



## LONG TERM SUSTAINABILITY

### SOIL BUILDING PROGRAMME - COMPOST

Appletons annually apply 1500 cubic meters of pine bark compost to our seedbeds to increase the organic matter content of the soil.

A by-product from sawmills, the bark is moistened and mixed with poultry manure and turned on a regular basis. A successful compost heap is an enormous number of micro-organisms having a fantastic time consuming a mountain of food. The improvement in the soil structure of our seedbeds has been dramatic resulting in improve friability, retention of nutrients and vastly improved root structure with more fibrous roots.

Key components for successful composting are plenty of organic matter for energy, enough nutrients (especially nitrogen) and plenty of aeration. Micro-organisms that are best at decomposing plant materials need plenty of oxygen and adequate moisture.



*Incorporating compost to form seedbeds*

### IMPROVING SOIL STRUCTURE

Soil structure is to a significant extent determined by the diversity and activity of the microbes making up the soil foodweb.

Bacteria contribute to soil structure by excreting the mucus and gums that help bind particles of soil together to form aggregates. Fungi extend a vast network of thread like hyphae through the soil, binding aggregate together and improving soil stability and structure. A healthy, well aggregated soil is able to support a diverse population of soil organisms and better able to sustain continual cropping.

Biological action can be used to remedy poor soil structure. Under the right conditions Mycorrhizal fungi can be used to break up compacted soil. The fungi's hyphae are able to etch their way through compacted soil creating an intricate web of channels. This network links the surface with the subsoil and enables moisture, oxygen and plant roots to penetrate deep into the soil. Excess CO<sub>2</sub> produced by the root and microbial respiration is able to escape into the atmosphere.

The diversity of the soil foodweb is adversely affected by the over use of fertiliser, herbicides, cultivation and the incorrect management of crop residues.

Bio-Start Mycorrin.nz and Digester.nz have been shown to stimulate and maintain mycorrhizal fungi and improve soil structure.



*End result of good husbandry*

