



Current titles in this Vineyard activities series include:

1. Taking soil samples
2. Measuring soil pH
3. Measuring soil salinity
4. Measuring organic carbon in soil
5. Assessing soil structure
6. Measuring soil porosity
7. Measuring soil strength
8. Measuring the infiltration rate of water into soil
9. Examining grapevine root systems
10. Monitoring soil moisture

## Vineyard activities 6: Measuring soil porosity

Soils need large pores and channels for adequate aeration and good drainage. Large pores that can be seen by the human eye are known as macropores.

Mesopores and micropores are too small to be seen by the human eye and are respectively responsible for storing plant available water and holding the water that is unavailable to plant roots. The movement of air through micropores is very slow.

For good plant growth, the soil needs a balance of macro-, meso- and micro-pores. Soil with too many micro-pores will drain poorly and result in waterlogging.

Clay subsoils often restrict water movement to depth and have a low porosity. Therefore, the porosity of the subsoil is often a good indicator of potential waterlogging of the surface soil.

Soil management can modify the porosity of a soil. Tillage and trafficking, particularly of wet soil, can destroy macro- and mesopores, while cover crops and mulches can maintain and stabilise these pores.

There is a simple field method to measure soil porosity by counting the number of pores on a face of a clod of soil. This is described below in more detail.

### EQUIPMENT

- Shovel
- Fuse wire (0.1mm and 0.5mm diameter)
- Recording sheet and pen

### TIMING

This measurement is best undertaken when soil sampling is conducted. See *Vineyard activities 1 - Taking soil samples*.

### METHOD

Extract a moist sample of soil and on an undisturbed face on a clod, select a representative 25mm<sup>2</sup> section (i.e. 25mm x 25mm) and count all pores in the size range 0.1–0.5mm using the two wires as a guide. Repeat three times at each site/depth where soil sampling is occurring.

**Note:** If the topsoil is very crumbly (friable), then the macroporosity is good, even though it is difficult to count the number of pores.

Irrigation classifications according to soil porosity are provided in the table over the page.

Number of soil pores (per 25mm x 25mm area)	Soil water conductivity (mm/h)*	Irrigation classification
10	0.6	Poor  Excellent
15	1.3	
20	2.3	
25	3.5	
30	4.9	
40	8.5	
50	12.9	

\*See Cockroft for details

## FURTHER INFORMATION

Product or service information is provided to inform the viticulture industry about available resources, and should not be interpreted as an endorsement.

The information in this Vitinote has been trialed by viticulturalists as part of the Cooperative Research Centre for Viticulture's Viticare On Farm Trials project. For information about On Farm Trials, visit [www.crcv.com.au/viticare/](http://www.crcv.com.au/viticare/)

A key reference on these topics is:

- Nicholas P, (Ed.) (2004) Soil, irrigation and nutrition, Grape Production Series 2, SARDI, Adelaide.

Another useful reference is:

- Nicholas P, Magarey PA and Wachtel M, (Eds.) (1994) Diseases and pests, Grape Production Series 1, Hyde Park Press, Adelaide (a glove box edition of this book is also available).

Both of these publications are available from Winetitles, 08 8292 0888, or visit [www.winetitles.com.au](http://www.winetitles.com.au).

Also see:

- Cockroft B, (1970) Estimation of soil permeability from counts of visible pores, Australian Journal of Experimental Agriculture and Animal Husbandry 10 (45), pp460-1.

*Water management for grapevine production: Research to Practice®* and *Grapevine nutrition: Research to Practice®* are training programs whose delivery can be fine-tuned to suit each region. They include topics on soil management issues.

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