

Grazing For Soil Health

Practices that support healthy livestock also build and maintain healthy soils.

by **TROY SMITH,**
field editor

Like most others, Dan Stelling's cow-calf operation is forage-based. There was a time, however, that Stelling paid little attention to his pasture forage. By his own admission, the Pierce, Neb., cattleman and farmer concentrated most on increasing the performance of his cattle, mainly through genetic selection. He did not devote very much time to grazing management.

"To me, pasture was something cows ate for five months of the year. I used pastures all season long, with set stocking rates," tells Stelling, explaining how his cows spent the remainder of the year eating crop residues and harvested feed.

A change in his way of thinking began during the years Stelling traveled as a representative for a bull semen marketing firm. Traveling around and visiting with various farmers and ranchers and seeing how they managed their grazing resources prompted Stelling to learn more about grazing-management concepts. Enticed by the potential benefits, including increased quantity and quality of forage produced, improved utilization of available forage and increased carrying capacity, Stelling applied rotational-grazing systems to his own operation.

Exposing pastures to relatively short grazing periods, followed by long periods of rest, resulted in greater diversity of grass species and increases in the more desirable perennial grasses. Long rest periods also allowed grasses to develop the deep root systems that afford greater drought tolerance.

"As I shifted to no-till farming and understood what that means to the soil, the light bulb really came on," tells Stelling. "I started to understand how grazing management impacts the soil, too."

Stelling also came to realize that cattle performance is related to the health of soils in the pastures they graze. That gave him a new appreciation for the value of litter — the grass that isn't eaten but is trampled down by cattle.

"Litter helps retain moisture, and it feeds the soil micro-organisms. They are your 'underground livestock,' and they need to be fed," Stelling explains. "Over time, the residue breaks down faster. It's a sign of more microbial activity. It's a good

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Not a fad

It has become fashionable for agricultural producers to talk about soil health. It's a hot topic among organic farmers and of growing interest to the growing number of farmers who use no-till methods. However, managers of cropland are not the only producers that should be concerned about soil health. Grassland managers need to understand that the soil is not just an inert medium in which plants grow. It is alive. Soil microbial biomass is huge, teeming with an enormous variety of living organisms, most of which are microscopic. Some microbiologists believe that as much

as 80% of soil nutrient functions are influenced by soil microbes.

University of Wyoming Soil Specialist Jay Norton defines soil health as the capacity to be used productively without damaging future productivity. On grasslands, productivity is sustained through the cycle of growth and decay of above-ground vegetation and below-ground roots. Norton says the cycle hinges on two things that are affected by grazing management. These two things are the kinds of plants growing on the land and the return of adequate amounts of plant residues to the soil.

"Plant communities with rich mixtures of bunchgrasses, rhizomatous grasses, tap-root forbs, nitrogen fixers and shrubs of many

species contribute a wide variety of residues that decompose at different rates and times," explains Norton.

"This supports a huge diversity of soil microbes that cycle plant materials over the entire year, providing nutrients to growing plants. Plant residues that decompose rapidly provide nutrients, while those more resistant to decomposition tend to become stable soil organic matter, or humus, that give soil a dark color, strong structure and absorbent qualities that enhance moisture-holding potential and resilience to disturbance."

Overgrazing, either by overstocking or by grazing for too long a period, leads to compacted soil with horizontal layers that hinder water absorption. Norton says the



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surest way to wreck grassland soil is to stir it up, compact it, leave it bare for much of the year, and repeat that process year after year. On grasslands where grazing is well-managed, sufficient grass is left behind to be incorporated into the soil, and rest periods promote deeper root growth.

According to Norton, research shows a positive relationship between plant diversity and productivity. In other words, more species leads to greater production of vegetation offering greater overall palatability and a higher plane of nutrition for grazing animals. Because those deep plant roots exude compounds containing nutrients, plant diversity increases the diversity of compounds that drive microbial activity. Disturbances that break the cycle create opportunities for invasion by less-desirable plants, usually annual species.

As an example, Norton cites the annual grasslands of California's Central Valley. Management begun in the Spanish-mission era resulted in annual grasses out-competing and replacing the native, cool-season perennial bunchgrasses. The long dominant annuals reproduce from seed in winter and spring, but die each summer. The dry residual material fuels frequent wildfires, yet managers must leave sufficient material after grazing to guard against erosion, poor germination and

further shifts toward less-desirable species.

Providing another example are cheatgrass-invaded grasslands of the West. According to Norton, the soil under cheatgrass loses organic material because the annual plant's mass of fine roots dies each year, leaving the soil porous and accelerating decomposition of organic material. Microbial activity is limited and limited periods of nutrient availability

favor weedy annuals. The result is more cheatgrass.

In native rangelands, says Norton, proper rest and planning grazing for different times of the year can maintain or enhance diversity. In improved pastures and management-intensive grazing situations, interseeding with nitrogen-fixing legumes, and managing pastures to maintain that diversity of plants can

improve both productivity and soil health.

"The same practices that support healthy and productive livestock also build and maintain healthy soils," emphasizes Norton.



Editor's Note: *Troy Smith is a cattleman and freelance writer from Sargent, Neb.*



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