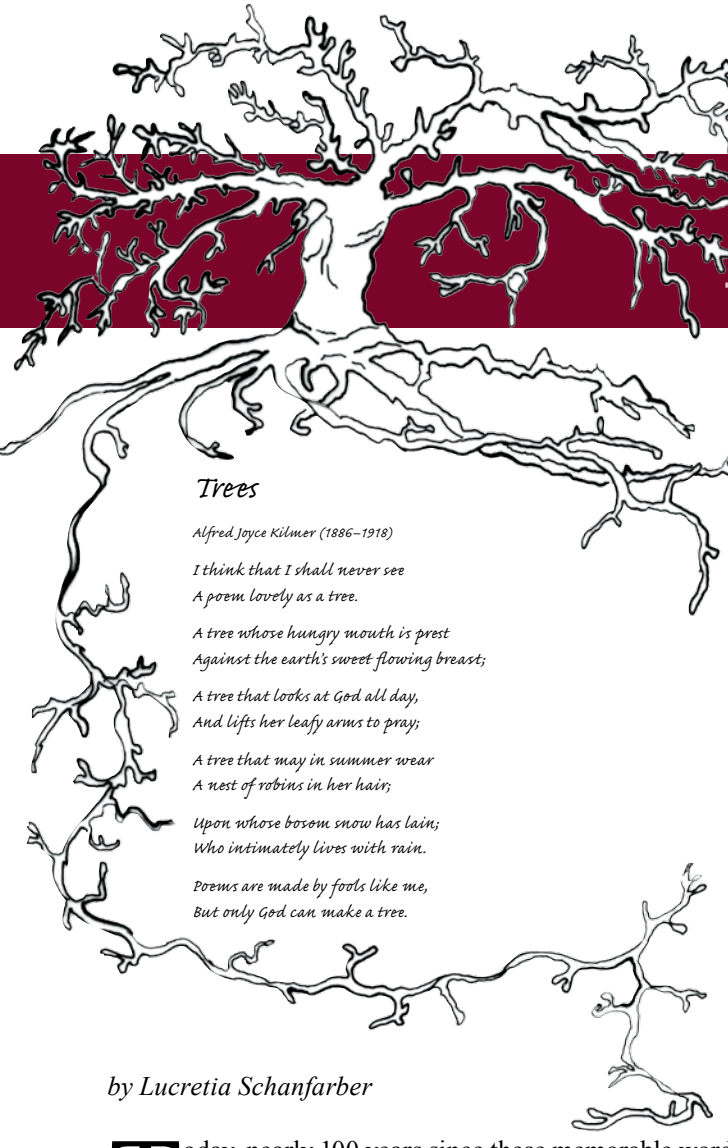
GE Trees

Taking Root in the Forest Industry



Trees

Alfred Joyce Kilmer (1886–1918)

I think that I shall never see
A poem lovely as a tree.

A tree whose hungry mouth is prest
Against the earth's sweet flowing breast;

A tree that looks at God all day,
And lifts her leafy arms to pray;

A tree that may in summer wear
A nest of robins in her hair;

Upon whose bosom snow has lain;
Who intimately lives with rain.

Poems are made by fools like me,
But only God can make a tree.

by Lucretia Schanfarber

Today, nearly 100 years since these memorable words were penned, the genetic sanctity and survival of our planet's trees are at risk. Several countries around the world, including our own Canada, have embarked upon a biotechnological journey that may be leading us down the path of genetic devastation for our natural forests and trees.

Concerns about genetically engineered foods and industrial crops continue. At the same time we must face the reality of another, potentially greater, threat to planetary biodiversity - genetically engineered (GE) trees.

Rooted in Money

Surfing the Canadian Forest Service (CFS) website *(www.nrcan.gc.ca/cfs)*, it is disconcerting to find evidence that the federal agency entrusted with the safe keeping of our nation's forests has become an enthusiastic supporter and promoter of genetically engineered trees.

The FAQ pages (Frequently Asked Questions) of the CFS site ask and answer the question: "Why are genetically engineered trees being produced? The objective is to produce more healthy trees on a smaller land base. Present levels in the demand for wood will double by the year 2020. Genetically engineered trees can be used in intensively managed plantations to decrease the effect of human pressure on our ecosystems while increasing the competitiveness of Canada's forestry industry."

The forest industry's keen interest in and promotion of genetically altered trees hinges upon the quest for significant monetary benefits. For instance, by controlling certain economically relevant traits, such as decreasing lignins - lignins are the naturally occurring chemical compound in wood that strengthens cell walls - and increasing growth rates, profits to the pulp and paper industries could improve significantly.

The subtext of government and industry's combined GE tree message is: "Trust us, we know best. Monocultural plantations of genetically engineered trees will save our native forests. First we will cut down that messy, unpredictable hodgepodge of all kinds and shapes and sizes of trees that's growing out there now. Then we will plant our new, improved trees! Rows upon rows upon rows, perfectly spaced for easy cutting; all genetically programmed to survive the pesticides, herbicides and fungicides we will need to douse them with. They will all grow to the same height and width, in the same time, and will all have the same 'novel traits' we have engineered into them in order to maximize our profits."

