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**ECOLOGICAL TRENDS IN THE WOOD
ANATOMY OF *Leptospermum scoparium* J. R. et G.
FORST (MANUKA) FAMILY: MYRTACEAE**

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ABSTRACT

The wood anatomy of manuka growing in five different habitats was analysed to establish whether or not different anatomical forms exist. The study involved the use of the light microscope for obtaining vessel and fibre quantitative data such as their length, width, wall thickness, density of vessel elements in a transection and average grouping of vessels. The confocal microscope was used to measure the area of perforation plates of fibriform vessels and wide vessels. The study also involved the use of the scanning electron microscope for determining the presence of cell wall sculpturing in the walls of wide vessels. The data was analysed by univariate analysis to determine any variation of wood characters within a population and between populations in the five habitats. The habitats were margins of lowland forests, swamp, sand dune, subalpine and hot thermal soils.

The study has established variations within each population in all the cell types. The study showed that plants differed anatomically in the average sizes of their cell length, width, wall thickness, abundance of vessels, area of perforation plates and the average grouping and the type of grouping of vessels. There was also variation of wood anatomy between populations in most cell characters except for the length of wide vessels, length of fibriform vessels and wall thickness of fibre-tracheids. In these characters the wood anatomy of manuka was more homogeneous.

The significant trends were that margins of lowland forests had wide and thick walled cells in all the cell types and also had high average group of vessels and large area of perforation plates of fibriform vessels and small area of perforation plates for wide vessels. It had short libriform fibres and fibre-tracheids. The swamp habitat seemed to follow margins of lowland forests except that it had the longest fibre-tracheids and libriform fibres and had the greatest area of perforation plates for wide vessels. Both of these habitats had the lowest density of wide vessels. Sand dune, hot thermal soils and subalpine habitats had on average the smallest vessels in terms of diameter and wall thickness and area of perforation plates, but had high abundance or density of wide vessels. Sand dune had wide and thick walled libriform fibres like margins of

lowland forests. Subalpine and hot thermal soils had comparatively small fibres in all dimensions.

Even though variations were established in most of the cell characters, the correlation of wood with ecology was less pronounced as compared to that found in families and genera in past research. Significant trends were manifest in diameter, wall thickness and density of wide vessels. The margins of lowland forests and swamp (more mesic habitats) had great diameter and cell wall thickness. They also had low density of cells. The other habitats, sand dune, subalpine and hot thermal soils (less mesic habitats) had comparatively narrow diameter of wide vessels, thin cell walls and high levels of wide vessels densities. It was found that the other characters such as length, width, wall thickness of fibriform vessels, libriform fibres, and fibre-tracheids, grouping and area of perforation plates of wide vessels showed complex and overlapping ranges between the habitats and had no significant correlation with ecology. From this research it is clear that general trends of ecological adaptation were evident and also that manuka has its own specific ecological trends.

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