

# Soil Health Activities in the Wimmera/Mallee - Birchip Site



This project is part of the *Healthy Soils for Sustainable Farms* Programme - funded by the Department of Agriculture, Fisheries and Forestry through the Natural Heritage Trust in partnership with the GRDC and managed by Land & Water Australia

The Farming Systems Project was established in 1999 to help determine the medium to long-term impacts of four different farming systems on the financial viability and physical and environmental sustainability of the farming operation. The Farming Systems trial site has been selected to demonstrate the impact of organic matter on the health of the soil.

## Objectives of this site

The aim of the site is to demonstrate the impact of organic matter on the health of soil.

The objective of the site is that landholders adopt new technologies and management practices. Landholders are encouraged to do this through:

- Continuing research into the impacts of organic matter on soil health;
- Increased support to adopt best practice; and
- Increased education of landholders.

## Current Paddock Demonstrations

The four farming systems being compared at the site are Hungry Sheep, Reduced Till, No Till and Fuel Burner. Information collected from the site includes crop rotations and crop yields, soil testing pre-sowing and post-harvest, EM Mapping, soil water and available nitrogen, weed population measurements.

Half of the No-Till paddock has had straw added to the surface to compare differences in organic matter levels over time.

## Location Map

This site is located approximately 28 km north of Birchip on the Birchip - Berrivillock Road (Figure 1).

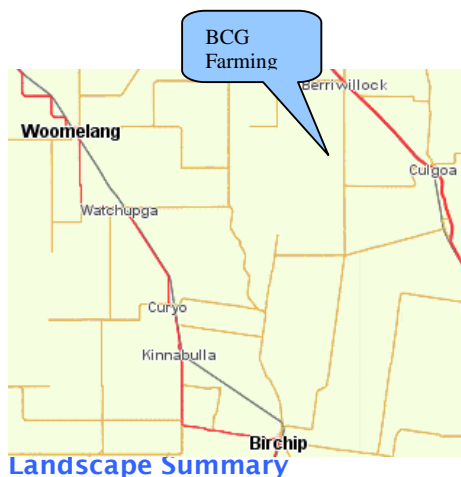


Figure 1: Location of the Birchip Farming Systems site

The region is part of the North Western Dunefields and Plains. The landscape is relatively simple, consisting of plains on which there are scattered low hummocks. There is a relatively narrow range of soils in this landscape; gilgaied light clays are the most widespread soils, occupying the plains. Lighter soils of sandy loams predominate on the slopes of the hummocks.



Figure 2: BCG Farming Systems, Fuel Burner paddock, LWA 20 (above) and the No Till paddock, LWA 21 (below), June 2007



## Management Practice

Farming systems within the Birchip region are mixed, with many farms utilising livestock to compliment the cropping program. Crop rotations are cereal based with only a small percentage of cropped land being sown to canola, lentils or another pulse crop. The decision to grow canola or pulses in the southern Mallee is mainly driven by an opportunistic autumn break, stored moisture, the need for a disease break or weed control. The predominant livestock enterprise is prime lamb production, however a number of farmers also run wool producing enterprises.

## Soil Profile Descriptions

The two soils pits described vary slightly, with a slight change in position in the landscape.

The first soil pit described (Figure 3) is in a cultivation paddock. The surface is a brown light clay that is not saline and is strongly alkaline. The subsoil is a brown light-medium clay with black mottles grading to brown medium clay to 100 cm, below which is a light olive brown medium-heavy clay with olive grey mottles. The subsoil is very strongly alkaline. The surface soil is sodic becoming strongly sodic with depth but that may not disperse due to the high level of soluble salts. The soil is moderately calcareous to highly calcareous throughout the profile with fine earth carbonates. Below 32 cm, soft carbonate segregations are common. Salinity levels increase to a high level below 32 cm. Boron levels are toxic in the subsoil which will affect the growth of boron sensitive species.



Figure 3: Soil Profile LWA 20

The second soil pit (Figure 4) is in a no-till paddock. The surface soil is a brown clay loam grading to a light clay to a depth of 18 cm. The pH is strongly alkaline, salinity is low, no sodicity and there is moderate fine earth carbonate present. The subsoil is a reddish brown with brown mottled light-medium clay changing to a brown medium clay to 80 cm. Below this, the soil changes to a yellowish brown medium heavy clay. The top of the subsoil is sodic becoming strongly sodic below 32 cm. Salinity levels are high below 80 cm which may prevent the soils from dispersing. Boron levels increase at 45 cm. The subsoil is strongly alkaline throughout, especially between 32-80 cm where many calcareous segregations and nodules are present.

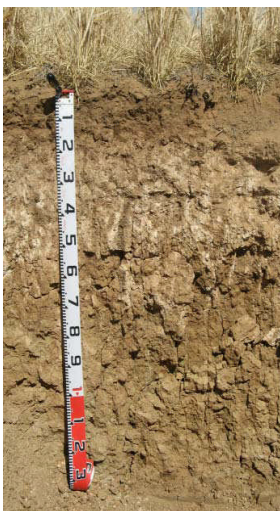


Figure 4: Soil Profile LWA 16

## Management Considerations

To improve soil health in the region, the following management practices should be considered:

- Subsoil constraints (including boron, sodicity and salinity)
- Subsoil is strongly sodic and the movement of water and plant roots is likely to be restricted as a result
- Decrease tillage and practice stubble retention to combat sandy surface soils that are susceptible to soil structure decline
- Controlled traffic to combat surface soils and subsoils that are prone to compaction and plough pans
- Alkaline nature of the soil (may tie up nutrients such as iron, manganese, zinc, copper and boron)
- Less frequent tillage, using less aggressive implements
- Working the soil at optimum moisture content can all assist in maintaining soil aggregation and porosity as well as reducing the breakdown of organic matter.

## Contact Details

Look for more Healthy Soils Information in your region at Victorian Resources Online – [www.dpi.vic.gov.au/vro](http://www.dpi.vic.gov.au/vro)

For further information on the Healthy Soils Project and upcoming events contact your local DPI Healthy Soils Officer:

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