

HEALTHY SOIL MEANS HEALTHY HORSES

by AEBM member, Tony Jones



So you have adopted the principles of natural horsemanship, you've even gone down the metal free route, no shoes, no bit and definitely no rugging. Your horse enjoys the company of other horses, travels over varied terrain on a daily basis, his feet are immersed in water every day, trimmed regularly, he has adequate shelter from the elements. Nutritionally you attempt to provide him with a balanced diet of vitamins, protein, carbohydrate, minerals and clean water. You've also adopted sensible management practices such as harrowing, slow rotational grazing, complementary grazing with cattle or sheep and a control program for worms. You've conscientiously attended to everything humanly possible to keep your horse content and healthy. Or have you?

To grow and maintain horses in optimum health we need healthy soil; a fundamental factor in both human and animal health that is often overlooked. Healthy soil is the foundation of a profitable horse business. Research by RIRDC (Rural Industries Research and Development Corporation) has shown that improved pasture grown on healthy fertile soil provides horses with all the nourishment they need to maintain optimum health and growth rates. Fertile soils are those that contain the greatest quantity of soil life and available minerals, and healthy soils don't just happen. To achieve a healthy soil environment there are three factors we must consider; the chemical, biological and physical factors.

The Chemical Factor

In the soil the Calcium (Ca)/Magnesium (Mg) ratio is all-important and is the key to soil fertility. The ratio in a fertile soil will be 7 Ca to 1 Mg. The pH of the soil (which is often referred to erroneously as the guide to the calcium content of your soil) is in fact the percentage of hydrogen attracted to the soil colloid. The soil colloid is a fragment of clay reduced to a size that can be reduced no further. The soil colloid carries a negative charge that attracts positively charged elements such as calcium, magnesium, hydrogen, potassium and sodium. These positive elements arranged on the soil colloid in their correct percentages known as the Base Saturation Percentage, determine your soil's fertility. Soil pH (on a scale of 0-14) measures the acidity or alkalinity of your soil. The lower the pH the more acid the soil, the higher the pH the more alkaline. More nutrients are available and more biological activity takes place in the neutral pH range of 6-7.

The pH reading can be affected as much by potassium, magnesium and sodium as it is by calcium. So beware; using a pH test exclusively to ascertain the calcium content of your soil is like checking the oil in your car to see if it needs petrol. Only a soil test providing a comprehensive analysis of soil samples will reveal the true level of calcium and all other elements, including trace elements, in the soil. As important as these and all other elements are in determining the pH of the soil and as architects of the plant they are actually less than 9% of the plant material. Over 90% of the plant material comes from the atmosphere as a gas, carbon, hydrogen, oxygen and nitrogen and they are free! Therefore once we have all the elements in the soil in balance nature begins to work for us.

Bacteria are important for healthy soil

The biological factor is one that has long been overlooked in the Australian agricultural landscape. A balanced equilibrium of calcium and magnesium creates a soil environment suitable for bacterial and fungus activity, for proper decay of organic residues into CO₂, carbonic acid and a host of organic acids necessary for release of mineral elements in the soil system. Bacteria have many roles to play in a healthy soil including the breakdown of organic matter into humus. Some live in a symbiotic relationship with the plant, providing nutrient from a distance the plant root system cannot reach, receiving carbohydrate in return. For microbes to proliferate in the soil the ratio between carbon and nitrogen is critical. This ratio can be determined by a comprehensive soil test and appropriate remedial action taken where required.

There are many forms of both carbon and nitrogen. Carbon is the element that makes anything organic and is vital to the living processes. Nitrogen is essential for the manufacture of protein. A lack of protein means a lack of growth. Maintaining a healthy biological environment is as essential as a balanced chemical environment if we are to have a healthy living soil.

Land management practices affect soil quality

The third factor to consider and the one over which we can possibly have the most direct influence is the physical factor. The ability of the soil to provide nutrients to the plant is determined by the soil structure. Soil structure consists of 50% soil, 23% air, 4% organic matter and 23% water. The plants roots must be able to use the air spaces to penetrate deep into the soil to increase access to nutrients and moisture. The ways we aerate our soil, till the soil, the machinery we use and grazing management practises are among the factors that will impact on soil structure.

To maintain a healthy soil all three factors, the chemical, biological and physical, must be kept in balance. Soil management programs based on a holistic approach to sustainable farm management have benefits both environmentally and economically.

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