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PROBLEMS OF PASTURE MANAGEMENT

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The influence of climate and pastures throughout the rearing process is thought to be a major factor in racetrack success – especially in those events requiring stamina. From the time man first began to confine horses into enclosed spaces some 20,000 ago at the end of the last Ice Age, pasture management became necessary. There are two components to pasture management - soil improvement and pasture improvement.

SOILS:

The results of a survey into pasture management practices on Thoroughbreds studs in Eastern Australia have recently been published by the Rural Industries Research and Development Corporation (RIRDC*). As part of the RIRDC's Equine Research and Development program, the study was designed to identify the management strategies that produced the best quality pasture. The study also identified the main areas where improvements could be made and assessed the sustainability of current methods.
To maintain soil fertility, regular soil tests are essential. In the Hunter Valley, 5 studs reported acid soils and 6 did not know the general pH status of their property. The level of unawareness was similar in the other regions studied.

Soil Tests:

Soil testing measures both pH and nutrient composition. This information allows fertiliser to be applied to meet individual paddock requirements. With the correct balance of nutrients in the soil, pasture growth and nutrient composition are maximised. Maximum availability of soil nutrients occurs in the soil pH range of 5.5 to 6.3.
Soil tests should be taken from both preferred and non-preferred grazing areas and from both high and low yielding paddocks. Sampling from these four areas will indicate the need for lime, phosphate, sulphur, magnesium, potassium and other trace minerals. Correction of fertility problems with fertiliser and rotational grazing with sheep or cattle will more uniformly distribute manure and address variations in soil nutrient levels in the paddock.

One of the most commonly held beliefs is that pastures need plenty of lime to sweeten them. Optimum pasture growth is achieved at pH 5.5 - 6.3. When the pH is higher - which quickly occurs with repeated heavy dressings of lime - deficiencies of copper, iron, manganese and zinc can occur. For this reason, excess lime can work against bone growth. The use of lime should be related to soil test pH values, which should be maintained at around 5.5 to 6.3.

Long periods between soil testing suggests that growing conditions for pasture plants is sub-optimal – especially with respect to soil acidity. This would make molybdenum – very important for nitrogen fixing – unavailable.

Plant mineral composition varies widely due to botanical composition, season, and fertiliser history and soil type. Most well managed pastures should provide adequate macro-minerals but not necessarily micro-minerals. Clovers usually have higher micomineral content than grasses, except for selenium. Where soils are deficient in cobalt, copper, molybdenum and selenium, mixing these minerals with fertiliser can increase pasture levels. Application rates should be calculated carefully as iodine, selenium and molybdenum can accumulate to toxic levels in certain plants. In addition, when these plants die, they return the selenium to the soil where it is taken up by other plants. If horses eat dirt, they can ingest large amounts of these trace minerals.
Seaweed can be a source of excessive iodine. If excessive amounts of molybdenum are applied to the soil it can accumulate to excessive levels in the pasture. High concentrations of molybdenum in the pasture have been shown to depress blood copper levels. Eating soil rich in iron and sulphur is also known to reduce copper absorption. Manganese supplements may be required in horses on heavily limed pasture, sandy soils or if the diet contains excessive levels of calcium, zinc or iron. High soil iron levels can reduce cobalt uptake and induce vitamin B 12 deficiency.

PASTURES*:*
To improve and re-establish pasture, reintroduction of desirable grasses and clovers can be performed, but the causes for pasture decline (eg soil deficiencies or imbalances) should be assessed and corrected beforehand. When endeavouring to maintain high quality pastures, the grazing behaviour of horses creates two problems**:**

- preferred plant species are quickly grazed out, allowing weeds and less palatable species to predominate.
- urine and manure levels are higher in areas of less preferred pasture. Loss of nutrients from soil in grazed areas reduces the growth of grasses such as annual and perennial rye – which require enriched soil. These grasses can be re-established in an autumn under-sowing program.