> "GE trees are the greatest threat to the native forest since the chainsaw."

This cheerleader mentality of rooting for a very new and untested biotechnology is deeply disturbing for a variety of reasons. One obvious reason is the assumption and promotion of the unproven premise that the benefits of growing and harvesting genetically engineered trees outweighs the risks and hazards. This is yet another example of governments, corporations and possibly academics disregarding the universal precepts of the precautionary principle. The precautionary principle is included in the *Canadian Environmental Protection Act* and in the environmental charters of many other nations for good cause: to protect the environment and future generations against threats of serious or irreversible damage.

Talking Profit

The forest industry seems to have adopted a hybrid language that obscures their intentions to make GE tree plantations a part of the Canadian landscape. Less than 10 years ago, a newsletter published by the Poplar Council of Canada (PCC) dated July 1998 and still displayed on their website (*www.poplar.ca*) proudly told its trade members to prepare for the next big thing in forest management: genetic engineering. Blatantly touted as the answer to bigger profits and more industry-friendly timber, GE trees were openly endorsed and raised as the sceptre of the future of forest management. Newsletter excerpts from PCC reveal a condescendingly patriarchal undertone to the effect that the only thing standing in the way of this pre-arranged marriage between biotechnology and the forest industry were the ignorant, fearful public. The code text might indeed read: 'Those damned consumers and pesky conservationists…why don't they get out of our way and let us run the forests.'

The ensuing public rejection of GE crops undoubtedly led PCC to adopt a more subdued but nonetheless enduring strategy for introducing GE trees to Canadians.

A cozy triad of government, forestry industry stakeholders and academic biotechnology researchers is developing, poised to promote the public acceptance of GE trees.

But with the recent flush of international recognition (*Science,* September 15, 2006), tree genome researchers are systematically targeting the forestry industry as a funding resource. A June 2006 paper prepared for Genome Canada and presented to PCC by Barb Thomas and Jim Richardson, titled "Poplar Genomics to Poplar Production: Bridging the gap for best use of our resources and knowledge" highlights many potential benefits to this academic-corporate union.

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GE Trees in Canada

Thus far, there has been no recorded release of GE trees in Canada. But there is definitely research being conducted. According to the David Suzuki Foundation *(www.davidsuzuki.org),* four "confined" GE tree research trials are underway. All located in Eastern Canada, these trials include two test plots of GE poplars, one plot of GE Black Spruce and a plot of White Spruce with an insecticidal gene from Bacillus thurningiensis (BT). Note that many scientists, including Dr. Suzuki, are concerned that pollen from outdoor GE trees can never be entirely safely confined.

In Canada, GE plants and trees are regulated by the Canadian Food Inspection Agency (CFIA). The CFIA

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A tree by any other name?

Although they are frequently used interchangeably, the terms **"genetically modified," "genetically engineered,"** and **"transgenic"** do not entirely mean the same thing.

A **genetically modified** tree is one that has had its genetic material altered through any method, including conventional breeding.

A **genetically engineered** tree is one that has been modified using techniques that permit the direct transfer of genes to that organism. Collectively these techniques are called recombinant DNA technology.

A **transgenic** tree has been genetically engineered using genes from another genus.

As you can see, transgenic trees are not the same as hybrid trees. There's a big difference.

Hybridization involves selecting trees with desirable traits and breeding them (sexual reproduction) to produce beneficial offspring. This selective cross breeding uses genetically distinct parents within the same species and genes are not individually manipulated.

Transgenic trees, however, have been genetically engineered to contain DNA from an external source. They have undergone a genetic alteration or modification whereby specific genes have been added or removed to produce a unique genetic combination that is expressed in the tree.

Genetic modification includes selecting genes from different species (or kingdoms) and re-mixing them to produce novel traits not found in the tree's wild relatives and not previously seen in its species.

The hoped for novel traits produced in transgenic trees include:

- herbicide tolerance
- pest and viral resistance
- abiotic (i.e drought and freezing) stress tolerance
- tissue composition
- modified fibre quality and quantity
- altered growth rate
- altered reproductive development
- modified versions of fruit or flowers

⇦ *GE Trees continued*

is currently updating the "Guidelines for Confined Field Trials of Forest Tree Plants with Novel Traits" and has invited consultation from tree improvement associations and academic, federal, provincial, territorial and private forest sectors. No mention of invited public input can be found on the CFIA site.

Global Resistance to GE trees

The worldwide outcry to ban the release of GE trees into the environment is getting stronger and louder. Angry public scorn has led to vandalism of laboratories and field sites containing genetically modified trees in several countries including the USA and Canada. Forest accreditation bodies, including the Forest Stewardship Council, have also expressed concern about the use of transgenic trees and will not certify plantations that contain research trials of transgenic trees.


Photo by E. Arijoos

Last April (2006) mounting international concerns led delegates to the United Nations Convention on Biological Diversity to pass a formal UN declaration urging caution on GE trees. Greenpeace International's submission to the convention stated that the risk of harmful environmental effects from transgenic forest trees is considerably greater than from shorter-lived GE crops, particularly because trees can reproduce many times before they are harvested. The submission provided evidence on ecological risks associated with transgenic forest trees, calling them "significant and likely to prove unmanageable and irreversible."

