OP118

Green deserts: novel afforestation technologies in semiarid environments

GARRIDO LAURNAGA, [F1] HERNANDEZ NAVARRO, [S2] CLÉRIGO PEREZ, [Z3] MARCOS ROBLES, J.[L3] ORTIZ SANZ, L.[3]
Departamento de Producción Vegetal y Silvopascicultura (Universidad de Valladolid España)
fegala@pvs.uva.es

The LIFE project "Green Deserts" aims to demonstrate the technical and economic feasibility of the application of an innovative technology to sowing and tree planting in semiarid areas of the Iberian Peninsula and in areas degraded by fire or mining.

The "waterbox" is a smart polypropylene container with a lid, on whose surface there is a series of diagonal grooves which collect water from rain and moisture from air by condensation. Its 15-litre deposit provides water to the plant during its first year by means of a wick, with no additional source of irrigation. The wick penetrates the soil under the box, slowly dripping water to the plant root system. As the plant grows, its roots go deeper and deeper into the soil, eventually finding its own water source. Once this happens, the box can be removed. The vessel design also prevents water evaporation from its top, creating a microclimate in its interior that protects the plant from sunlight, wind, frost and pests.

The results of experimental tests conducted in 5 Spanish provinces (namely Valladolid, Leon, Zamora, Zaragoza and Barcelona), have yielded mean survival rates above 90% in those seedlings equipped with waterbox, without significant differences amongst the species under test, while 78% of the control group planted without any specific device had died after one year. This allows an environmental and economic improvement by avoiding the need for plant replacement.

These results allow the application of this innovative technology in very diverse fields such as agriculture, reforestation and restoration of ecosystems, and could offer an interesting solution for seeding or planting in places where irrigation is difficult and expensive to conduct.

Keywords: waterbox, green deserts, forestry, arid, irrigation control, survival.

OP119

New Wood Derived Materials – Potentials

Lennart SALMÉN
Innventia AB, Stockholm, Sweden

There is a high interest of replacing oil based materials with renewable, bio-degradable ones. Here the utilisation of the major wood components; cellulose, lignin and the hemicelluloses, glucomannan and xylan comes into special focus. Minor wood components from bark or extractives can certainly be attractive for speciality products but can not serve as replacements for the majority of oil based polymer materials.

Cellulose has traditionally been used (apart from pulp) in producing regenerated materials as well as chemical derivates thereof. Improvement of the dissolution and reactivity of the cellulose is here a key issue in making way for more environmentally friendly processes. Nanofibrillated cellulose has acquired exciting interests and energy efficient ways in its production seems feasible in the near future. As a material the nanofibrils possesses high interest as barrier materials or as aerogels in filters etc. The material production in larger scale is though a major development issue due to the high water holding capacity.

Hemicelluloses are of interest as oxygen barrier films, showing excellent properties. One drawback is the relatively low molecular weight of the wood xylan and glucomannan mainly reflected in a too high brittleness. Utilising these hemicelluloses in combination with cellulosic reinforcements or employing cross-linking strategies for increasing ductility of the films may be one way. Another possibility is to modify the xylan by grafting, for example with PLA, into a material with thermoplastic behaviour.

Lignin derived from wood materials generally represents a rather heterogeneous substance. The LignoBoost process has here made it possible to produce larger quantities of lignin more cost efficiently and with less impurities. High interest has arisen in lignin utilisation for carbon fibres. Other promising potential uses of kraft lignin are as activated carbon and for replacement of phenol formaldehyde resins.

Large challenges still exist in the development of competitive materials derived from wood. The progress is however promising.

Keywords: Barrier films; cellulose; hemicelluloses; lignin; nanofibres

OP120

Increasing sub/tropical eucalypt timber plantation profitability by value adding to thinnings

Henri BAILLERES, Rob McGAVIN, Kevin HARDING, Michael KENNEDY
Horticulture & Forestry Science – Agri-Science Queensland – A service of the Department of Employment, Economic Development and Innovation – 50 Evans Rd, Salisbury 4107 QLD Australia
Telephone + 61 (0)7 3272 9327 // Facsimile + 61 (07) 3875 1015 // Mobile + 61 (0)4 3460 6524
henri.bailleres@bigpond.com

New processing options and end-uses are being developed to create larger, more stable and higher-value markets for plantation-sourced wood. To justify continued expansion of Australia's current hardwood plantation estate it is becoming necessary to develop higher value end-uses for, both pulpwood and smaller 'sawlog' resources. To improve its profitability and win new markets, the industry needs to use stems currently culled during thinnings as they have little or no economic value.

