

How our native giants shrug off heatwaves

New research has unearthed an unknown resilience to extreme heat waves in tall trees, providing useful insights for catchment management.



Credit: Patche99z / Wikimedia Commons

In addition to obvious threats to trees from fire, scientists worldwide are concerned about trees and whole forests dying during increasingly frequent drought and heatwaves.

In a new study published in *Oecologia*, researchers recorded the effects of the 2009 Victorian heatwave – which brought temperatures of up to 49°C – from within [Mountain Ash forest](#) at Britannia Creek, near Warburton.

Results show that the forest giants survived due to their incredible ability to store, use and refill water in their stems.

‘Current theory would suggest that many Mountain Ash trees that were not affected by the fires should have died of severe water stress on Black Saturday, but they did not,’ says co-author Dr Sebastian Pfautsch from the University of Western Sydney.

‘The remarkable ability of this species to grow quickly and reach tremendous heights, yet survive extreme droughts and heatwaves, is very heartening as we enter a period of history which is predicted to see increasing numbers of extreme weather events.

‘There’s been much concern [that] Australia’s tall trees could succumb to higher temperatures and less rainfall, but our study shows they’re far more resilient than expected,’ says Dr Pfautsch.

‘This research is a key step in predicting how they will respond and their capacity to support the ecosystem through services such as carbon sequestration and water yield.’

The ability to survive owes much to the capacity of the trees to use stored water that will be mobilized when water in the soil becomes limiting. This feature is emphasized by the researchers’ recording of substantial water uptake by the trees at night.

‘Wood of these remarkable trees can act like a sponge, being squeezed dry during the day and recharged during the night,’ explains Dr Pfautsch.

It had been widely assumed that water uptake at night was a minor process, but the researchers found that the Mountain Ash trees ‘recharged’ their internal storage at night at rates of up to 30 percent of daytime levels.

Dr Pfautsch’s co-investigator, Professor Mark Adams from the University of Sydney, says that water use by Mountain Ash is critical to determining water yield for the City of Melbourne.

‘Understanding how and how much the trees use water under extreme conditions, and understanding how extreme conditions affect the trees, is therefore vital to future catchment management.’

But more research is needed to ensure we fully understand the complex ecosystems of our forests. ‘Many questions remain before we can accurately predict their future in a warming world,’ Dr Pfautsch says.

Sources: University of Western Sydney, University of Sydney

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