Transgenic trees in Chile: Urgent need to modify DNA of policies, not plants

Transgenic forestry in Chile is shrouded in mystery, secretiveness and corporate lobbies. While state agencies deny that transgenic trees have been released into the environment, laboratories, universities and companies devoted to forestry-related biotechnology multiply in the country, supported by public funds. Schizophrenia, a sudden scientific interest or reprehensible political irresponsibility?

In September 2014, the Latin American Observatory of Environmental Conflicts (OLCA) requested detailed information from the Chilean Agricultural and Livestock Service (SAG) about the existence of transgenic tree plantations, their location, ownership and area in hectares. SAG replied that since 2000 there exists a "Norm for the confinement and introduction to the environment of live modified plant organisms capable of propagation", which only allow entry of transgenic species into the country, but not their release into the environment. Therefore, SAG said that it cannot authorize plantations in open fields, and so it has no data to report. However, it said that it does have records of authorizations for experimentations, and that they have granted two prior to 2000. One in 1996, which implied the confinement of 240 transgenic seedlings resistant to glyphosate for experimental use in Los Ángeles, in southern Chile, under the name of *"Forestal y Agrícola Monte Águila"*, a subsidiary of Chilean forestry giant CMPC. And the other, in 2000, was granted to *"Fundación Chile"*, a corporation that has the Chilean government and the Anglo-Australian mining company BHP Billiton as partners, for radiata pine trees resistant to shoot moth, with seedlings imported from New Zealand.

Because of the regulatory loopholes and lack of access to information, concern has arisen over the fate of those GM trees, which should have been destroyed after research was completed. Even though experiments with transgenic trees have been authorized, their release into the environment was not. Therefore, there is no applicable liability or monitoring of the experiments that can effectively control those doing the experiments.

It is surprising that there were not more records of confinements, given that forestry biotechnology is such a hot topic. We discovered a well-articulated network of major transgenics firms, big forestry groups and universities, working together not to confine anymore – and in that way avoid registration and other things – but to produce directly their own seeds. Based on a study of biotechnology research for producing transgenics in Chile (1), the Department of Molecular Genetics and Microbiology of the Pontifical Catholic University of Chile created the first transgenic pine embryos using *Agrobacterium tumefaciens,* a bacterium which has the property of transmitting DNA from one plant to another by a process known as transformation or transfection, which biotechnologists have studied intensively in recent years. This was the second in the world, after New Zealand. Likewise, the *Universidad Austral de Chile* and *Fundación Chile* have also been working for years on transgenic pine trees resistant to pine shoot moth. Moreover, the *Universidad de la Frontera* and the Vitrogen company are developing transgenic eucalyptus trees that are tolerant to frost and resistant

to fungi that cause defoliation.

Fundación Chile has founded several companies to carry out transgenic tree research: Genfor, Neosylva, *Genómica Forestal* and Biogenetic. Genfor develops and supplies “improved forestry genetic material” and its head of operations also works for agribusiness transnational Syngenta. Neosylva has a license to sell its elite clones of radiata pine trees to forestry companies Arauco and Mininco, and has support from the Cooperative for Genetic Improvement of New Zealand. It has a tree nursery in Villa Santa Fe, in Los Ángeles, and its tissue culture and molecular analysis laboratories and greenhouses are in Valdivia.

Genómica Forestal was launched by forestry companies Mininco and Arauco, *Universidad de Concepción*, CEFOR (subsidiary of *Universidad Austral*) and *Fundación Chile*. In 2012, the consortium received funds from the “Innova BioBio Fund” from CORFO (state research funding) and it is mounting a business platform for its biotechnology products, according to official reports from CORFO.

Lucía Sepúlveda, spokesperson for the “I do not want Transgenics in Chile” network, said that after 2000, state funding was used as an incentive for several transgenic forestry projects. These include experiments with eucalyptus varieties with insecticide properties, tolerant to defoliant fungi (developed between 2002 and 2005 by the *Universidad de la Frontera*), and frost-tolerant eucalyptus experiments (developed between 2004 and 2007 by the *Universidad de Concepción* and *Universidad Andrés Bello*for Cellulose Arauco). But when SAG was asked about the results of these projects, it said that since no seedlings had been released and the experiments had been carried out in contained premises, according to the companies, no monitoring had been needed or carried out.

In other words, the state exercises no monitoring of the research on transgenic trees that it funds, and on the contrary, promotes a forestry model that is increasingly called into question in terms of its social and environmental impacts, incorporating the transgenics, which are overwhelmingly rejected by citizens. Networks and organizations that oppose and resist transgenic initiatives are growing in number by the day. They carry out information campaigns, collect scientific and technical information, lodge complaints and lawsuits, speak up on their views to the authorities, go onto the streets to demand a ban, and also with the simple and wise act of meeting regularly to exchange seeds that will keep the millenary legacy over the territories.

In fact, the regions where monoculture tree plantations have expanded the most, essentially on territories grabbed from the Mapuche indigenous people, have also the highest poverty rates in the country. The plantations have generated a water crisis in the centre-south of the country that is unprecedented in national history, and all the indicators point to alarming desertification and ecosystem vulnerability. A clear sign of this are the forest mega-fires which happen every summer since at least a decade, because of the combustible nature of pine and eucalyptus trees, loss of moisture and impoverished soils.

To make matters worse, the transgenics companies are subservient to transnational interests. Out of 3 million hectares of monoculture tree plantations in the country, 70% are owned by the CMPC conglomerate (in the hands of the Matte family) and Arauco (owned by the Angelini family). These are two of the foremost economic groups in Chile, and they are expanding rapidly in Peru, Argentina, Brazil and Uruguay. The situation is clear, in spite of all the secretiveness: they are experimenting with the common heritage, entirely for private profit.

Latin American Observatory of Environmental Conflicts (OLCA) Team

(1) María Isabel Manzur, June 2003. *Investigación biotecnológica en Chile orientada a la producción de transgénicos* (Biotechnology research in Chile aimed at transgenics production).