



## Genetically Engineered Trees: An Overview of Latin America

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### Overview

Today, political, social and economic changes in the developing world such as privatisation of state-owned enterprises, infrastructure, establishment of capital markets, achievement of trade agreements and implementation of macro economic as well as political reforms have made countries like Chile, Brazil and Argentina leaders in the development of biotechnology tools to meet the growing global demand for forest products.

The dominance of private funding in GMO tree research as well as genetic patents have limited the amount of information that can be found about experiments on this topic<sup>1</sup>; the only report from an intergovernmental agency was done by FAO in 2004. This report identified countries like Argentina, Brazil, Chile, Costa Rica, Cuba, Guyana, Mexico, Uruguay and Venezuela as taking part in genetically engineered research in the forestry sector, and mentions Chile and Brazil already carrying out field experimentation and Argentina lab experimentation. However, there are records that in Mexico there was GE *pinus sp.* field experimentation going on in as early as 1997.

Most known experiments going on in Latin America include Eucalyptus species mainly for forestry use but also as raw material for cellulose production; in addition, some companies carry out research on poplar species, pines, acacias and fruit trees. The different traits known to be manipulated include reduced lignin, improvement of wood quality and wood quantity, cold tolerance, and insect, fungi and disease tolerance (for more detailed information please see annexes to this document).

### Brazil

Currently, Brazil is recognized worldwide as one of the leaders in the development and implementation of innovations in the area of genetics and forestry, most notably with eucalyptus<sup>2</sup>. The Brazilian forestry sector is responsible for around 5% of GDP (Ministry of Science and Technology, 2005) being the seventh-largest producer of pulp in the world and has the highest average productivity ratio (40m<sup>3</sup>/ha/year), 10 times higher than other competitors<sup>3</sup>; Brazil and the US show similar rate of patenting approval (48% and 53% respectively) and enjoy the same

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<sup>1</sup> [https://docs.google.com/viewer?a=v&q=cache:ApNLGvRt-A4J:www.inia.es/gcontrec/pub/CELESTINO-HERNANDEZ-CARNEROS\\_%28y\\_otros%29\\_%28SRF14-3%29\\_1162282779875.pdf+&hl=en&gl=us&pid=bl&srcid=ADGEESg37-USnR4c2KMcBMYk\\_YoaJFFxVCBtylzxTo7qJrNPh9KWwW9t7ROmiVDkkdkO2uYuhGQkmP9mg-ChnyiUtS6kWB2T7hxbPD5wc8fgcRMiGDLJP9tUcT97SZiz-m5QJoCmUTWa&sig=AHIEtbRyfA2SUD70Yah9ouQ99tN9E-4naw](https://docs.google.com/viewer?a=v&q=cache:ApNLGvRt-A4J:www.inia.es/gcontrec/pub/CELESTINO-HERNANDEZ-CARNEROS_%28y_otros%29_%28SRF14-3%29_1162282779875.pdf+&hl=en&gl=us&pid=bl&srcid=ADGEESg37-USnR4c2KMcBMYk_YoaJFFxVCBtylzxTo7qJrNPh9KWwW9t7ROmiVDkkdkO2uYuhGQkmP9mg-ChnyiUtS6kWB2T7hxbPD5wc8fgcRMiGDLJP9tUcT97SZiz-m5QJoCmUTWa&sig=AHIEtbRyfA2SUD70Yah9ouQ99tN9E-4naw)

<sup>2</sup> <http://www.embrapa.br/imprensa/noticias/2009/junho/1a-semana/genomica-do-eucalipto-no-congresso-de-florestas-energeticas/?searchterm=eucalyptus>

<sup>3</sup> <http://www.allelyx.com/>



average profitability per biotechnology company (US\$20 million per year) (Hernandez & Valenzuela, 2004). Although the last minute decision by GE tree company ArborGen, which is based in the US with research facilities in Brazil, not to go public on the NASDAQ in 2011 has contributed to the significant decline in stock value of at least one of its joint owners--New Zealand based timber company, Rubicon.<sup>4</sup>

## Chile

In Chile, there has been a rapid increase in the number of experiments being carried out, but it is not only the private sector that is involved, organized 'consortiums' between academia and the business sectors also take part; whereas in Brazil, although private and academic cooperation exists and seems to be escalating, it is the private sector that seems to dominate tree genetic engineering in the country. In fact, back in 1999 there was already recognition that several Chilean biotechnology companies were the result of academic research projects that were developed into companies.

