
Research with Genetically Engineered trees advances in Asia

WRM just updated a 2008 country by country overview of research with Genetically Engineered (GE) Trees. This overview contains summarized information from 24 countries where such research is taking place. The main research objectives identified are on how GE trees could improve disease resistance, wood quality and use for bioenergy purposes. Most of the 750 field trials of mostly eucalyptus, poplar and pine tree species, - excluding fruit trees - registered worldwide until now, is taking place in the Americas, mainly in the USA and in Brazil. In both countries, commercial release of GE eucalyptus is dangerously close. Nevertheless, it is important to also have a close look on other continents. Risky research with GE trees, especially with poplar, eucalyptus, rubber and oil palm, is advancing in Asia, with China leading as the country with second highest number of field trials worldwide and first commercial release of GE poplar trees .

Introduction

Industrial tree plantation companies want us to believe that using GE trees results in many benefits. One of the main benefits they mention is that using GE trees can result in an increase in wood production per hectare, and therefore in less land use. But in the past two decades, the plantation industry already improved productivity of trees a lot without using GE technology. In spite of this past increase in productivity per hectare, the area of industrial tree plantations - including eucalyptus, pine, rubber and acacia, as well as oil palm plantations – was not reduced, it increased fourfold (!) in the global South.

Introducing GE Trees is dangerous. There are many potential environmental impacts as summarized in the introductory article of this bulletin, including the fact that there is basically no empirical data about the behavior of transgenic trees over time. In general, access to adequate information is lacking. But this is a first necessary step for people affected by GE research and field trials as well as for others concerned about the issue in order to take action and support local struggles. The updated briefing “GE tree research - A country by country overview”, is therefore one of the tools WRM is providing to reduce the existing information gap.

GE Tree research in Asia

China is the only country in the world to have commercially released non-fruit GE trees and the country with the second highest registered number of field experiments (78) worldwide. Well over one million insect resistant GM poplars have been planted in China since 2002. No records are known to be kept of where the trees are planted or how many have been planted. According to officials from the Chinese Academy of Forestry, “both commercialized species are female poplars with altered fertility”. However, in 2004, Xue Dayuan of the Nanjing Institute of Environmental Science told the

China Daily that genes from the GM poplars had already appeared in natural varieties growing nearby. Also, new insect pests have emerged that were previously unknown in poplar trees not genetically engineered. Besides poplar, research is also being undertaken to develop GE eucalyptus and rubber trees.

In **Japan**, genetic engineering has been performed on several trees like eucalyptus, Japanese cedar and poplar, with different objectives including increased CO₂ fixation by trees and increased quality and quantity of biomass. A number of universities and research institutions have been jointly working with major pulp and paper corporations, like Oji Paper. Until 2013, 9 field trials had been carried out, 7 with eucalyptus and 2 with poplar. The most recent field trial that is on-going (2013-2017) is carried out by the University of Tsukuba with cold-tolerant eucalyptus. According to the RIKEN research institute, new field tests will be carried out with the Nanjing Forest Institute of China and the Forest Science Institute of Vietnam, the latter in collaboration with Oji Paper.

In **India**, research is carried out on GE rubber trees by the Rubber Research Institute of India. In 2012, field trials were approved by the federal government with GE rubber trees in the states of Kerala and Maharashtra. It was reported soon after this federal authorization that the state of Kerala wanted to maintain its status as state free of GMOs (Genetically Modified Organisms) while the Maharashtra state government formed a commission to study the issue in all its aspects.

In **Indonesia**, more than 10 years ago, it was reported that the Indonesian Institute of Sciences (LIPI) was working in partnership with the Japan Society for the Promotion of Sciences (JSPS) in genetic engineering of Acacia and Sengon for increased CO₂ fixation by trees. This Japanese-led joint project resulted in the production of 750 GE Acacia and 400 GE Sengon trees in Indonesia. No recent information has been found about these trials or about a follow-up trial.

In **Malaysia**, since the 1990s research is carried out on GE oil palm and rubber trees. The aim of having GE oil palm is to obtain more oil, improve oil quality, herbicide tolerance and insect and fungal resistance. With GE rubber trees, the focus is on production of specific, commercially valuable proteins. Research is mainly carried out by the Malaysian Palm Oil Board and by the Malaysian Rubber Board, respectively. In spite of the efforts by Malaysia since the 1990s to be one of the global leaders in biotechnology, commercial oil palm plantations are only expected from 2040 onwards. No information has been found on field trials. The slow process might be due to the existing opposition to GE crops in general in Europe, one of the major markets for Malaysian palm oil.

In **Taiwan**, the only information publicly available is that the Taiwan Forestry Research Institute is collaborating with the North Carolina State University in the USA in genetically engineered eucalyptus to achieve more cellulose production and more CO₂ uptake by these trees. In 2011, field testing of GE eucalyptus for pulp production was on-going.

In **Thailand**, France's research centre, CIRAD, is jointly working with some Thai research institutions on GE rubber trees, especially for higher latex production. A collaborative initiative between French and Thai research institutions was created in 2008, called the "Hevea Research Platform in Partnership". It is unknown if there are any field trials of GE rubber trees in Thailand.

Research in **New Zealand** has focused on radiata pine and Norway spruce, aimed at herbicide tolerance, flowerless trees and wood that is easier to pulp. Opposition is growing and is mainly headed by two organizations: GE-Free New Zealand in food & environment (Rage Inc.), and the Soil and Health Association. The latter carried out a campaign for the GE tree trial of the research institute Scion to be stopped and the trees to be removed. Following a different approach, in January 2008,

activists got into Scion's GE tree experiment site and damaged 19 trees. A new Scion's field trial attempt with 375 pine trees, set up in 2013, was destroyed in a break-in action in 2014.

In **Australia**, research is or has been carried out on GE eucalyptus, and the focus has been on faster growth, 'improved' wood quality and sterility. Little is known about the work being carried out at two universities – Melbourne and Adelaide - and even less about research by Ensis, a collaboration agreement between Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) and New Zealand's research institute, Scion. Australia is probably the most dangerous country for carrying out research on GE eucalyptus, given that eucalyptus trees are native to Australia. Any accidental release of pollen from GE eucalyptus – for instance, those manipulated for sterility - could easily contaminate and threaten the future of the country's natural forest ecosystems.

People in those countries where GE tree research is taking place were never asked to give their free, prior and informed consent to such dangerous research and such information has never been made available. Where authorities responsible for regulating such research eventually organize public hearings, these usually have a technical character. This in turn discourages participation by local communities affected by the plantations and others interested to discuss the issue. This summary of Asian countries provides an overview of the results of the collaborative investigation effort since 2008. It aims to provide sufficient information for concerned organizations and individuals in the relevant countries to involve themselves in the issue.

Find the full briefing at: GE tree research - A country by country overview- WRM Briefing, November 2008 (updated in August 2014)

– <http://wrm.org.uy/books-and-briefings/ge-tree-research-a-country-by-country-overview/> - Please contact wrm@wrm.org.uy if you have any relevant information that you think should be included – or if you spot errors or omissions in the country sections of this briefing or in the information sheets where the briefing is based on.