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R&D WORKS – JULY 2014

Welcome to our July edition of the R&D Works newsletter.

We all know that wood is good, and now research has established that wood surfaces featured in buildings can reduce the activity of the sympathetic nervous system, which is responsible for physiological stress responses in people. Other stories this month include a consortium of Japanese companies working together to put nanocellulose, made from wood fibres, into practical use as a next-generation material that is one-fifth the weight of steel but about five times stronger; a hall made entirely from interlocking timber sections created by robots and requiring just 12 cubic metres of timber to construct a 245 square metre building; developing a new system to propagate pine hybrids that tolerate water stress; and an international team of researchers has successfully sequenced the genome of *Eucalyptus grandis* (Flooded gum or Rose gum) to help breed trees that grow faster, have higher quality wood and use water and land more efficiently,

I do hope you enjoy reading about these exciting research projects and find inspiration for your business and for future opportunities.

Ric Sinclair
Managing Director
FWPA

MAIN NEWS



Eucalyptus genome successfully sequenced

With a result that offers major potential for the forest industry, an international team of researchers has successfully sequenced and analysed the genome of *Eucalyptus grandis*.

“Now that we understand which genes determine specific characteristics in these trees, we will be able to breed trees that

grow faster, have higher quality wood and use water and land more efficiently,” said the lead investigator on the project, Prof. Zander Myburg of the University of Pretoria, South Africa.

[\(more\)](#)



Understanding fertiliser use to prevent 2nd rotation decline in hardwood plantations

Predictive relationships to assist fertiliser use decision-making in eucalypt plantations” (PNC304-1213)

Many hardwood plantations in southern Australia are ready for harvesting and subsequent replanting. However, while previous experience shows that applying appropriate amounts of fertiliser can prevent second rotation trees being less productive than first rotation trees, there is no reliable, cost-effective method to predict how a plantation will respond to fertiliser or when is the best time to apply it.

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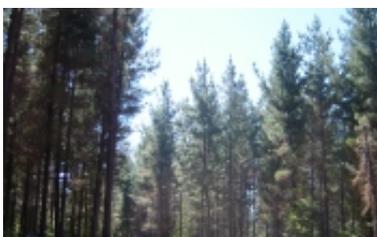
FOREST GROWING



Remote sensing and UAVs used to assess forest fire impacts

Fire is a regular occurrence throughout the world’s forested landscapes and affects millions of hectares annually. A variety of remote sensing applications have been developed to quantify wildfire impacts in forests with varying success. Remote sensing technology applications for wildfires have typically involved quantifying burn severity, fuel levels, and forest resource recovery following burn. Wildfire remote sensing applications have recently included active or real-time technology applications for mapping burn impacts and wildfire detection and monitoring.

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New system to propagate pine hybrids able to tolerate water stress

The Basque Institute for Agricultural Research and Development, Neiker-Tecnalia, and SCION -- the New Zealand Forest Research Institute-- have developed a system of somatic embryogenesis in the hybrid species of *Pinus radiata* X *Pinus attenuata*, a pine species with a proven tolerance to a lack of water. Their research has resulted in the obtaining of a large quantity of plants within a short period of time in addition to making the cryopreservation of tissue possible so that the tissue can be used according to market demands.

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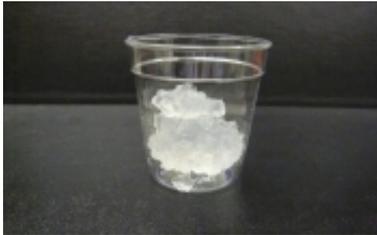
NEW PRODUCT INNOVATIONS



3D-printed composite is lighter than wood and stiffer than concrete

Researchers at Harvard University have developed a way to 3D-print a cellular composite with record lightness and stiffness using an epoxy resin. This marks the first time that epoxy is used for 3D-printing, and the advance could lead to the development of new lightweight architectures for more efficient wind turbines, faster cars, and lighter airplanes.

[\(more\)](#)



Nanocellulose - next gen material in development

About 100 companies in Japan will work together to put nanocellulose, made from wood fibres, into practical use as a next-generation material. It is one-fifth the weight of steel but about five times stronger. The group aim to utilise the new material for manufacturing auto parts, construction materials, artificial blood vessels and various other purposes.

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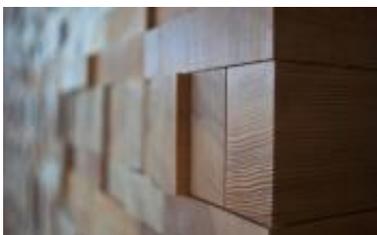


Investment in bioplastics research pays off

Bioplastics are a small but rapidly growing niche that currently represents about 1% of the global plastics market. Their use is expected to grow by over 10% per year, with the estimated global market expected to be more than 12 million tonnes per year by 2020.

[\(more\)](#)

TIMBER CONSTRUCTION AND DESIGN



New report: wood's the healthy choice

A growing range of scientific and anecdotal evidence is pointing to a range of benefits wooden buildings bring to the occupants. The cause of this effect is thought to be biophilia which can be described as the comfort and attraction humans feel to natural and life like things.

[\(more\)](#)

WOOD HARVESTING TRANSPORT AND LOGISTICS

Application of an UAV for 3D modelling



Skid trails constructed for timber extraction in steep terrain can constitute an environmental concern if not well planned and executed. Carrying out post-harvest surveys in monitoring constructed trails in such terrain is an onerous task for forest management and values are largely based on assumptions of trail symmetry and terrain uniformity.

[\(more\)](#)



The effect of storage conditions on the natural drying of radiata for energy use

National energy policies increasingly support the use of forest biomass for energy supply due to its contribution to climate change mitigation, community welfare and local development. To help increase the efficiency of forest biomass, a University of Canterbury study researched the effect of storage duration and technique on the moisture content of radiata pine biomass logs in New Zealand.

[\(more\)](#)

WOOD PROCESSING AND MANUFACTURING



Robots help create ultra-thin wooden exhibition hall

The Landesgartenschau Exhibition Hall in Stuttgart, Germany, is claimed to be the first building to have its core structure made entirely from interlocking timber sections created by robots. Made up of over 240 individual segments of beech plywood created using a robotic fabrication method, the 17m tall, 245m² structure required just 12m³ of timber to construct.

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OTHER INFORMATION



What drives forest innovations in North America?

The promise of increased industry competitiveness through innovation has driven interest in innovation by industry managers, policy makers and academics. The forest industry has produced a strong level of research in recent years and it is important to better understand the market characteristics driving these innovations. This review focuses on 28 forest sector research papers published in USA and Canada from 2000 to 2013.

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