The regulatory environment for biotechnology in Chile is mainly focused on the use of genetic engineering technologies<sup>5</sup>, and it is the Ministry of Economics - Chilean Economic Development Agency (CORFO) that has funded Genfor's research into the genetic engineering of Eucalyptus and *Pinus radiata*. Interestingly, in Chile there is no real regulation in regards to GE tree experiments or environmental releases. In theory, they couldn't be planted commercially due to existing regulations, but due to the lack of official information and ignorance of biosecurity and auditing measures, anything can happen.<sup>6</sup>

The one specific regulatory framework for GM research and field trials in Chile lies in the Resolution of the Agriculture and Livestock Service (SAG, in Spanish), in its Rules and Regulations for the Transgenic Releases; according to this resolution, in Chile only transgenic seeds for multiplication for exporting purposes are allowed to enter the country; transgenic release for consumption is not allowed.<sup>7</sup> However, Monsanto's former global forestry Chief expressed that Chileans could be the first to enter the market with a transgenic tree as they have a targeted goal, relationships with the government and the necessary infrastructure to reach this goal.<sup>8</sup>

But these government relationships are not exclusive of Chile; in Brazil, in June 2010 the Studies and Projects Finance Organization (*FINEP*) - a public company managed by the Ministry of Science and Technology - granted the Suzano-owned FuturaGen, \$1.2 million for advanced plantation forestry for bioenergy research. As of 2009, Suzano, owner of 310,000 ha of eucalyptus plantations in Brazil, will build five plants designed to process wood into pellets by 2019 for sale as fuel to European

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<sup>4</sup> <http://www.stuff.co.nz/business/industries/financial-results/7094697/Rubicon-launches-21m-funding-bid>

<sup>5</sup> Hernandez & Valenzuela, 2004

<sup>6</sup> <http://www.mapuexpress.net/?act=publications&id=5542>

<sup>7</sup> <http://www.eumed.net/cursecon/ecolat/cl/srn-transg.htm>

<sup>8</sup> <http://www.eumed.net/cursecon/ecolat/cl/srn-transg.htm>



thermoelectric facilities, demonstrating that purposes for genetically engineered tree production have broadened. It is noteworthy that Suzano is one of the current Rio+20 sponsors.

### **Mexico**

On the other hand, in countries like Mexico, biotechnology for the forestry sector is an area with very little development thus, information available for genetic engineering in trees is very scarce except for a report found from 2007 regarding GE trees in Guerrero<sup>9</sup>. However, records from FAO (2004) state that field experiments were already going on beginning in 1997 and in 2004, Mexico was doing experimentation on GE trees. The Autonomous Indigenous University of Mexico built the first forestry biotechnology lab in Sinaloa in July 2011<sup>10</sup>, which could indicate that Mexico is silently making progress on this sector with plans to enter the GE trees 'picture'.

Besides, companies in Mexico have taken advantage of the lack of legislation on GE trees and obtained permits from the Secretary of Environment and Natural Resources (SEMARNAT), and National Forestry Commission (CONAFOR), without presenting Environmental Impact Assessments, or the subsequent audit from the Federal Attorney for the Protection of the Environment (PROFEPA), to propagate transgenic eucalyptus modified for resistance to fungus, altered lignin and cellulose content and other characteristics related to wood quality. This research took place in Costa Grande in Guerrero in 2007<sup>11</sup>.

The company Silvicultora Saraya S.A. de C.V., a subsidiary to Kimberly Clark México, S.A. De C.V, has rented close to 1,514 ha of land in different 'ejidos' in the state of Guerrero for planting GM eucalyptus, *Pinus sp*, *Swietenia humilis*, *Tabebuia rosea*, *sw-tab-cedrela* and *sw-cedrela*, which has been a cause of discomfort for the people living in these 'ejidos'.

