3rd New Zealand and German CELL WALL SYMPOSIUM

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Special Issue:

Plant Cell Walls: Diversity and Approaches to Understanding their Function

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Guest Editorial

This Special Issue of the Journal comprises 14 selected and peer-reviewed papers from the 3rd Joint New Zealand - German Cell Wall Symposium held in Auckland, New Zealand from 13 to 15 February 2008.

Primary and secondary plant cell walls are an essential component of our daily life. They are renewable biomaterials, serving as an important source of food (primary cell walls), as building materials (secondary cell walls) and energy (primary and secondary walls). In New Zealand, information about the biochemistry and physical properties of plant cell walls can have a huge impact on the economic value of horticultural products, such as kiwifruit and apples, and forestry products, such as paper and timber.

Primary and secondary cell walls function in different ways: the primary wall enables a plant organ to expand and grow; and the secondary wall provides mechanical support. Understanding the nature of the links between primary and secondary cell walls is essential for a more complete understanding of cell walls and, more specifically, about the structure/function relationships of plant cell walls. For example, the composition and architecture of primary cell walls is likely to influence the architecture and properties of secondary cell walls. Thus, during wood formation, while cells are still expanding, they have only primary walls, and it is only after expansion has stopped that the secondary wall is laid down. Equally, the mechanical, and often functional, properties of cells with secondary cell walls are not only determined by the way the secondary wall develops, but also by the way some of the compounds, such as lignin, are deposited into the framework of the middle lamella and primary cell wall.

In 1997, a Memorandum of Understanding was signed between the New Zealand Ministry of Research, Science and Technology and the Deutsche Forschungsgemeinschaft (German Research Foundation). As a result of this agreement, in 2004, a group of New Zealand and German research scientists agreed to hold regular bilateral meetings on plant cell walls, combining topics of formation, structure and function of both primary and secondary walls of wood and non-wood tissues.

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In 2005, the first Symposium “The Plant Cell Wall as a Complex Biocomposite – Linking the Primary and Secondary Walls” was held in Rotorua, followed by the second Symposium “The Plant Cell Wall: Recent Advances and New Perspectives” held in Hamburg in 2006. The third meeting was held in February 2008 in Auckland, New Zealand. The remarkable breadth of topics was captured under the motto “Plant Cell Walls: Diversity and Approaches to Understanding their Function”. Six delegates from Germany and twenty-nine delegates from New Zealand attended the symposium. Twenty-five of these scientists gave presentations in their area of expertise, which formed a foundation for discussions and for exchanging information and seeking opportunities for collaboration between New Zealand and Germany.

A wide variety of topics, all related to cell walls, were reported on during the Symposium. The topics included cell-wall micro-architecture; the cell walls of fruits; the uses of cell-wall components in food products; the production of biofuels from cell walls; the mechanical properties of walls; the water, mineral and heavy metal content of woods; cell wall biosynthesis and the structures and functions of specific cell-wall polysaccharides. In addition, many techniques were described that can be used to study cell walls. These included monoclonal antibodies to locate specific polysaccharides; synchrotron radiation X-ray techniques; and different types of microscopy such as UV fluorescence, scanning and transmission electron microscopy, and Fourier-transformed infrared (FTIR) microscopy.

The following 14 papers provide a permanent record of key topics discussed at the Symposium and complete Volume 39 of the *New Zealand Journal of Forestry Science.*