



Soil nutrients in a pasture cycle through soil organisms, pasture plants, and grazing livestock. Proper management can enhance the nutrient cycle, increase productivity, and reduce costs. Two practical indicators of soil health are the number of earthworms and the percentage of organic matter in the soil. A diversity of pasture plants growing on healthy soils use sunlight and the nutrients in the soil to effectively produce quality forage. Paddock design and stocking density can also affect the efficiency of nutrient cycling in a pasture system. Adding fertilizer, based on soil tests, balances the soil's mineral composition, resulting in better plant and animal growth and increased soil health. Correct pasture management can effectively increase soil fertility through understanding the effects of the plants and animals living in and on the soil. Not only can soil organisms generate mineral nutrients or make them available, but these same minerals can also be recycled several times in a growing season, if the soil ecosystem is healthy and plant cover is optimal. With good management, nutrients can recycle quickly with minimal losses to air and water. Less fertilizer will be required over time, and this means increased profitability for the entire farm.

Producers create a healthy soil through good soil management and smart grazing strategies. Good managers will soil test regularly and apply fertilizers, lime as needed. They monitor the results of these decisions and make note of their observations for future reference. Understanding forages and adjust stocking rates and paddock rest periods. Also making, harvesting and seeding decisions to maintain and improve their soil and pasture resources.

Here is how forages use minerals and nutrients.

Lime - Soil PH needs to be 6.6 to 6.8 and base saturation needs to be 70% plus

- Helps with the movement and absorption of phosphorus, nitrogen, and magnesium.
- Benefits bacteria, fungi, protozoa and other soil life so important for nutrient cycling.
- Releases important trace and growth nutrients by its pH-altering effect.
- Helps clover, which requires twice the calcium of grass. Abundant calcium is necessary for clover nodulation.
- Creates soil tilth and structure so that air and water can move more freely through soil by causing clay particles to stick together. Soil must be able to breathe to grow great grass.
- Allows pastures to be more droughts tolerant
- Improves the palatability of grass and clover, makes the pasture softer for animals to graze, and lessens grass-pulling in new stands.
- Helps prevent weeds



Nitrogen

- Directly affect forage crude protein levels in grasses, with much less effect on crude protein levels in legumes.
- Greatly increases forage dry matter yield
- Within reason, the greater the nitrogen fertilizer applied the higher the forage grass crude protein; there is, of course, an upper limit to this affect.
- Nitrogen fertility levels should be based on realistic yield expectations however, and forage crude protein levels should be managed by plant maturity at harvest, whether by haying or grazing management

Potassium - Soil level for adequate is 150 ppm

- Deficient or low potassium fertility levels will most assuredly reduce forage growth, e.g., can become first limiting nutrient and decrease overall yields.
- Potassium uptake can be in luxury amounts by most forage species, typically, plants will accumulate 2 to 20 times sufficient levels of potassium when it is available in the soil.

Phosphorus - Soil level for adequate is 30 ppm

- Low soil phosphorus can be growth-limiting.
- Phosphorus is typically not consumed in luxury amounts as is potassium and will generally show on forage analysis as 0.2 to 0.3% composition on a dry matter basis.
- Phosphorus may be low enough in forage plant tissue that it becomes deficient in the grazing livestock diet.
- When phosphorus is this low in the soil, plant growth will most definitely be reduced.
- Soil phosphorus levels must be adjusted for adequate forage growth.