

Issue 19 Monday 14th April 2005

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Soil Fertility and Nutrition

The fertility of the soil plays a major part in what nutrients stock can obtain from grazing on pastures grown on that soil. The first major aspect of fertility is the clay content or how heavy the soil is. Clay particles act as little sponges holding onto nutrients and releasing them as the plant requires them. So a heavier soil is usually more fertile and contains more of the nutrients that plants and animals require. Heavier soils also have the advantage of holding more moisture which in a dry environment gives much greater pasture growth. However there will always be exceptions with some heavier soils that may be deficient in one or more nutrients required by livestock.

The protein content of the grass is much more closely related to the maturity of the pasture than to the fertility of the soil. Low nitrogen soils will grow less grass but of a similar protein content to high nitrogen soils. Legumes in the pasture will increase the protein content of the pasture and help put nitrogen back into the soil. Cattle can also selectively graze to select a higher protein diet than the average of what is in the pasture. Once grass starts to set seed the protein content is falling and will continue to fall as the plant browns off. Pastures on extremely high nitrogen soil can accumulate nitrogen in the nitrate form. This can lead to nitrate poisoning. This is mainly a problem on fertilised high production pastures such as rye grass.

Phosphorous is closely related to soil type with most of the sandier soils in Queensland being known to be at least marginal for phosphorous. Only the heavy soils of the Darling Downs, Brigalow belt, Mitchell grass downs and frontage alluvial country are usually described as having adequate Phosphorous. Phosphorous requirements vary with class of stock so the best method of finding the phosphorous levels of your own country is by using dung samples on green pasture. There are always exceptions with some isolated heavy soils that have a low phosphorous status

Trace element deficiencies are generally found on lighter soils particularly in the higher rainfall areas. These lighter soils have limited ability to hold on to these nutrients and millions of years of rainfall have washed these elements away. Many of the inland sandy soils are derived from ancient sea beds and are also low in trace elements. Cobalt, copper and selenium are the most common trace element deficiencies and these are common on coastal sandy soils. To determine mineral deficiencies a blood or liver test is usually required. Alternatively a feed and see approach can be useful in areas with severe deficiencies. With severe deficiencies of trace nutrients a visible response to supplementation can be seen in as little as two weeks.

Fertilised pastures do not always contain adequate nutrients for stock growth. Fertiliser programmes are generally designed to maximise pasture growth and do not always correct deficiencies in stock requirements. Protein content is still related to pasture maturity and so on fertilised pastures stock will still require protein supplementation when they have gone to seed and hayed off.

In summary lighter soils generally have greater deficiencies of nutrients for stock growth as they are not as capable of holding the nutrients as heavy soils are. Protein deficiencies however are related to pasture maturity and composition more than soil fertility.

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