Coomandook Soil Improvement Trial

Background

The aim of this trial work was to investigate options that overcome water repellence on non-wetting sand, and improve the nutrition of the soil at depth. The trial (trial 1) was established in 2013 on Paul Simmons's property at Coomandook, with follow up monitoring of the 2013 treatments in 2014 and 2015.

The method

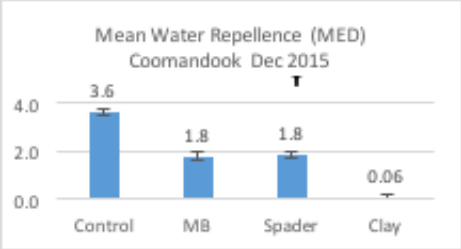
The trial compared soil modification, spading and Mouldboard ploughing, in isolation and in combination with organic matter and fertiliser to give a total of 30 different treatments. Treatments were replicated 4 times to give 120 plots.

Organic matter and fertiliser treatments included aged pig manure, composted pig manure (CPM), composted grape marc (TPR), vetch hay, cereal straw, cereal silage, fertiliser 1 (135 kg DAP in 3 applications), fertiliser 2 (270 kg DAP in 3 applications), fertiliser 3 (67 kg DAP in 3 applications) and the control (nil).

Commander barley was sown in 2013, lupins in 2014 and Mace wheat in 2015. Measurements included crop dry matter production, nutrition and yield over 3 years to observe the long-term effects of the treatments.

The results

Crop productivity was measured over 3 years as yield and biomass production. Each year showed a statistically significant interaction of soil treatment and nutrition, meaning that the productivity of the crop depended on both the soil modification treatment and the nutrition applied.



The table shows that the mean water repellence after 3 years had decreased in spaded and Mouldboard plough plots.

Soil modification

Soil modification did show a significant effect on yield. In general, spaded plots had higher yields than mouldboard plough plots or the control plots.

The Mean Water Repellence Coomandook Dec 15 table also shows that water repellence after three years had decreased in spaded and ploughed plots.

Nutrition & organic matter

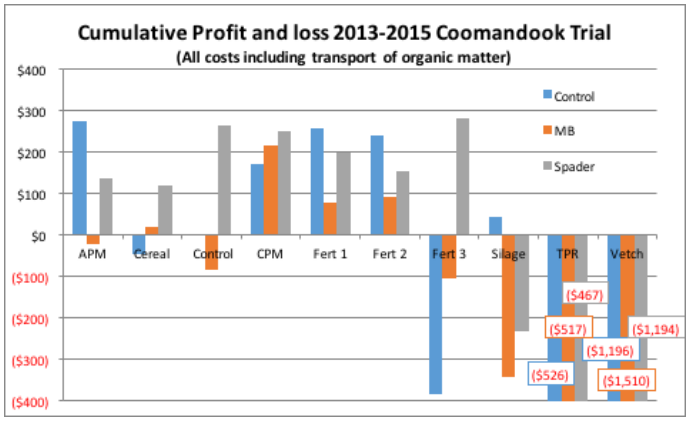
Plots with high nitrogen and phosphorous treatments yielded higher than the control plots. The extra DAP fertiliser at the medium and high rates applied in the first season had an ongoing effect over the 3 years of the trial.

The plots with hay, straw or silage did not perform as well for the mouldboard plough as the machine had difficulty incorporating these amendments.

In terms of yield, the outstanding organic matter types were TPR and CPM (Composted pig manure). Aged pig manure also performed well, but had more variation in yield response.

The profitability of compost, manure or plant matter depends greatly on the cost of the product and the cost of transport. Generally, the cheapest closest source of nutrition with reasonable nutrient content is the most profitable, provided it can be handled and used with machines available.

Adding organic matter with no soil modification can increase yield for cereals, but may cause yield loss in dry seasons or with lupins. This is caused by an increase in root growth in the topsoil but not at depth, which can lead to haying off in spring.



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Sustainable Farming

Conclusion

Treating water repellent sand using soil modification without clay can be done using either a spader or a mouldboard plough.

No organic matter amendment or fertiliser rate had any effect on the water repellence of the sand in this trial.

When all costs are considered (nutrition, transport, and spreading), the cheaper organic matter options of pig manure (APM and CPM) show an increase in profit when used either alone or in combination with spading.

The high cost of buying or transporting organic matter such as silage, vetch or TPR (grape marc) means that they are not cost-effective options in this situation.

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