

to assess the optimal growth temperature. Our results show that optimum temperature for growth depends on the species. The three most planted genotypes in Brazil presented different ideal temperatures for maximum growth: *E. saligna* (17.7 °C), *E. grandis* x *E. camaldulensis* (19.7 °C) and *E. urophyllax* sp. (24.4 °C). Minimum temperatures, ranging from 11.7 - 13.8 °C, and maximum from 31.6 - 32.6 °C were responsible for initiating or stop growth. Understanding the dynamics of tree growth and the relationship with climate is useful to predict productivity in new expanding regions with no previous information, to improve growth predicting models, and to perform zoning of genotypes of Eucalyptus.

### Spacing effects on volume of *Eucalyptus* plantations across a climatic gradient in Brazil and Uruguay

Rafaela Pereira Neves<sup>1</sup>, Rafaela Carneiro<sup>2</sup>, Renata Aparecida Serio Abranches Junqueira<sup>3</sup>, Otávio Campoe<sup>4</sup>

<sup>1</sup>Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba, Brasil; <sup>2</sup>Instituto de Pesquisas e Estudos Florestais, Piracicaba, Brasil; <sup>3</sup>Floragro, Itatinga, Brasil; <sup>4</sup>Universidade Federal de Santa Catarina, Curitiba, Brasil (rafaelapnaves@gmail.com; rafaela@ipef.br; renatabranches@yahoo.com.br; otavio.campoe@gmail.com)

The productivity of commercial forest plantations depends on several variables such as age, genetic material, biotic and abiotic conditions. There are interactions among those variables, e.g., the drier the environment, the higher the competition for water, thereby the area per tree must be larger, without compromise stand level production. The cooperative research program TECHS (Tolerance of *Eucalyptus* clonal to Hydric, Thermal and Biotic Stresses) of the Forestry Science and Research Institute (IPEF) aims to study the biotic and abiotic stresses that affect the productivity of different *Eucalyptus* clones. Our goal in this study is to determine which *Eucalyptus* materials are more efficient for which region in which spacing. We evaluated 34 sites in a wide climatic gradient from northern Brazil to Uruguay (latitudes ranging from 3° to 33° South). In each site, on average, 11 clones were tested in permanent plots where the spacing was increasing from 0.75 m<sup>2</sup> to 24 m<sup>2</sup>. We evaluated the mean volume per tree and the mean volume per hectare according to the spacing at the end of the rotation (approximately 7 years). The preliminary results indicated that in general, plastic clones had a better performance, although in some extreme conditions site-specific clones performed better. The volume per hectare was greater in smaller spacings but in most cases, the production was unfeasible, due to the high mortality or small dimension of the trees in high stocking. These results contributed to understand how the future productivities will be in relation to the management and climate.

### Characteristics of waste from colonies of *Atta colombica* (Hymenoptera: used in dry forest restoration processes / Caracterización del residuo proveniente de colonias de *Atta colombica* (Hymenoptera: Formicidae) utilizado en el proceso de restauración en bosque seco

Alexandra Fonseca Vargas<sup>1</sup>, Miguel Eugenio Cadena Romero<sup>1</sup>

<sup>1</sup>Universidad Distrital Francisco José de Caldas, Bogotá, Colombia (ing.alexandraf@gmail.com; cademielro@hotmail.com)

