Point Pass soil constraints investigation

The visual response from the subsoil treatment versus the control in the oats and vetch mix.

Background

The area covered by the Point Pass Agricultural Bureau membership has several soil constraints that are limiting productivity, profitability and sustainability.

This project aimed to look at innovative techniques to identify constraints and improve the efficiency of amelioration.

This involved improving knowledge and understanding of three locally representative soil types and investigating subsoil manuring, a concept that has had positive production responses in higher rainfall areas in Victoria.

The method

Two replicated trial sites with up to 9 sub-soil treatments were established using a trial deep subsoil manuring machine.

These sites were chosen for their heavy textured sodic B horizons that limit water infiltration and plant growth. Treatments applied included:

- Control treatment
- Rip only
- Plant based compost (20-40t/ha)
- Plant and animal manure based compost (20-40t/ha)
- Gypsum (10t/ha)
- Brew – a mixture of compost, chicken manure pellets and gypsum (40t/ha)
- TPR and Grape Marc mixtures
- Compost and Biochar
- Pig manure compost.

After establishment, landholders sowed the sites. Biomass measurements were taken of a vetch and oaten hay mix at the Robertstown site and lentil grain yield at the Eudunda site. It is envisaged that the sites will be monitored into the future.

The results of this trial were delivered at a workshop in February 2016.

Mapping of pH was conducted over 120ha and two paddocks providing objective information on soil pH and identifying areas of limitation to allow for more precise ameliorant application.

Three representative soil types were examined physically and chemically down the profile by digging soil pits. Moisture monitoring devices were co-located at these sites adding value to the information received.

The subsoil manuring machine applying treatments in 2015.

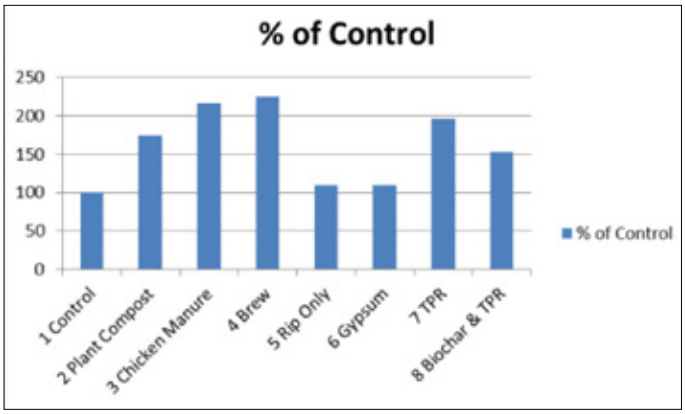
The results

The deep subsoil manuring site at Robertstown had a large improvement in the quantity of biomass grown over the control treatment in the very dry decile 1 spring conditions.

The responses in lentils at the Eudunda site were not as good with the control being the highest yielding treatment.

It is thought that the choice of crop grown may have affected the response of the treatment. It was also acknowledged by members that it might take time at this site before a treatment response is observed.

The results of the soil pits and pH mapping were collated in the "Soil Smart: Understanding your soils" booklet for the Point Pass Ag Bureau. The document contains background information on soil health, physical and chemical properties of the soil, soil nutrition and soil water.



Charred small leaves and branches

Recommendations

There has been a large cost in setting up the subsoil manuring trial, and to date, only one year of assessments has been made. Work done in other areas suggests that it can take up to five years for the full benefit to be realized. The next phase is to measure changes as a result of the treatments after three to five years, to fully assess the sub soil manuring technique.

Conclusion

Subsoil manuring and pH mapping of soil acidity is specific for particular soils with soil constraints. The district has a range of soils, which may be suit treatment with these techniques. The subsoil-manuring machine is still at proof of concept stage, and has not yet been fully commercialised to broad acre application. The lack of a commercially available machine or a contractor providing the service will limit the implementation of the technology.

The availability of a suitable organic matter source may also inhibit adoption, as will the time-frame to realise results.

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