

For the past several weeks we have explained the importance of soil health. We have talked about methods to use to test soil health and discussed indicators that you can use to measure the quality of your pastures. We talked about common nutrients found in the soil, and the important roles they play in keeping soil quality where it needs to be. This week we will finish our discussion on soil health and explore different methods to keep in mind to better manage soil quality.

When producers consider methods available to improve their soil they likely think about chemical fertilizers, herbicides for weeds, and lime applications. Though many have varying opinions on the immediate and long-term efficacy of these practices, we encourage you to consider some other arguably more efficient ways to improve the health of your soil. In our last article we talked about nutrients found in the soil but it is the living organisms in the soil that largely affect those nutrients. When you think about how to improve soil quality it is helpful to first think about those things living in the soil- the insects and microorganisms that call the soil “home”. To understand this, think about the place you call your “home”. Chances are, it’s a house that protects you from extreme weather conditions, such as heavy rain, hail, and strong winds. It’s a place with a well-regulated temperature that never gets too hot or cold (unless your spouse controls the thermostat). In your home you likely have access to food at any moment, and the food available is probably some variety of grains, fruits, vegetables, and dairy products. This is the same type of home that microorganisms require in order to thrive and give back to the soil, which in turn improves plant quality, and ultimately produces better cattle.

The first key to think about in maintaining soil quality is the “roof” for the microbes’ home. Just like you have a roof on your house for protection, soil microbes need protection as well. Disturbance of the soil greatly diminishes the habitat of soil microbes. Types of soil disturbances can be placed in three categories- physical, chemical, and biological. A common physical disturbance of the soil is bare or compacted soil caused by tillage. Not only does this disrupt soil microbes, it is destructive to them as well. A chemical disturbance is caused when a producer misapplies a farm input, such as fertilizer. This also disrupts the microbe growth and quality of life. Biological disturbances can also be caused by mismanagement and occur when pastures are overgrazed. Overgrazing reduces root mass, increases runoff, and increases soil temperature, all of which are detrimental to ensuring that soil microbes have a safe home to live in. It is also important to make sure that your soil has proper armor to protect it. Organic matter acts as a great protector and offers many benefits. It helps eliminate bare spots in the pasture, conserves moisture, reduces temperatures, suppresses weed growth, and protects the microorganisms from the destructive impact of raindrops. Are you providing a good shelter for the microbes’ home in the soil?

Aside from establishing a solid structure for the soil microbes to live, producers should aim to provide adequate food for the microbes. An easy source of food for soil microbes can be found in the roots of living plants. Thus, a sure way to feed the microbes is to maintain live plants in the soil year round. This task reaps many benefits. As with people, different microbes have different genetic makeups which require a variety of different carbohydrates and nutrients. The best way to meet the needs of the different microbes is to have plant diversity in your pastures.

In other words, a diversity of plant carbohydrates is required to support the diversity of soil microorganisms in the soil. Therefore, in order to achieve a high level of diversity, different plants should be grown. One of the major keys to improving soil health is to ensure that the food webs consist of several types of plants or animals, not just one or two. The human body is designed the same way. To perform at our best, we need diversity in our diets. Soil microbes require the same in order to be productive. Having plant diversity (i.e. introducing legumes) in your pastures can also help maintain live plants in the soil. Legumes, and other cool season plants, are helpful, as they can extend your grazing season into winter months, which results in a narrowed winter feeding gap. Are you giving soil microbes the nutrients they need to improve soil quality in your pastures?

Another method to consider is the type of grazing you allow your livestock to do. Studies show that when natural grazing systems are mimicked, soil function greatly increases. Examples of these natural grazing systems are management intensive grazing, rotational grazing, and ultra high stock density, or mob, grazing. The key to each of these grazing systems is that the *animals*, not chemicals, fertilizers, or machinery, are used to improve manure distribution, reduce plant selectivity, increase plant diversity, and improve soil function. By concentrating the cattle to smaller areas, their urine and manure are “recycled” to naturally fertilize the soil. Further, rotating pastures allows time for each pasture to rest, recover, and regrow before the cattle are put back in that pasture. This also tends to result in more total forage biomass used because the cattle are more likely to eat ALL plants in the pasture, not just overgraze their favorite plants.

If you are a cattle producer, chances are that you are a grass farmer first because you market the grass *through* the cattle. With this in mind, you should be constantly aware of the condition of your forages and the soil in which they grow. Be ever mindful of feeding those microorganisms *in* the soil so that you can have productive cattle that reside *on* the soil. In an industry where the market changes with the weather, it is important to be aware of the input costs associated with feeding your cattle. Though fertilizer and/or lime applications may be necessary in some situations, the methods mentioned here can help improve pastures all while reducing input costs. This is the type of management that producers should implement in order to be successful, and have operations that can last through the good and bad times. If you have any questions about the things mentioned in this article, or about any of the articles in this Soil Quality series, please contact us. Refer to the links below to read more on soil health management: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/mgmt/>
<http://thecattlemanmagazine.com/archives/2013/february/cattle-and-healthy-soil.html>

Thanks,
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