# Rates of survival of epicormic and lignotuberous shoots produced by stressed *Eucalyptus obliqua* LHerit. seedlings are influenced by root tip growth and the presence of leaves.

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## Abstract

Seedlings of Eucalyptus obliqua L'Herit, of approximately 300mm height and with a stem caliper above the lignotuberous swelling of 3-4mm grown under ideal greenhouse conditions, were stressed by decapitation or exposure to different levels of heat stress by exposure to temperatures ranging from 40-120°C for from 2 to 128 minutes. Some seedlings were also subjected to repeated doses of these stresses. Lower temperatures and shorter exposure durations were often sub-lethal and decapitation to the same extent as heat killing of plant tissues elicited similar levels of epicormic and lignotuberous shoot production and growth.

Decapitated plants with different numbers of leaves left intact showed different rates of epicormic and lignotuberous shoot survival. Supplementary carbohydrate supply to decapitated plants was done by placing plastic tubing over the cut stems and injecting a sucrose solution. Using specially designed containers, the root systems of the seedlings could be inspected on a daily basis to determine whether the root tips were healthy and selected root tips were monitored to determine if and when they had resumed growth after treatment.

Survival rates of epicormic and lignotuberous shoots were enhanced in decapitated plants by the presence of healthy, functional leaves. Supplementary feeding of decapitated seedlings with a glucose solution gave slightly higher rates of shoot and plant survival, suggesting that the production of photosynthate by the leaves was at least partly responsible for this improvement.

The re-commencement of growth after significant stress through the development of either epciormic or lignotuberous shoots was preceded by root tip growth. Root tip growth usually commenced 2-3 days before epicormic or lignotuberous shoot growth could be detected. If root tips did not re-commence growth after the imposition of stress, then ebicormic and lignotuberous shoots did not develop and the plants invariably died.

Depending on the level of stress imposed, the usual order of regeneration was from epicormic buds higher up in the branches, then epicormic buds on lower branches, then epicormic buds on the trunk and finally lignotuberous buds. Lignotubers and the shoots they produce are a last-resort survival mechanism (Moore 2015). In repeatedly stressed plants, lignotuber size often increased as lignotuberous buds swelled and then were repressed by the growth and development of epicormic shoots higher on the stem.

Moore GM (2015) The role of Lignotubers (Basal Burls) in the stress recovery of messmate stringybark, Eucalyptus obliqua L'Herit. seedlings and its arboricultural implications. Arboricultural Journal 37(2), 113-125.

**Key Words;**

Lignotuber, epicormic shoot, decapitation, root tip, photosynthate

**Biography**

Greg Moore, a Senior Research Associate at Burnley Campus, University of Melbourne was Principal of Burnley from 1988 to 2007, and Head of the School of Resource Management at the University from 2002 to 2007.

With a general interest in horticultural plant science, revegetation and ecology, Greg is interested in all aspects of arboriculture. He was inaugural president of the International Society of Arboriculture, Australian Chapter, and has been a member of the National Trust of Victoria's Register of Significant Trees since 1988 and its chair since 1996. He has been on the Board of Greening Australia (Victoria) since 1988 and has chaired Treenet since 2005. He is on the board of Sustainable Gardening Australia and is a trustee of the Trust for Nature. He has published 3 books, 4 book chapters and over 150 papers and articles related to the biology and management of trees.