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**ballina**  
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## Soil Fact Sheet 5

# Assessing Soil Aggregate Stability

When a fragment of soil is immersed in fresh water, there are four things that can happen:

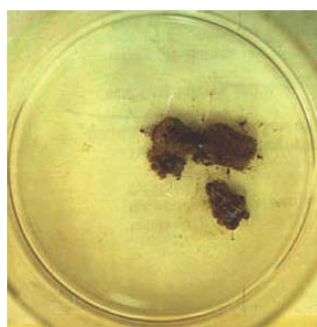
1. It can remain unchanged
2. It can swell
3. It can fall apart into smaller fragments (it slakes)
4. It can disperse into a fine milky suspension

### You will need:

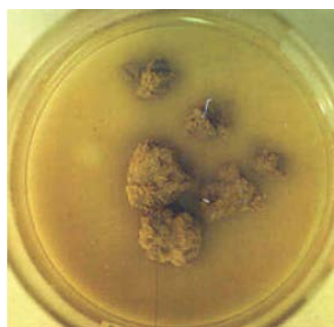
- Air-dried aggregates 4-6 mm in diameter (size of a green pea)
- Rain water or distilled water
- Flat bottom dishes e.g. shallow glass jar or transparent plastic cup

### The method

The soil should be sampled from the horizons of interest, particularly the top 0 - 10 cm, and the subsoil. Allow the soil to air-dry (this is very important and may take a couple of days).



**Figure 1: Example of a soil that does not disperse.**



**Figure 2: Example of a soil that does disperse.**

- Using a shallow glass jar or dish, gently place three air-dry aggregates about the size of a green pea into 30-40mm of rain or distilled water;
- Watch the aggregates carefully for first few minutes to observe if slaking is to occur. Slaking will typically occur within the first hour;
- Leave the samples for 20 hours before checking for dispersion, indicated by cloudiness or milkiness around the base of the aggregate.

Dispersion Test Results	
Description of What Happens	Classification
Soil completely disperses	Highly Dispersive
Soil partially disperses	Moderately Dispersive
No dispersion	Remould the soil (see below) and repeat

If the air-dry natural aggregates do not disperse, rework some soil in a moist (not saturated) state and make into three pea sized balls. Immerse into rain or distilled water once again. Observe the aggregates after 2 hours, and again after 20 hours.

**Figure 2:** Example of assessing aggregate stability on natural (left) and reworked (right) aggregates of soil from three horizons of a soil profile: surface soil, upper subsoil and deeper subsoil. Photograph: Mark Imhof.

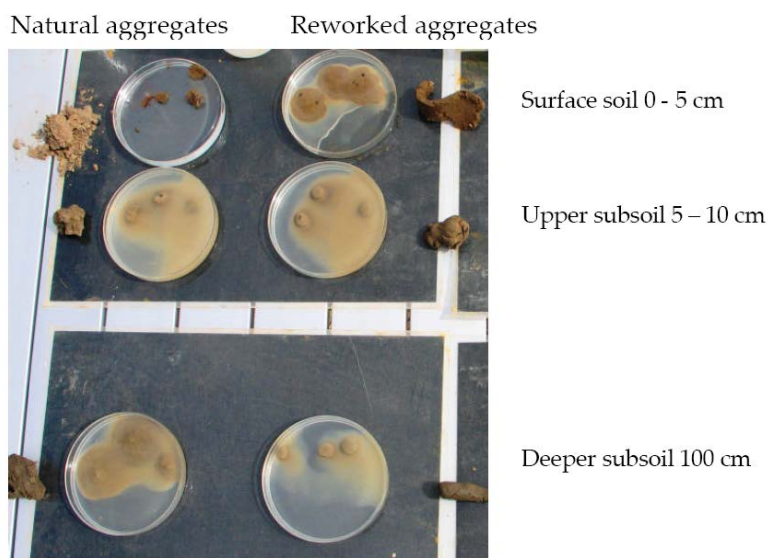


Figure 2 shows the upper subsoil to be the most dispersive horizon of this soil profile, classified as 'Highly Dispersive'. The shallow surface soil of this profile is 'Non-Dispersive', but when moist surface soil was reworked it became 'Dispersive after Moist Reworking'. The deeper subsoil would be classified as 'Moderately Dispersive'.

Reworked Dispersion Test Results	
Description of What Happens	Classification
Reworked soil disperses	Dispersive after moist reworking
Reworked soil does not disperse	Non dispersive

### What does this mean for my soil?

**Highly Dispersive** - Surface soils that are highly dispersive may suffer from severe crusting. Dispersive subsoils may have poor drainage and be prone to waterlogging. Dispersive soils are likely to respond to gypsum. A laboratory test will be valuable to determine how much gypsum to apply. Increasing the organic matter of the soil will assist in stabilising the soil also.

**Moderately Dispersive** - 'Moderately Dispersive' soils will have similar problems to 'Highly Dispersive' soils but to a lesser degree. These soils are likely to respond to gypsum.

**Dispersive after Moist Reworking** - Cultivation of the soil when it is moist will cause dispersion. Gypsum could be useful in promoting this soil to a 'Non-Dispersive' soil.

**Non Dispersive** - Excellent aggregate stability indicating the soil will not suffer from any significant soil structural problems. Appropriate management will help ensure structural stability into the future.

### Reference

Baxter NM & Williamson J (2001) Know Yours Soils – Assessing Yours Soils (Part 2). Department of Primary Industries, Bendigo Victoria. ISBN: 0 7311 4557 7

### Further Information

Please contact Council's Development and Environmental Health Group on Ph 02 6686 1210.