En el área de compensación del Embalse El Quimbo en el Departamento del Huila Colombia, se utiliza el material residual proveniente de las colonias de hormiga arriera *Atta colombica* en el proceso de restauración, como sustrato en vivero y aporte de materia orgánica. Se caracterizó químicamente el desecho, para la evaluación estructural (mineralización) y composición mineral en sus estados residuales reportados en los montículos "in situ", en tres diferentes coberturas naturales: Bosque (BQ), Herbazal Abierto (HA) y Arbusto Denso (AD), así mismo evaluar la influencia de tres profundidades del montículo (superior, medio e inferior), en época seca y húmeda, la forma de bloqueo correspondió a tres intervalos de tiempo durante el día (Mañana, Mediodía y Tarde). Las variables de respuesta se analizaron mediante un Análisis de Varianza Combinado, para un diseño de Bloques Completos al Azar con arreglo factorial 2 x 3 en serie de experimentos. La relación C:N osciló entre 3.90 y 12.00, mostrando que el valor inferior se obtiene en la interacción de la Época Seca (ES) con Herbazal Abierto (HA) y a la Profundidad Inferior (PI). Así mismo, en la interacción existente de ES x HA x PI, los elementos P (11.29 ppm), Ca (5.43% M.S.), Mg (0.89 %M.S.), B (84.57 ppm) y Cu (17.77 ppm), mostraron sus mayores concentraciones. El K presentó su mayor concentración de 1.90% M.S para la Época Húmeda en un HA y Profundidad Superior, también en Época Seca se presentó la misma concentración, pero en AD y a la misma profundidad

## C2q: PHYSIOLOGY AND GENETICS IN PLANTATION SPECIES

### RNA interference suppression of DOF transcription factor from *Populus tremula* x *Populus alba*

Laudiane Zanella<sup>1</sup>, Juliana Degenhardt-Goldbach<sup>2</sup>, Isabel Gerhardt<sup>3</sup>, João Carlos Bepalhok Filho<sup>1</sup>

<sup>1</sup>Universidade Federal do Paraná, Curitiba, Brasil; <sup>2</sup>Embrapa Florestas, Colombo, Brasil; <sup>3</sup>Embrapa Informática Agropecuária, Campinas, Brasil (laudianezanella@hotmail.com; juliana.degenhardt@embrapa.br; isabel.gerhardt@embrapa.br; joao.bespa@gmail.com)

From the total biomass produced by plants, 70% is represented by cell wall, in which carbon is mainly accumulated in the secondary wall. Therefore, the understanding of the mechanisms that regulate cell wall synthesis and its modification through genetic engineering may lead to the increase of lignocellulosic biomass. Among several functions already attributed to the proteins of the Dof transcription factors, its relation with cell wall formation is one of the most studied. However, the mechanisms involved in this process are not fully elucidated. *Populus* is the most used model plant for studies with forest species, including functional genomics. The objective of this work was to silence one gene of the Dof family by RNAi in plants of *Populus tremula* x *P. alba*, and investigate its function, aiming at the future production of *Eucalyptus* and *Pinus* plants with higher biomass production. For this, a silencing vector was constructed with specific primers of a Dof family gene from *Populus*. To obtain the transgenic plants via *Agrobacterium tumefaciens*, root segments were used as initial explants. Fifteen events were obtained, and in twelve the Dof expression was suppressed at different levels, according to qPCR analyzes. Of these, on five the expression was highly suppressed, indicating that the gene was successfully silenced. In morphological evaluations after 90 days the events did not present phenotypic differences in relation to non transformed plants. Physiological and histochemical analyzes are underway to evaluate lignin and cellulose contents and structural changes in transformed plants.

### Cloning optimization of gene encoding trypsin inhibitor in *Falcataria moluccana* Miq.

Ulfah J Siregar<sup>1,2</sup>, Auraga Dewantoro<sup>1</sup>, Nofri Yanti<sup>1</sup>

<sup>1</sup>Bogor Agricultural University, Bogor, Indonesia; <sup>2</sup>SEAMEOBIOTROP, Bogor, Indonesia (siregaruj@gmail.com; auragadewanto@yahoo.com; nofry17@gmail.com)

Sengon (*Falcataria moluccana* Miq.) is a multifunctional and fast growing tree species which has a high economic value. However, the increasing trend of sengon plantation has caused a pest outbreak, especially *Xystrocera festiva* stem borer. Borkor larvae have trypsin enzyme in their gut to hydrolyse stem of sengon. Some sengon resistant accessions showed inhibitory activity of trypsin enzyme, which are important aspect for sengon tree improvement program. The objectives of this research are to optimize preparation of cloning method for the construction of genomic library, especially trypsin inhibitor (TI) gene. This