

## Know Your Pasture's Soil

The advantages of high quality pastures and forages are increased energy, digestible fiber, quality protein and balanced minerals. To obtain these advantages, soil needs to have the right balance of nutrients and minerals, much like balancing a cow's ration. If a cow's ration is not balanced, she loses yield (milk) and quality (components and body condition). Balancing soil fertility is no different. The forages and pastures we grow need the same nutrients and minerals that our cows do in order to achieve yield and quality. Let's take a look at some nutrients and minerals to see how they affect forage quality.

**Calcium** is the foundation of the whole fertility program. If this is not in balance, many of the nutrients and minerals may not be available for the plant to use. Once in balance, your pH will be in the correct range also. This increases nitrogen utilization, which in turn increases the protein content of the forage.

**Nitrogen** is directly linked to increasing the protein level in forages. Lack of nitrogen affects chlorophyll production and results in lower energy absorption from the sun. Plants low in nitrogen mature earlier. Nitrogen is also essential for the production of vitamins and energy systems in the forage. It is an essential component of amino acids, which form plant proteins.

**Phosphorus** plays an important role in photosynthesis and respiration, influencing energy storage and transfer, cell division and cell enlargement. Phosphorus improves the overall quality of the forage by building a store house for the plants energy, protein, minerals and nutrients.

**Potassium** is essential for protein synthesis. It is important in breaking down carbohydrates, a process which provides energy for plant growth. It aids the plant in overcoming the effects of diseases. Potassium is involved in the activation of more than 60 enzyme systems which regulate the rates of major plant reactions. Legumes utilize more potassium than grasses. When potassium is too high, it can affect palatability of the forage.

**Sulfur** increases forage quality and affects the quantity and quality of protein. It releases energy in the cells and is part of Vitamin B1 and biotin.

**Zinc** builds chlorophyll, helps enzymes function correctly, affects growth hormones in the plant, and affects elongation of internodes.

**Boron** is needed in only small amounts, but most soils are low as boron is not easily stored in soil. It is very important in the plant's nutrient intake of calcium and other minerals. It aids in

cell wall formation, sugar transfer, energy release in cells, protein production and improves overall forage quality.

**Copper** helps control molds and fungi, aids in chlorophyll production and photosynthesis, helps enzymes function properly, and helps with the immune system of the plants.

In summary, we need to build adequate, balanced levels of nutrients and minerals in the soil to produce high-energy, high-quality pastures and forages. In grazing dairies, cows will have a higher dry matter intake if the pastures have adequate levels of calcium, phosphorus, sulfur and trace minerals. These same forages will have higher sugar levels, which help to improve their digestibility, since energy is readily available energy for rumen microbes. With higher sugars, less starch is needed and fiber levels are maintained for rumen functions.

- Every time grasses are cut or grazed, roots will slough off. This fast cycle of root growth and die off is why grass has the capability to build organic matter.
- Clover and other legumes have the ability to produce lots of nitrogen, improving soil fertility.
- Fertility has tremendous influence on tillering and persistence.
- Having lots of tillering going into summer will extend grazing longer into a drought due to the fact of the aggressive new life in the tillers.
- Fertility is a big factor in a stands ability to thrive under grazing pressure.
- It is much cheaper to stay ahead with fertility than to try playing catch-up, and yield will improve dramatically.