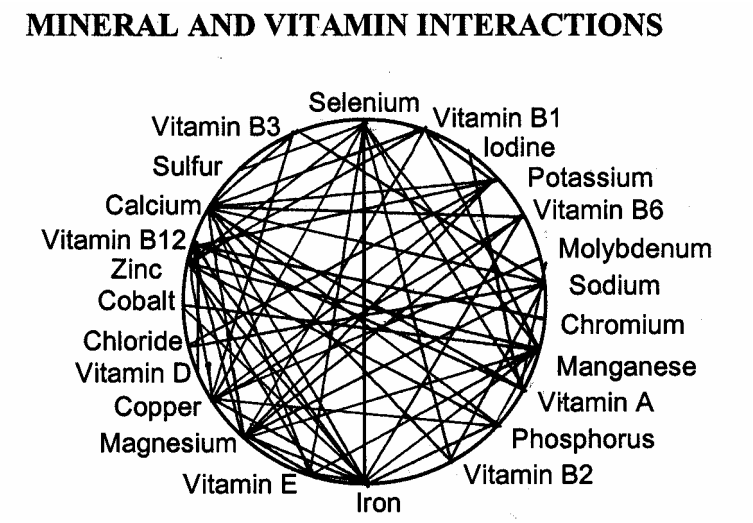
Pasture Mineral Levels:
High pasture phosphorus levels have not been correlated with growth rate, however studs with high phosphorus levels in supplementary feeds had faster growth rates – suggesting that the phosphorus in the pasture was not in a form that could be absorbed by horses.
The ratio of calcium to phosphorus is a great importance in the formation of sound bone and joint structure. The recommended ratio is 1.5 to 2 parts calcium to 1 part phosphorus.
The absolute level of each mineral is also important. Cannon bone growth in weanlings has been strongly correlated with high calcium levels in the

pasture. However, excessive calcium intake it has also been associated with a higher incidence of epiphysitis in sale yearlings. Young rapidly growing thoroughbreds are likely to require supplementary calcium and phosphorus over winter – but adding calcium alone is likely to result in increased risk of bone growth disorders.

Magnesium and sodium supplementation is often required on studs, which use high rates of potassium-containing fertilisers. Magnesium is closely associated with calcium and phosphorus in both plant and animal functions. The availability of magnesium from grasses may be as low as 30% and excess potassium may further reduce this.
Studies in New Zealand have shown that magnesium intake is associated with faster weight gains, bigger girth and longer body length. Sodium has a specific role in the formation of sound bone. Pasture may not supply sufficient sodium especially if potassium-bearing fertilisers have been applied - because potassium can displace sodium in both plant and animal systems. Most pasture and roughage contain adequate levels of potassium. Excessive potassium in pasture can reduce growth rates due to interaction of potassium with magnesium and sodium.

Minerals and supplements:
Because grains, chaff, hay and pasture are all deficient in vitamins, minerals and trace elements it is necessary to supplement most pasture and traditional diets. However, the balance must be correct. Borderline imbalances and deficiencies may not affect overall general health - instead they cause reduced fertility, abnormal growth, failure to reach potential, bone, joint, ligament, tendon and birth weaknesses and defects, poor performance, breakdowns and injuries. When several supplements are used the risk of overlap, excesses, deficiencies and imbalances increases.
A mineral deficiency is not always due to a low intake - excessive intake of one can induce deficiencies of others. Magnesium deficiency can occur if calcium and/or phosphorus intake is too high. In these cases, the magnesium deficiency is corrected by adjusting the calcium and phosphorus intake. A detailed description of all possible trace mineral and vitamin interactions is beyond the scope of this review, however the following chart summarises some of the known interactions.

MINERAL AND VITAMIN INTERACTIONS



'Chelated' minerals are 'attached' to protein or carbohydrate - preventing interactions and improving uptake compared to natural inorganic minerals. Except for phosphorus, which is absorbed in both the small and large intestines, all other minerals and proteins are taken up in the small intestine. ***If protein, lysine, methionine vitamin and mineral levels are selected with exacting care, the calculations are inaccurate if the feed is not digested in the small intestine.*** Processing of feed by steam-extrusion increases digestion in the small intestine from around 30 to over 90% - releasing essential amino acids and increasing mineral absorption.

At Mitavite, agricultural scientists, equine veterinarians and nutritionists have combined their fields of knowledge and expertise to formulate Mitavite Promita - to *balance* pasture and traditional diets. A fully *steam-extruded* complete supplementary feed, Promita contains the correct ratios of protected vitamins and chelated mineral proteinates ensuring that what you feed ***is*** available for bone and muscle growth, fertility and performance.

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