

# National Landcare Program: Smart Farms Small Grant – Fruit Growers Victoria

## FACT SHEET 5 Subsoils and Nutrition Influence

Subsoils vary widely in their ability to support plant growth, with an increasing number of studies indicating that nutrient and water resources are abundant in subsoils and orchard trees can reach these resources.

Subsoil constraints such as compaction and soil acidity lead to a reduction in root growth and distribution which limits the ability of crops to access subsoil water and nutrients.

Constraints to root growth in the subsoil includes soil acidity, high aluminium (Al), low levels of soil phosphorus (P), low calcium levels (Ca), and often high levels of manganese (Mn), and compaction of fine clay.

Despite the usually lower relative root activity in the subsoil, the large volume of subsoil in comparison to mostly shallow topsoil is an important resource for crop nutrient and water uptake.

Greater exploitation of subsoil resources by tree crops would afford multiple benefits.

### Amelioration

The parts of the soil profile that are rich in water, oxygen and nutrients inevitably encourage more active root growth.

Managing amelioration with deep ripping, liming, or other amendments can lead to increased uptake of water and nutrients, resulting in improved efficiency of biomass production and more efficient yields.

Understanding the factors which determine the positive or negative responses to amelioration through soil analysis seeking broader information than

just crop nutrition, will allow growers to determine under what circumstances it is worthwhile to overcome the constraints.

### Observations

Geology of the Goulburn Valley sees a highly variable topsoil and subsoil matrix.



*Variation in the soil profile with Shepp. Fine Sandy Loam topsoil.*

From the analysis conducted, indications for improved production efficiency can be attained with amelioration in many subsoils. This work generally needs to be

undertaken during establishment and maintained during production phases. pH and nutrient amendments are generally indicated in analysis.

Exposed subsoils such as midrows where soil has been moved for mounding, especially if they are of fine texture are likely to shed more water than infiltrates into them. The result is potential erosion risk, and midrow compaction. A perennial sward of cover can improved this situation.

Soil moisture probes are a tool to consider in current production blocks as they provide information on soil EC, and where

the tree is pulling water from. This indicates root system depth and activity and determines the irrigation depth at which amelioration of nutrition amendments may need to be managed to.

Subsoil manuring is a tool being developed and would benefit many Goulburn Valley soils. The wide opening tyne used with this machine allows larger volumes of composts or manures to be dropped deeper into the soil.

Darren Cribbes  
conNEXUS Global