



## ARECA Soil Health Initiative

This article is part of a series to promote better understanding of our agricultural soil resources along with practices that can influence soil health.

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### How Grazing System Choices Impact Soil Health

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Did you know that your choice of grazing systems for your pasture has a huge impact on soil health and productivity? In fact, even the choices you make within your chosen grazing system will impact soil health and pasture productivity. For this article, we'll take a look at two grazing systems that are pretty much opposites from each other, but first we'll look at the basic principles that come into play.

As forage plants are grazed, portions of the roots slough off; more so with a severe graze than with a light or moderate graze. As the plants re-grow, the roots recover and re-grow as well. This process of sloughing off and re-growing is a large contributor to the pool of organic materials in the soil. In addition, dead and live plant materials are trampled to the soil surface during grazing, also contributing to the pool of organic materials. As long as forage plants are allowed to recover fully from grazing before being grazed again and sufficient forage residue is left, the supply of organic materials from both sources will keep soil microbes well fed and converting organic materials into soil organic matter. More organic matter in soil accommodates more air and water in the soil, which accommodates more microbes.

A dense and diverse cover of living plants supply microbes with food (sugars). The microbes, in turn, access minerals and nutrients, convert them into plant available forms and make them available to plants via the roots. Also, a highly diverse plant population results in a highly diverse microbial population. As the many different microbes have different jobs to do, microbial diversity is very important in keeping soils healthy. Therefore, forage plant diversity is very important to healthy soils and healthy, productive pastures.

Now let's take a look at continuous grazing as a system. In this system, livestock enter the pasture sometime in spring and are removed in fall. Most of the time livestock are turned out when there is about 8 to 10 inches of growth and are removed when there's nothing much left to graze. If the stocking rate is high, livestock will keep the pasture as short as a golf green. If the stocking rate is low, livestock will graze patches and leave other patches. Grazed patches will be re-grazed whenever there's enough forage there for the animals to bite off. Patches that are left un-grazed will continue to mature and become less palatable.

What happens below the soil surface under continuous grazing? As forage plants are grazed, portions of the roots slough off, but if plants are continually kept short by continuous grazing pressure, the roots won't have a chance to re-grow after the plants are grazed. Therefore, little organic material is returned to the soil from roots sloughing off. As well, there is little organic material being trampled into the soil surface, especially where the pasture is grazed very short. Un-grazed areas tend to have low animal traffic, so plant materials don't get trampled and soil microbes have access to plant materials above the soil surface, the plant materials must be in contact with the soil surface.

When the natural cycling of plants being grazed and recovering is interrupted or broken, we start seeing desirable plant diversity losses, increases in invasive species, increases in bare soil, decreases in organic materials available to soil microbes, decreases in soil organic matter, decreases in the diversity and the number of beneficial soil microbes and decreases in plant available nutrients resulting in reduced pasture productivity, soil degradation and erosion.

Now let's take a look at the other end of the scale. Grazing systems that reduce grazing durations and allow for full recovery of a highly diverse mixture of forages increase organic materials in the soil from roots growing and sloughing off. Management choices that leave lots of plant residue well trampled into the soil surface by grazing animals at a high stock density add to the supply of organic materials as well, not to mention the many deposits of dung and urine left by the animals. The most intensive grazing management systems are often called "Mob Grazing", although any grazing system that optimizes grazing durations, recovery periods, residual forages and stock density would fit here.

**Figure 1. Example of mob grazing at an equivalent of 1 million pounds of beef per acre.**



These grazing systems allow plants to fully recover and minimize grazing before plants are recovered. They also use high stock densities to accomplish some level of uniformity in the residue left behind and also to get most of the residual forage material well trampled into the soil surface. As a result, there is a consistent supply of organic material being placed where microbes can access them, increasing the microbial population. Such systems also promote increasing plant diversity resulting in higher microbial populations and diversity. This is what drives the natural cycling of minerals and nutrients and builds healthy productive soils.



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Many of the grazing systems in use do not fit in one extreme or the other. They fall somewhere in between, with some being more similar to continuous grazing and others leaning toward the “Mob Grazing” end of the scale. Those more similar to continuous grazing will tend to get results that may be better than continuous grazing, but nowhere near the results of systems similar to “Mob Grazing”. Likewise those systems that are most similar to “Mob Grazing” will get results more similar to such systems.

A word of caution though, if you’re trying to use systems similar to “Mob Grazing”, but your recovery periods are too short, or you don’t leave sufficient residue after grazing, you could be shooting yourself in the foot. If you fall into this trap you’ll find that your pasture rotations are speeding up instead of slowing down as plant growth slows down. If you find that you’re not leaving enough residue you will see plant recovery slow down, also leading to grazing before plants are fully recovered. You’ll see your pastures decline in health and productivity and you just might not see until it’s too late, that your soil health is getting worse instead of better. I’ve often seen that poorly managed “rotational” grazing systems decline faster and to worse levels than continuous grazed pastures.

The choice is simple. Grazing systems more similar to “Mob Grazing” are sustainable. By sustainable I mean “able to perpetually regenerate itself and maintain a healthy condition”. Management is the key input in these systems. On the other hand, grazing systems similar to continuous grazing tend to deteriorate. Often, managers of these pastures find that they must add expensive inputs to keep these pastures productive. When productivity drops too much, these pastures are broken up and reseeded at a very high cost. Regardless of these inputs, soils under these pastures tend to degrade. Such systems are neither economically or environmentally sustainable.