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## R&D WORKS – August 2014

Welcome to this month's edition of the R&D Works newsletter.

Our stories include research into a wide variety of new products including biodegradable cellulose fibres that are stronger than steel or aluminium per weight; lignin-derived chemicals for future markets; a bio-composite material made from pulp dubbed a sustainable alternative to plastic; through to articles on the health benefits of trees in diminishing air pollution; adaptation strategies in managing risk in Australian plantations under climate change predictions and the successful establishment of a biological control agent (parasitoid wasp) of pine aphids that are causing lost production in softwood plantations. I hope you enjoy reading about these research projects and the potential benefits they can bring to our industry.

Ric Sinclair  
Managing Director  
FWPA

## MAIN NEWS



### Devising the best strategies for *E. globulus* and *P. radiata* plantations under climate change.

Predicted changes to Australia's climate over the next one to three decades will affect management strategies for Australia's *Eucalyptus globulus* and *Pinus radiata* plantations. Forecast changes in the frequency and intensity of droughts, bushfires, and emergent diseases and pests will affect where plantation managers can plant with the confidence of getting a healthy tree crop and how they should look after their trees.

[\(more\)](#)



## **Trees reduce air pollution, respiratory problems**

Trees are nature's answer to diminishing air pollution, as well as reducing respiratory problems for the human population, according to US Forest Service scientists and collaborators behind a new study.

Their broad-scale estimates concluded that trees are saving more than 850 human lives a year and preventing 670,000 incidents of acute respiratory symptoms - and that's just by improving air quality by less than 1%. Not to mention that trees can help save \$7 billion a year in health costs by reducing respiratory illness.

[\(more\)](#)



## **Fuel treatments and landform modify landscape patterns of burn severity in an extreme fire event**

Under a rapidly warming climate, a critical management issue in semiarid forests of western North America is how to increase forest resilience to wildfire.

Researchers from the University of Washington evaluated the relationships between fuel reduction treatments and burn severity in the 2006 Tripod Complex fires, which burned over 70 000 ha of mixed-conifer forests in the North Cascades range of Washington State and involved 387 past harvest and fuel treatment units.

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## **FOREST GROWING**



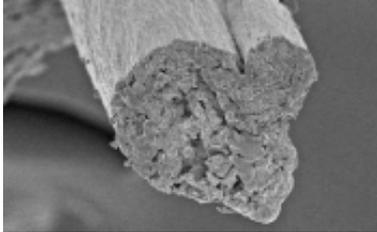
## **DPI study shows biocontrol for pine aphid is taking hold**

Pine aphid - a devastating pest that causes more than \$20 million in lost wood production to the softwood industry each year - is coming under welcome pressure from a biological control that is taking hold in pine growing regions across NSW. Funded by FWPA, the project (PNC063-0607) commissioned the South Australian Research and Development Institute (SARDI) to research and introduce a potential biological control agent, the parasitoid wasp, *Diaeretus essigellae*.

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## **NEW PRODUCT INNOVATIONS**

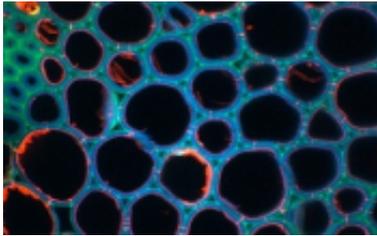
### **Stronger than steel fibre spun from wood**



Researchers at Sweden's Royal Institute of Technology (KTH) have developed a way to make biodegradable cellulose fibres that are stronger than steel or aluminium when weight is taken into account.

The technique draws on the cellulose fibres that make up a tree. Each single fibre is composed of as many as 40 million smaller fibres, or "fibrils".

[\(more\)](#)



## Lignin-derived chemicals to hit market in 2021

Lignin, a component of lignocellulosic biomass and a common byproduct stream from cellulosic conversion processes, has a potential market worth of \$242 billion. However according to Lux Research, the commercialisation of lignin derived chemicals such as BTX (a mixture of benzene, toluene, and xylene) and cyclohexanol lags growing feedstock supplies.

[\(more\)](#)



## Layered paper 3D printers: full colour, low cost

While most 3D printers use plastic or metal based materials, Irish company Mcor's unique paper-based 3D printers make some very compelling arguments. For starters, instead of expensive plastics, they build objects out of cut-and-glued sheets of standard 80 GSM office paper. That means printed objects come out at between 10-20% of the price of other 3D prints, and with none of the toxic fumes or solvent dips that some other processes require. Secondly, you can print onto it in full colour before it's cut and assembled, giving a high quality, high resolution colour "skin" all over the final object.

[\(more\)](#)



## 'Sustainable' alternative to plastic

A British paper and technical fibres company and a Swedish forestry giant have unveiled a sustainable alternative to plastic which they claim is strong enough to carry the weight of an adult and can be composted within 100 days. DuraPulp was developed by James Cropper in partnership with Södra, a Swedish forestry cooperative.

[\(more\)](#)



## Enhancing biofuel yields from biomass with novel new method

A team of researchers, led by Professor Charles E. Wyman, at the University of California, Riverside's Bourns College of Engineering have developed a versatile, relatively non-toxic, and efficient way to convert raw agricultural and forestry residues and other plant matter, known as lignocellulosic biomass, into

biofuels and chemicals.

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## WOOD PROCESSING AND MANUFACTURING



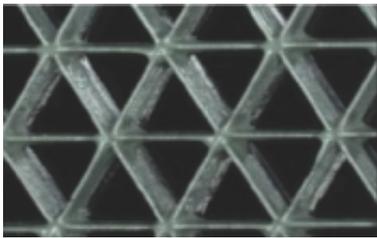
### **New Method to Treat Ash Firewood**

The emerald ash borer has destroyed tens of millions of ash trees in the U.S. since the beetle's discovery in 2002 in Detroit.

Current treatment standards require ash firewood to be heated to a core temperature of 60 degrees Celsius for a minimum of 60 minutes. To explore an alternative heat treatment option, researchers at Virginia Tech investigated the effectiveness of using a vacuum and steam treatment to kill the insect in ash firewood. Having an effective treatment would allow people to transport ash firewood outside of existing quarantine zones.

[\(more\)](#)

## OTHER INFORMATION



### **Carbon-fibre epoxy honeycombs mimic performance of balsa wood**

Wood has a part to play in wind energy too. In wind farms across North America and Europe, sleek turbines equipped with state-of-the-art technology convert wind energy into electric power. But tucked inside the blades of these feats of modern engineering is a decidedly low-tech core material: balsa wood.

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