

Genetically engineered trees: Basic Background

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Sharratt<info@cban.ca><p>What is genetic engineering?</p><p>Genetic engineering (sometimes also called genetic modification) is the altering of a plant's genetic blueprint by inserting genes or DNA segments on the molecular level. Unlike conventional breeding and hybridization, the process of genetic engineering allows for the direct transfer of genes between organisms in entirely different species or kingdoms that would not breed in nature.</p><p>Why are trees being engineered?</p><p>The main traits being engineered into trees are herbicide tolerance so that tree plantations can be sprayed with herbicides that won't kill the trees; insect resistance to create a tree that is toxic to pests; reduced lignin so that trees can be processed into ethanol or paper cheaper; increased cellulose so that trees can produce more ethanol or paper; faster growth to speed up the planting-harvesting cycle; and cold tolerance so that GE trees can be planted in colder climates. All of these traits would be used in industrial tree plantations. With the new boom in the biofuels market, corporations are developing trees as a potential source of biomass for ethanol. The main tree species being experimented on are from the groups of pine, spruce, poplar and eucalyptus.</p><p>Why are GE trees a problem?</p><p>Trees live for decades and their pollen travels for hundreds of miles. Pollen models created in 2004 by Duke University researchers show that pollen from forests in the southeast U.S. can travel in air currents for more than 1,200 km into eastern Canada. The contamination of forests with GE tree pollen or seeds could devastate ecosystems and biodiversity. Once contamination begins it cannot be stopped and is irreversible. GE trees will contaminate forests, which themselves will become contaminants in an ever-ending cycle of living pollution.</p><p>The field-testing and commercialization of insect-resistant (Bt) trees, toxic to a class of insects (Lepidoptera), will, as recent studies indicate, harm soil and aquatic ecosystems as well as effect non-target insects. This in turn will impact biodiversity and the food chain of local fauna, including birds and other organisms.</p><p>The genetic engineering of trees to be cold tolerant threatens to expand the environmental and social impacts of plantations into colder regions as well as bring the threat of new invasive species.</p><p>The commercialization of herbicide tolerant trees will only add to the use of pesticides in tree plantation and the accompanying serious environmental impacts, including the destruction of local flora and impacts on human health.</p><p>Of particular concern is the extensive research being carried out to develop trees with reduced or modified lignin for the production of cellulosic biofuels. Lignin is an important structural polymer (it helps trees stand) that is significant in the defense against insects and disease. Low-lignin trees would be more susceptible to disease and pests and would be vulnerable in wind storms. The spread of low-lignin trees and their genes via seed and pollen to forests could be devastating.</p><p>Already native forests in countries around the world are being destroyed to clear land for large industrial pulp, timber and biofuel (oil palm) plantations. Both clearings and monoculture plantations are severely affecting forest biodiversity, worsening global warming, and threatening the lives, livelihoods, and cultures of forest and Indigenous peoples and communities.</p>