This paper describes current Australian R&D into value adding to improve economic returns from small diameter (12 - 25 cm), 8–15 year old sub/tropical hardwood plantation thinnings. The product focus is raised far above the pulpwood commodity baseline to maximise the value of the fibre harvested. Small spindleless veneer lathe technology has been used to optimize the processing of this resource. Results are clearly indicating that the early age hardwood plantation resource, previously thought to be unusable, can be processed to yield valuable structural grade veneer. Plywood and Laminated Veneer Lumber (LVL) products have been manufactured and tested utilising multiple construction strategies. New market-relevant options, such as innovative hybrid/composite pole products, arched and straight light structural round members and hardwood veneer-based engineered structural products, are discussed and compared with more traditional sawing approaches. These offer economically viable avenues to more profitable operations in smaller-scale plan-

tation resources and using smaller log sizes than required for conventional peeling, pulping and sawmilling uses.

Keywords: Hardwood, Thinning, Structural Round Members, Veneer-based engineered structural products, Sawing, Pole.

OP121

Physical, mechanical and biological properties of Australian Red cedar particleboards

[1]Lina BUFALINO; [2]Marcelo Xisto RIBEIRO; [1]Vânia Aparecida de SÁ; [1]Lourival Marin MENDES; Andréa Aparecida CÔRREA; [1]Thamirys Andrade LOPES
1 Federal University of Lavras (UFLA), Lavras // Forest Science Department – Wood and Science Technology Sector
2 Federal University of Piauí (UFPI), Bom Jesus // Forest Science Department
linabufalino@yahoo.com.br

Australian red cedar (Toona ciliata var. australis) has stood out as a planted forestry species in several tropical and subtropical countries. Australian red cedar wood has several uses such as furniture, decorative veneer, civil construction, boats, floorings and others. However, it is important to consider that any wood processing such as veneering and sawing always results in the production of a great amount of residue. Particleboard is a generic term for panels manufactured from particles of lignocellulosic materials, which are combined with a synthetic adhesive or other suitable binder. This work aimed to evaluate particleboards produced with different compositions of Australian red cedar wood by determining their physical mechanical and biological properties.

18-year old Australian red cedar obtained from a commercial plantation was used. The work was divided in four stages: 1) Evaluation of the chemical properties of red cedar wood in order to verify its potential for particleboard production; 2) Analysis of the physical and mechanical properties of particleboards made from wood residues of Australian red cedar produced with different target densities of 0.65 and 0.70 g/cm^3 and different adhesive contents, 6 and 9%; 3) Selection of the best processing variables for the production of particleboards made with Australian red cedar mixed with Eucalyptus sp. and Pinus sp. woods at 50% proportion; 4) Study of the resistance of the Australian red cedar wood and particleboards to dry termite attack, using Pinus sp. wood as a control treatment.

The following results were found: 1) Australian red cedar presents a great amount of extractives compared to woods often used for particleboard production, as the average value found was 13%. However, average lignin content was low, 24%; 2) Particleboards made with target density of 0.70 g/cm^3 and 9% urea-formaldehyde presented the best results for physical and mechanical properties; 3) For physical properties, particleboards made from 100% Australian red cedar were similar to particleboards made from 50% of this species and 50% Pinus sp. and both had better results than particleboards made from 50% Australian red cedar and 50% Eucalyptus hybrid; 4) Australian red cedar wood presented much higher resistance to dry-termite attack than Pinus sp. wood. The inclusion of Australian red cedar wood resulted in resistant particleboards.

Keywords: Toona ciliata; biodegradation; target density; adhesive content.

OP122

Suitability of pulp production from Salix excelsa (willow) clones

Bahattin GÜRBOY[1], Gülnur MERTOGLU ELMAS[2], İnci Nur ERAY[3]
1 Istanbul University, Forestry Faculty,Forest Industry Engineering. Chemical of Forest Products, Turkey
2 Istanbul University, Forestry Faculty, Forestry Vocational school, Paper program,Turkey
3 Forest Industry Engineer
mertoglug@istanbul.edu.tr

In this study, fiber morphology properties of Salix excelsa (willow) clones were studied in the view of suitability for pulp and paper industry. The second aim of this preliminary study was to reduce the pressure on forest resources and meet the demand alternative sustainable raw material for pulp.

Clones amples were supplied from The Poplar and Fast Growing Forest Trees Research Institute Izmit-Turkey. The discs which were cut approximately 4 cm diameter and then were divided into group three each ages from earlywood to latewood. These individually were cut chip woods as earlywood and latewood. According to Franklin method were easily obtained mikroscopic preparations. Salix excelsa woods from 64/12 and 84/28 clones grown in Turkey were measured fiber dimensions such as, fiber length, fiber width (diameter), lumen diameter and cell wall thickness. Also, relationships between fiber dimensions determined as felting power, elasticity, rigidity coefficient, Runkel classification, Muhlstep ratio and F factor. The effect of these on pulp strength properties were discussed. As known that there is strong relationships between the strengths of paper and morphologic structure of wood fiber.

