

# The Biological Influence on Soil Compaction

Joe & Ray Vella – Razorback NSW

Control: *Untreated plot*

Treatments: *OziVerm treatments at 2, 4, and 8 tonnes per hectare*

Soil compaction is a serious and often underrated problem in farming soils, and whilst cultivation provides some short term relief most 'tired' and biologically deficient soil will quickly return to a compact state. Compacted soils are more difficult to work and much of the irrigation and rainfall that is applied runs off rather than infiltrate. The tightness of the soil leads to a dramatic reduction in root development, poor crop performance and reduced yields.

Overworked and tired soils are also typified by low and unbalance soil biology. In fact it is the gradual depletion on beneficial soil biology from continual cultivation and use of chemicals and fertilizers that results in compaction. WHY?, because one of the main functions of beneficial biology is to maintain soil structure and keep the soil aerobic. As soils get tighter Oxygen flow to the plant roots is also restricted, creating anaerobic (Oxygen deprived) soil conditions, which most plant pathogens (diseases) thrive in. Healthy, productive soils need to be aerobic, allowing both air and moisture to move freely around plant roots, the aerobic environment favours beneficial aerobic organisms whose function maintains soil vitality, nutrient cycling and plant health.

## Observations

Joe and Ray Vella have had a particularly hard corner of one block, which was becoming progressively less productive over time. Following conventional thought processes, they had planted a sorghum crop in the area to try and open the ground up, although they had tried this previously without any noticeable change in soil conditions. This time around after ploughing the sorghum in, part of the problem area was treated with OziVerm at various rates of application to test the value of restoring soil health by reintroducing beneficial biology and also to help breakdown crops residues.

The following table is a summary of Penetrometer readings (average of 10 readings taken from each area) 9 weeks after application.

	Ave Depth to 300 psi	Maximum Pressure
Treated	393 mm	337 psi (442mm)
Untreated	213 mm	487 psi (337mm)
Difference %	+85%	

Compaction levels of 300psi or less are regarded as a good indicator of effective root depth or depth to a hard pan, readings above 300psi indicate the likelihood that root penetration will be reduced.

- **The average depth to 300psi** indicates a 180mm (7 inches) **greater effective root depth** in the treated area (nearly twice that of the untreated area).
- **The maximum pressure reached** in the treated area was only marginally above the ideal level at 442.5mm (17 inches), where as in the untreated area the probe could only be inserted to a depth of 337mm (13 inches) before reaching its maximum of 487psi and was already too compact for effective root development well before this.

From a more practical point of view, the area was subsequently replanted with cabbages and Joe and Ray noticed that the cabbages harvested from the treated area were noticeably larger and heavier than those from the untreated area.

Soilsmart products and technical services are specifically designed to help manage one of the most complex and diverse eco-systems on earth - the interface between the soil and the plants we grow.

Soilsmart products will help you to build a strong and balanced biological soil eco-system, maintain aerobic soil conditions and develop a disease suppressive environment in the root zone.

### Biological Diversity

The plants we rely on to grow quality crops, turf surfaces and landscapes all evolved in the presence of, and rely on, a strong and symbiotic relationship with beneficial soil organisms which play a significant role in regulating the health of the entire plant/soil eco-system.

The key to success however is diversity - nature is built on it — consequently we have developed a range of products and programs that have a broad bio-diversity and offer long term benefit. They are also based around indigenous Australian biological species which are suited to our climatic and soil conditions.

Even small changes to your existing programs can improve biology and quickly translate into improved aerobic soil conditions and healthier and more resilient plants. These advances also result in more extensive and vigorous root systems and an increase in water use efficiency. Maintaining bio-diversity and balance also encourages the conversion and retention of minerals, increasing fertilizer efficiency and minimising the need for repeated applications.

Soilsmart products and programs allow you to stay ahead of pests and disease and offer a truly preventative approach to soil and plant health by:

- Building Organic Carbon reserves in your soil.
- Establishing a natural defensive network against disease and pests.
- Strengthening plant health and stress tolerance.
- Increasing fertilizer efficiency.
- Sustaining soil Oxygen levels.
- Reducing costs and improving risk management.

The science that enables us to measure and manipulate the soils' biological properties has advanced rapidly in the past decade, bringing about a much better understanding of how we can influence this very complex bio-system to our advantage. Soilsmart have maintained an association with and are accreditation with organisations like The Soil Foodweb Institute USA, who are at the forefront of research and technology development in this important area of environmental management.