



farmtalk



This article contains information most relevant to the less than 350 mm rainfall mallee farming region

Sharing, Learning, Doing!

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Farmtalk is a product of the Mallee Sustainable Farming Inc. Tri-State Research and Extension team

Soils Ain't Soils: The Mallee Experience

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The issue

Soils ain't soils. In a high rainfall year the flats yield well and the tops of the hills go yellow, with protein being poor. In a low rainfall year the hills yield best, whilst the flats aren't worth harvesting. In an average rainfall year the slopes are the most productive section of the paddock. Another soil, colloquially known as Belah, performs well in most seasons and is therefore often favoured for cropping.

This *farmtalk* covers the following:

1. What are the main soil types in the low rainfall Mallee?
2. How is water holding ability affected by the soil type?
3. What effect does soil type have on paddock management?

What we know

Soil has three components:

- sand;
- silt; and
- clay particles.

These influence soil properties, like the ability of soils to store water and the capacity for water to be taken up by plants.

What this means

Different soil types have different characteristics and therefore require different management as detailed over.

Typical soil profiles



Hill (sand)

Flat (clay)

Belah (clay loam)



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Characteristics of soil on the hill (sand)

- Large sand particles and large pores predominate.
- Low water holding capacity (e.g. 25%).

Management of soil on the hill (sand)

- Long fallows are ineffective for moisture storage as the maximum water holding capacity of the soil is quickly reached during the fallow period and any extra rainfall goes to deep drainage. Large losses of nitrogen can result from this deep drainage.
- These soils perform well when intensively cropped as the crop grows predominately with seasonal rainfall and the soil is healthier due to more organic matter and beneficial microbes, which help stop nitrogen from leaching.
- Light rains are effective as most of the water is easily available to plants.

Characteristics of soil on the flat (clay)

- Small clay sized particles predominate.
- High water holding capacity (e.g. 36%).
- Unavailable water is high (i.e. 23%).

Management of soil on the flat (clay)

- Flats are the most variable part of the landscape varying from paddock to paddock.
- They can store moisture responding well when fallowed but are also prone to subsoil constraints. It is therefore best to treat them as a zone within the paddock.
- The best way to determine management is to soil test to a metre to determine the lower water limit in November then follow with pre-sowing soil moisture and nitrogen tests.
- This information can then be used as the basis for a crop budget.
- For more information on calculating potential yield and nitrogen requirements see the Mallee calculator link at www.msf.org.

Characteristics of Belah soil (clay loam)

- Mixture of pore sizes (sand, silt, clay).
- Greater water holding capacity than sands (e.g. 30%).
- The lower limit for unavailable water is less than clay soils (i.e. 14%).

Management of Belah Soil (clay loam)

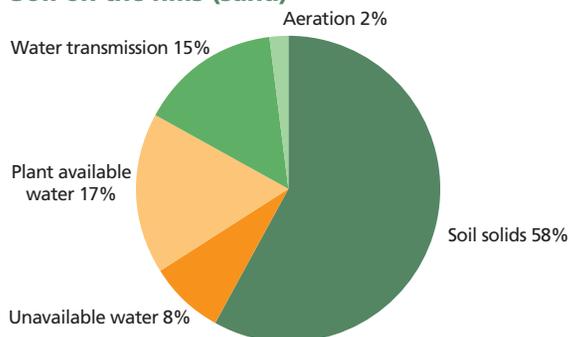
- Continuous cropping can be effective on these soils.
- However, fallow can provide a buffer against poor rainfall years. At the Kerribee MSF site, CSIRO measured this benefit to be 10 to 20 mm of stored water, which translates into a 0.2 to 0.4t/ha yield advantage.

Where to next

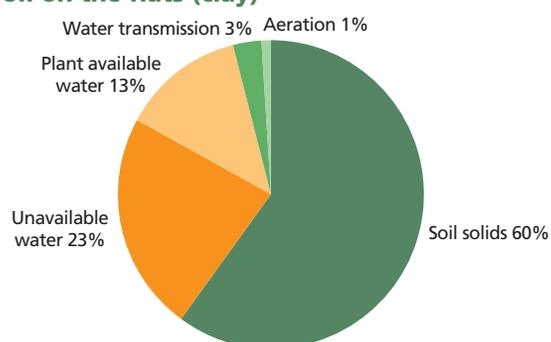
One of the best tools available is soil nutrient and moisture testing. However, in the Mallee where it is common to have more than two soil types in the one paddock, it is essential to know which soil is being sampled. The best option is to take two soil tests, one from the hill and one from the flat (when testing soil paddocks use the same sample locations each time). Treating the flat as a separate zone to the hill in terms of management is then possible and should result in better economic efficiency as you can place resources where they are needed.

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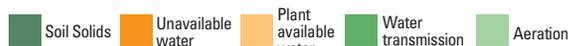
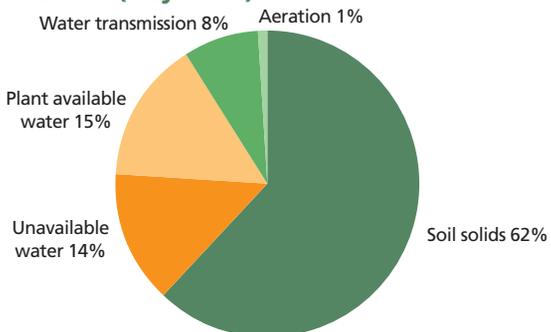
Soil on the hills (sand)



Soil on the flats (clay)



Belah soil (clay loam)



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