Willow clones (84/28 and 64/12) fibers are of mean length with 776.24 µm, 853.90 µm. They also have a mean value of fiber width 18,89 µm; 20.77 µm. Consequently, according to the fiber morphology values it was found that pulp from Salix excelsa 64/12 and 84/28 clones wood would be suitable for use in paper board and corrugated board production.

Keywords: Salix excelsa clone; willow; fiber morphology; pulp; fiber dimension

OP124

Assessment of Wood Quality and Fibre Properties in Intensively Managed Douglas-fir Plantations using NDT Tools

Cosmin FILIPESCU[1], Ross KOPPENAAL[1], Eini LOWELL[2], David BRIGGS[3]
1 Canadian Wood Fibre Centre, Canadian Forest Service, Victoria BC
2 US Forest Service, PNW Research Station, Portland OR
3 Stand Management Coop, University of Washington, Seattle WA
Cosmin.Filipescu@NRCan-RNCan.gc.ca

Current knowledge on the influence of intensive plantation silviculture on wood quality and fibre properties of conifers in the Pacific Northwest is limited and fragmented. Integration of wood quality into growth and yield simulators is also impacted by traditional methods of assessing wood quality being time consuming and expensive. Routine collection of fibre properties information using NDT technologies has the potential to improve predictions and understanding of contributing factors.

2012 IUFRO CONFERENCE DIVISION 5 FOREST PRODUCTS

INTERNATIONAL UNION OF FOREST RESEARCH ORGANIZATIONS

8 › 13 JULY'12 - ESTORIL CONGRESS CENTRE, LISBON, PORTUGAL

FINAL PROGRAM, PROCEEDINGS AND ABSTRACTS BOOK

www.iufro2012.org

ORGANIZING ENTITIES

IUFRO

Hinc patriam sustinet
Instituto Superior de Agronomia
Universidade Técnica de Lisboa

Centro de Estudos Florestais (CEF)

DIVISION 5 - FOREST PRODUCTS

Coordinator
Andrew Wong, Malaysia

Deputies:
Jamie Barbour, United States
Dave Cown, New Zealand
Pekka Saranpää, Finland

INTERNATIONAL ORGANISING COMMITTEE

Conference Chair
Pekka Saranpää (Finland)

Conference Co-Chair
Jamie Barbour (USA)

Scientific Committee
Andrew Wong (Malaysia)
Dave Cown (New Zealand)
Helena Pereira (Portugal)
Jamie Barbour (USA)
Jerry Winandy (USA)

LOCAL ORGANISING COMMITTEE

Chair
Helena Pereira
Vice-rector of the Technical University of Lisbon, full professor of ISA (School of Agronomy), president secretary of the Forest Research Centre/ Centro de Estudos Florestais (CEF).

Jorge Gominho,CEF, ISA
Isabel Miranda, CEF, ISA
Sofia Knapic, CEF, ISA
Francisca Lima, AIFF (Competitiveness and technology center for forest industries)
Pedro Cardoso, THE (local PCO)

Congress Agency and PCO Organizing Committee Support

THE – The House of Events
Office contact +351 22 8348940
Contact at Conference Centre +351 21 464 6204

Technical Board
Francisca Lima, AIFF
Jorge Gominho, CEF, ISA
Sofia Knapic, ISA
Luis Leal, ALTRI
Susana Silva, Cortiçeira Amorim
Susana Carneiro, Centro Pinus
José Manuel Nordeste, RAIZ

BEST POSTER AWARDS

The Scientific Committee wishes to encourage scientists to display outstanding posters during the IUFRO Division 5 conference.

An Awarding Body will evaluate all the posters exhibited during the poster sessions, based upon the following selection criteria:

1. Presentation: layout (attractiveness, legibility, creativity)
2. Content: innovative ideas and value of subject matter
3. Presenter's ability to convey the message

The awards will be presented at the Conference dinner, on July 11 and consist of a certificate and a gift sponsored by 3DCork – www.3dcork.com

ACKNOWLEDGMENTS

GOLD SPONSOR

grupo Portucel Soporcel

PREMIUM SPONSORS

altri

SONAE INDUSTRIA

FSC

BEST POSTER AWARDS SPONSOR

3D CORK intelligent nature

CO-SPONSOR

estoril CENTRO DE CONGRESSOS

PARTNERS

anefa Associação Nacional de Empresas Florestais, Agrícolas e do Ambiente

GREEN PARTNERS

Criar Bosques Um projecto Quercus

Pegada Ecológica

SAP/YSP PROGRAM SPONSOR

FOREST SERVICE USDA

MEDIA PARTNERS

GREENSAVERS

planetazul o portal de ambiente e sustentabilidade

SCIENTIFIC COLLABORATORS

IRG

iawa

INTERNATIONAL WOOD CULTURE SOCIETY IWCS

Society of Wood Science and Technology SWST

INTERNATIONAL ACADEMY OF WOOD SCIENCE IAWS

OFFICIAL AIRLINE COMPANY

TAP PORTUGAL | A STAR ALLIANCE MEMBER