### **Colombia**

In 2009, the forestry industry in Colombia analyzed the possibility for its paper and biofuel companies to use genetically engineered trees to produce ethanol.<sup>12</sup> An article from April 2012<sup>13</sup>, states that Colombia will now work on the genetic modification of trees, with help from experts from the Sao Paulo University, as well as people at the Agronomic Center of the National University in Medellin - Faculty of Agricultural Sciences. They are interested in working with high demand native timber

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<sup>9</sup> <http://www.scribd.com/doc/34503478/BIOTECNOLOGIA-Aplicada-a-los-Recursos-Forestales>

<sup>10</sup> [http://www.uaim.edu.mx/joomla15/index.php?option=com\\_content&view=article&id=108:la-uaim-construye-el-primer-laboratorio-de-biotecnologia-forestal-en-sinaloa&catid=36:boletines&Itemid=58](http://www.uaim.edu.mx/joomla15/index.php?option=com_content&view=article&id=108:la-uaim-construye-el-primer-laboratorio-de-biotecnologia-forestal-en-sinaloa&catid=36:boletines&Itemid=58)

<sup>11</sup> Cisneros, 2007, Informe Siembra de árboles transgénicos en Guerrero

<sup>12</sup> <http://espanol.upi.com/Curiosidades/2009/11/09/En-Colombia-analizan-experimentar-con-%C3%A1rboles-transg%C3%A9nicos/UPI-57611257761940/>

<sup>13</sup> <http://www.agenciadenoticias.unal.edu.co/detalle/article/se-impulsara-transformacion-genetica-de-arboles.html>



products such as Cariniana, 'curly cumin', but will be starting up trials with eucalyptus or poplars.<sup>14</sup>

### Perú

In countries like Perú, there is a moratorium against any Living Modified Organism entering the country for harvest, raising, or any other purposes related to transgenic products. In response, according to Wikileaks, on December 14, 2007, Craig Stapleton -former US Ambassador to France- spoke about creating a "revenge list" of those countries not adopting transgenics<sup>15</sup>, showing again the power of multinational corporations like Monsanto in dictating governmental policies in the US.

### Conclusion

The field of genetically engineered trees in Latin America seems to be increasing at a fast pace. The lack of information, however, coupled with and caused by the lack of a good regulatory framework is causing this 'industry' to escalate without any consideration to environmental or social impacts, and with little or no oversight or monitoring from governments. In fact, the support of governments for GE trees seems to be one of the factors influencing the speed of its growth.

Some of the companies researched for this document (see annexes) are increasing their activities not only at a national level but also internationally; some of them have as an ultimate objective, to reach different markets all over South America, and in fact, some of those companies which used to be only US based, for instance, are now looking at southern markets, given the 'easy' conditions for expansion.

Partnerships with academic institutions are becoming increasingly popular and as the demand for wood and wood products also escalates massively--for instance, with the urgent need for providing the markets with renewable energies such as 'bioenergy'--these companies hope to ride this wave into large-scale commercial release of GE trees. The increasing demand for wood fibre, however, is being matched by a growing resistance to genetically engineered trees, in Latin America as well as in the United States and around the world; it is important to highlight that '*Chile Sin Transgenicos*' is the largest anti-transgenic network in Latin America.

**Note:** *Although Uruguay and Argentina have been mentioned as major countries with an important role on GE tree experimentation, they have not been included due to time restrictions. A full report is intended to be disseminated at the CBD-COP10 in Hyderabad, India in October.*

For more information on genetically engineered trees, visit <http://nogetrees.org>.

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<sup>14</sup> <http://www.agrobio.org/news/>

<sup>15</sup> [http://verdadahora.cl/wikileaks\\_y\\_transgenicos\\_ee\\_uu\\_hizo\\_lobby\\_por\\_la\\_propiedad\\_intelectual\\_en\\_chile.html](http://verdadahora.cl/wikileaks_y_transgenicos_ee_uu_hizo_lobby_por_la_propiedad_intelectual_en_chile.html)