

Overirrigation of Young Vines Causes Poor Growth and Disease

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Growers have a great fear of droughting their young vines. But too much irrigation stunts growth and can cause root disease and young vine decline. Drip irrigation is especially bad because it saturates the soil near the vines, excluding all air from the affected area. Saturation with drip irrigation occurs regardless of soil type –

sandy soils get just as saturated as clay soils!

Young vines are much more susceptible to overirrigation: the root system is small and it is easy to drown every bit of it. The effect is to halve shoot weight, even if the waterlogging lasts just a few days per week¹. Longer waterlogging reduces shoot growth to one sixth! Shoots of waterlogged vines are very low in weight for their length – i.e. they are "spindly". Spindly shoots are sometimes seen in conjunction with vineguards, because vineguards reduce water use, slow the drying process, and prolong waterlogging. It is not a fault of the vineguard – it is a fault of wrong irrigation management.

The other effect of overwatering is to encourage the development of root rots². Last year I found one case of *Pythium* and two cases where *Cylindrocarpum* was killing young vines. *Cylindrocarpum* has only recently been recognised as potentially serious, but it seems increasingly common. It is closely related to the organism causes that other new disease, "Black Goo" or "Black Foot"^{3,4}. Waterlogged conditions encourage root rotting fungi and reduce the vine's ability to cope with disease attack.

The key question is: How do I schedule irrigation correctly in a young vineyard? The simple answer: "There is no substitute for measurement".

Postponing the installation of irrigation sensors until the vines are established is a mistake! Sensors need not be expensive: gypsum blocks are often ideal, but whatever sensors are used they must be placed where it counts – just a few inches below base of the newly planted vine.

Even with soil moisture sensors, the grower is left to decide how long to irrigate. Most simply apply "plenty of water", once again running the risk of overirrigating. A better policy is to irrigate for as short a time as the irrigation system will allow, and be prepared to irrigate a little more often.

Ideally, the irrigation system should be turned off as soon as irrigation water arrives at the bottom of the rootzone. CSIRO Land and Water is now trialling a new sensor that does exactly that⁵. Once the wetted front reaches the depth of the probe, the sensor turns the irrigation system off. Waterlogging is minimised while the useful amount of irrigation is maximised. Growth is increased and, of course, there is less impact on the water table.

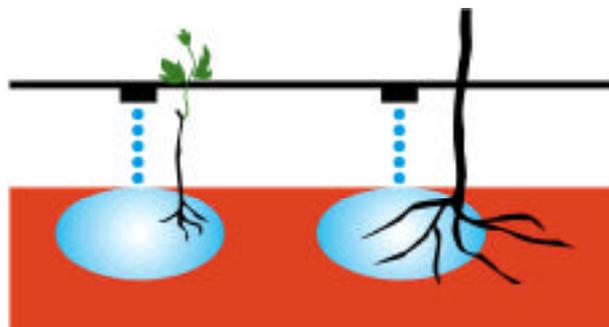


Fig 1. The small root systems of young vines are easily waterlogged, but with larger vines much of the root system is unaffected. Even occasional waterlogging can halve shoot growth if the whole root system is drowned.

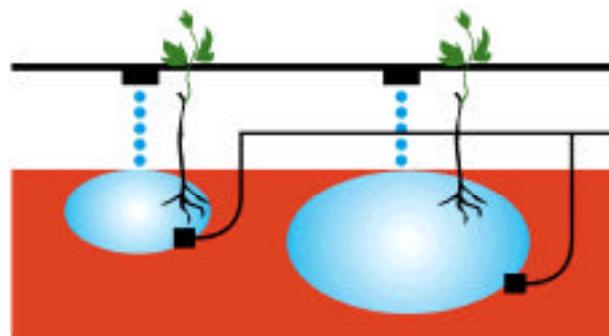


Fig 2. Irrigation sensors must be placed where soil moisture is important: in the middle of the root zone of the young vine. Placing sensors too deep or off to the side will result in overirrigation.

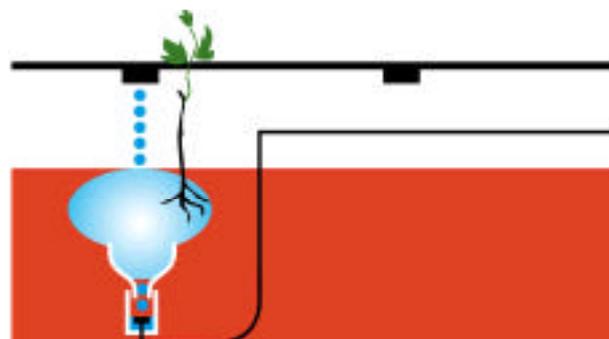


Fig 3. The CSIRO "FullStop" detects the arrival of the wetted front and turns irrigation off within minutes. Irrigation time is minimised and overirrigation is avoided. Drainage water collected in the unit can easily be sampled and analysed for salinity, nitrate, or anything else of interest.

References

1. Waterlogging reduces shoot growth and bud fruitfulness in pot-grown grapevines with a split root system. R.M. Stevens, G. Harvey, and R.E. Johns. *Australian Journal of Grape and Wine Research*, 1999, Volume 5 Number 3, 99-103.
2. Root Rots Can Stunt Young Grapevines. Graham Due. *Victorian Viticulture News*. Summer 1998-99. P 16-17.
3. Identifying trunk diseases. *National Grapegrowers*, November 1999, p.37.
4. Black foot disease in France. Philippe Larignon. In "*Black Goo: Symptoms and Occurrence of Grape Declines – IAS/ICGTD Proceedings 1998*", pp 89-90. See also www.ucdavis.edu and search for "+vine+decline".

Readers wanting to know more about the new CSIRO sensor should contact Paul Hutchinson at CSIRO Land & Water. Tel: (02) 6246 5551; Fax: (02) 6246 5560; email: Paul.Hutchinson@cbr.clw.csiro.au