



How Your Soil Can Work for You...

For at least the past 50 years there have been reports from all over the world concerning the upsurge in plant diseases and pests. This has occurred in spite of an expensive and massive effort using fungicides, pesticides and other toxic chemicals to control these diseases and pests in order to maintain and increase production.

The natural resistance to diseases and pests that plants formerly had, has been lost in those areas which have been intensively cultivated over many years. This loss in disease resistance has been attributed to the destruction of the natural bacterial and fungal flora which was previously present in the soil.

Healthy soil contains a vast, ever changing population of heterogeneous micro organisms and is one of the most dynamic sites for biological interactions in nature as many complex biochemical interactions occur there.

When organic matter or green manure crops are turned back into the ground, the materials come in close contact with these micro-organisms, usually in a moist environment and this enables the ready breakdown of this incorporated material. This practice is no longer commonly used in broad acre agriculture resulting in a lowering of the organic matter levels, carbon levels and consequently a loss of micro organisms in the soil.

Also, the overuse of certain fertilisers, fungicides and pesticides can have a severe, detrimental effect upon many useful and essential micro organisms that allow plants to grow normally with a natural resistance, or even immunity to certain diseases.

Research into soil microbiology since the 1920's has consistently shown that micro organisms are solely responsible for organic matter breakdown into nutrient rich humus. The importance of organic matter breakdown and the resultant increase in microbial population may well be very important in the maintenance of a healthy productive soil. A synergistic action does exist between organic matter and micro organisms.

The term "micro-organisms" include a large mass of varying types of minute animal life from bacteria and fungi being the smallest up to earthworms being some of the largest. This diverse group includes actinomycetes, fungi, viruses, protozoa, yeasts, algae and other similar micro organisms, in addition to nematodes, rotifers, earthworms, and some arthropods, primarily mites and springtails (collembola).

It is the interaction and balance of this myriad of biological life forms that helps to maintain the tilth or health of the soil. Closer examination of the relationship between flora and fauna in organic matter decomposition and nutrient cycling identifies that as nematodes and protozoans feed upon microbial populations, they consequently affect organic matter decomposition.

It is likely that such feeding ultimately liberates nutrients immobilized in microbial cells or reduces competition between micro organisms so that mineralization is actually accelerated. These activities not only influence the general nutrition, health, and vigour of higher plants (which relates to disease susceptibility), but also determine the competitive behaviour of root-infecting fungi and their microbial antagonists.

Mites and collembola are known to fragment organic matter as they feed on soil microflora. This fragmentation to finer particles creates new surface areas for microbial colonization and consequently speeds the decomposition and mineralization processes of micro arthropods. As well as the production of

plant nutrients, soil micro organisms have been found to produce growth stimulating substances, plant hormones, which may be essential for maintaining vigorous plant growth.

Unfortunately, as micro organisms can not be seen with the naked eye, conventional farming systems pay little attention to their needs with continued application of chemical fertilisers and sprays in the quest for greater production. It is the plant life growing from the soil that attracts the attention of most producers, but it is the activity of the soil micro organisms that releases the elements necessary for this obvious plant growth.

The breakdown and decaying of the organic matter plays a major role in producing plant available nutrients. Sufficient plant available nutrient is unable to be produced in low organic matter soils through microbial action alone and therefore the addition of chemical fertilisers are generally utilised.

However, this in fact contributes to the degradation of soil structure, leaching of nutrients from the soil into waterways and to the large quantities of unavailable chemicals and minerals being tied-up and unavailable to the plant.

As the salts from water-soluble fertilisers build up in the soil solution, the beneficial bacteria activity is reduced. The continual use and increasing rates of a water-soluble fertiliser regime alone, ensures that the grower becomes more and more reliant on this very fragile system of nutrient availability.

The alternative to this fragile system is to rebuild soil structure by increasing organic matter and providing the base elements and ideal environment for microbial activity to again provide nutrients to meet the plant requirements. After all, it stands to reason that if you improve the health of the soil, you must improve the health of the plant and therefore the quality of the fruit.

The addition of minerals and organic matter to soil and the resultant increase in microbial activity can over time release these unavailable elements to plant available nutrient. This is particularly true with nitrogen production and phosphorous availability. Specific bacteria can breakdown chemically tied-up phosphorous and store this phosphate within their bodies. This provides a constant source of plant available phosphorus from the bank of chemically unavailable phosphate in the soil. Phosphate levels as high as 30% of the plant requirements of phosphorus may be supplied to the plant in this manner.

Orchard crops provide the ideal starting point for this transformation as mulch is often used for weed control. The addition of selected minerals and broad spectrum micro organisms (Soil Mate & Stubble Mate) to organic matter when it is applied is required to influence the resultant change in soil structure, water holding and water infiltration capacities and increase in humus percentage in the soil.

The marked effect of minerals and organic matter upon soil structure can not be over emphasised.

Please contact Alex or Ian through our "contact us" page or phone 1800 819 003 to enable us to assist you in your future endeavours.