If they weren’t, they would be found in nature, while untouched native perennial pastures may have well more than 100 different species growing at a time.

►**Animal impact.** Cook believes livestock on an operation are a luxury for the cover-cropping producer. In Cook’s experience, a cover crop completely tilled back into the soil presents residue problems.

“In many situations guys aren’t grazing it. They’re just returning all that residue back to the soil . . . You can use the livestock as the primary digestion mechanism for the residue. This is nature’s nutrient-recycling program,” he advises.

Animals are an important part of a healthy ecosystem, Brown says. “Soils were formed in conjunction with herbivores.”

“Think back to the buffalo days, when the prairies were loaded with millions of buffalo,” says Cook. “They’d roam around, and the Great Plains had 7- to 8-foot (ft.)-tall prairie grass. They had soils that were 14%-15% organic matter (OM). They had aerated zones of the soil that were 40 to 60 inches deep. Today, we’re lucky to have aerated zones

of 3 to 4 inches and 2% to 4% organic matter.”

Cook explains that a herbivore’s hoof is shaped and acts similar to a plow. As the animal walks, it pushes forage into the soil, thus feeding the soil microbial population. The impact on the microbes is dependent on the stage of growth of the forage. Green,

growing biomass has a greater affect on soil biology than brown/yellow dormant biomass.

Brown grazes 350 cow-calf pairs and up to 800 yearlings and grass-finishers on his ranch year-round. During the winter he provides minimal harvested feed. He prefers to have them graze as long as possible. “Animals have four legs for a reason. We don’t need to provide them with a bed and breakfast,” he states.

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same as the summer, we don't want to graze all of it. We want to trample residue, so we can build topsoil — one-third for the critters above ground, two-thirds for those below ground," he recommends.

► **Water-holding capacity.** Healthy soil, says Brown, has a higher water-holding capacity, and he has the data to prove it. Brown explains that when he started farming his ground in the early 1990s, he had less than 2% OM in his soils.

"At less than 2% OM, I could only hold a little under 2 inches of moisture per foot of the soil profile, so in a 4-foot soil profile, I could only hold a little under 8 inches of water. Today, I'm over 5% organic matter. I can hold over 20 inches of water," he says.

► **Aggregation and aeration.** All soils are made up of three components: sand, silt and clay, says Cook. Based on soil type, each individual particle will form a specific aggregate. Good aggregated soil will have plenty of micro and macro pore space. The soil pores are where oxygen, nutrients and water are held, and where microbial action takes place.

"The better you can aggregate your soil by way of plant debris, animal hoof action and biological activity in the soil, in general, allows for more fertile, more robust function in the soil," he explains.

"Soil should look like black cottage cheese," describes Brown.

Most soil pathogens can't live in aerobic conditions. A well-aerated soil discourages pathogens, says Cook.

"Plants create aerobic conditions within the soil; therefore, that is a natural strategy for eliminated disease pressure by increasing the aerated zone," he says.

"Diversity and biology in the soil is a natural predation on pathogens, as well," Cook adds. "In the soil it's Armageddon every day. It's strictly a numbers game. It takes about a million bacteria to control one fungal spore, so anything you can do to promote the numbers of your beneficial organisms will be dividends down the road."

► **Reducing erosion and water runoff.** Cook likens water runoff and soil erosion to standing atop a ladder and pouring a bucket of water onto bare ground. The pressure of the water hitting the soil causes it to move, leaving a hole.

"If you've got a crop growing, that raindrop is going to hit the leaves before it hits the soil. That leaf acts as a cushion. It slows the velocity of that raindrop, so that

► After wheat harvest in August 2014, this eastern Idaho field was seeded to a barley and forage radish cover-crop mix during the first week of September. Cattle were turned in Oct. 27. This photo was taken Oct. 30.



raindrop can more easily be absorbed into the soil," he explains.

He adds that simply having root mass slows water flow and holds the soil in place.

Results of cover cropping

Brown cites his county average for bushels (bu.) of corn per acre as just less than 100 bu.

"In 2012 we grew 142 bushels of corn per acre without fertilizers, pesticides or fungicides. My cost to produce a bushel of corn, market it, everything, is \$1.44. Even at today's corn price I can still make money," he states.

By incorporating just one cover crop, the Tillage Radish, Cook has experienced 10%-15% yield increases in cereal grain crops. He also says he has seen a 13% reduction in fertilizer costs after continued use of cover cropping.

Ian Gerrish, ranch manager for Cobb Creek Farms in Hillsboro, Texas, says he thinks grazing cover crops is a fantastic strategy and a financially sound choice. "You can easily start

putting dollar figures to cover cropping, and it pencils out much better than if you were feeding hay," he says.

Gerrish produces registered-Angus bulls for Pharo Cattle Co. and manages a commercial-Angus replacement-heifer program. In 2014, the first year of cover

cropping for the operation, Gerrish fed 1.5 animal units per acre on cover crops during peak growing season. This spring he expects to increase that number. "We're running yearling heifers, and they just blow up on it. They do great," he states.

"In the soil it's Armageddon every day."

— **Jared Cook**

Cobb Creek's cool-season cover-crop mix consists of oats, cereal rye, ryegrass, berseem clover, crimson clover, sweet clover, a vetch species and Austrian winter peas. The operation also planted a warm-season mix of sorghum alnum,

Sorghum-Sudan grass, iron clay peas and black-eyed peas.

Of the cool-season mix Gerrish says, "Even at 1.5 animal units per acre, they'll stay growing ahead of you."

After one year of cover cropping, in addition to mob grazing, Gerrish has seen a dramatic increase in the water-holding capacity of his soil.

"We stayed a little greener around here. Just after the first cover crop, we stayed greener for five days to a week longer than our neighbors did, who have the same type of soil and the same range grasses," he noted.

Cover cropping benefits the soil several ways, and it doesn't mistreat the cattle grazing it, either.



Editor's Note: Paige Nelson is freelance writer and cattlewoman from Rigby, Idaho.