The submission further stated "Greenpeace is opposed to the release of genetically engineered organisms into the environment at the present state of knowledge and calls for a ban on the release of transgenic trees. As an interim measure a global moratorium on commercial releases and on larger scale experimental releases is recommended."

The impact of "out-of-the-lab" GE trees is yet to be fully determined, but a determined consortium of environmental health organizations has called for a global moratorium on the commercial release of genetically modified trees until further research has been conducted.

Sierra Club's website states the organization "does not oppose the use of genetic science in indoor research or medical applications. Our policy about genetic research is that there should be more of it, more of it aimed at answering questions about long term effects on health and the environment, and less of it shielded as 'confidential business information' as at present. We believe genetic technology belongs indoors, with containment, not outdoors in fields and forests."

The Geography of GE Trees

The GE tree threat is worldwide. A preliminary list of GE trees in various stages of research and development was compiled by Dr. Neil Carman of the Sierra Club Genetic Engineering Committee in 2005. The list reveals that hundreds of field trials and genetic engineering laboratory efforts are under way around the world to commercially develop GE trees *(www.mindfully.org)*.

Based on information from Global Justice Ecology *(www.globaljusticeecology.org)*, the United States has 150 GE tree test plots and conducts over two thirds of the world's GE tree research. China is believed to currently be the only country where commercial GE tree plantations exist. They are unregulated; GE trees can be bought at nurseries and planted anywhere. Chile may be next in the queue of countries wanting to commercialize GE trees.

Rooting for the Future of Trees

The poem "Trees" is probably the most quoted poem in American history. Its opening couplet has been deeply planted in the psyche of millions of people. And for good reason. Trees have held a revered place in all cultures as universal symbols of life, abundance and fertility. They play a critical role in sustaining the health of our planet's ecosystem.

We must stand together, roll up our sleeves and continue to do whatever it takes to preserve the biodiversity of our planet's trees.

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Risky Business

7 reasons GE trees are dangerous to the health and eco culture of our forests

1. Uncontrollable cross-pollination

The threat of GE trees interbreeding with wild trees is extreme. Tree pollen can be blown by the wind and drift on air currents for hundreds, possibly thousands, of kilometres from its source. This can lead to unintentional but irreversible cross-pollination and the spread of genes from transgenic trees to unmodified trees, native, wild and cultivated alike. Evidence of significant cross-pollination between genetically engineered crops and wild varieties has already been shown in corn, rice and canola. Although scientists hope to create sterile GE trees to prevent pollination of native trees, it is not 100% assured.

2. Ecosystem disruption

Trees which have been genetically modified for plantation planting to produce specific commercially advantageous traits could prove devastating to natural tree populations. Subsequent offspring from cross-breeding could alter the way trees cycle nutrients and water. Genetically modified plantation trees developed for high growth rates absorb more nutrients and moisture than traditional varieties. This depletion creates a threat to the productivity of the land. Low lignin GE trees (or their hybrid offspring) would also decompose far more quickly, which would alter soil structure, ecology and fertility.

3. Toxic properties

Novel traits such as insect and fungal resistance and low lignin content produced through genetic engineering could harm natural tree species. For example, beneficial insects could be poisoned by genetically produced biopesticides and the application of stronger pesticides designed specifically for application to GE trees. Other native forest species including fungi (mushrooms), insects and birds would be negatively impacted through toxicity and food supply reductions.

4. "Super pests"

Trees bred with biopesticide properties are of particular concern to the health of the many beneficial insects living in our forests. This genetically engineered trait allows for greater tolerance to toxic pesticide use and also has the potential to lead to the creation of pesticide-resistant "super pests" that would be especially harmful to unprotected, natural plants.

5. "Super weeds"

Another novel trait manipulated in the production of some GE trees is herbicide tolerance. There are concerns that this trait would allow for and actually encourage the greater use of toxic herbicides in the growing of plantation trees. Like rampant pesticide use, the excessive application of herbicides could reduce biodiversity by killing other plants, lead to an increase in the growth of resistant types of weeds, as well as polluting soil and water.

6. Patented monopolies

Smaller wood lot managers and timber producers will be faced with the same economic risks and outcomes as those associated with growing genetically engineered agricultural crops such as corn and soy. Transgenic trees, like their bioengineered food crop counterparts, will be patented, which could quickly lead to a monopoly of large timber corporations controlling the industry.

7. Silent forests, unlivable habitat

When trees are grown purely for the sake of commercial traits, natural reproduction through seed dispersal from pine cones and similar structures is potentially eliminated. Without seeds to eat, many forest creatures have no food source. Transgenic trees with herbicide resistant traits will promote the use of stronger herbicides to eliminate forest bed undergrowth which normally provides habitat and food for a wide range of forest dwelling creatures. While herbicides and pesticides are already being used with non-GE species, it is thought that GE tree plantations will exacerbate their use. Trees engineered to produce their own pesticides will create a poisonous environment for the myriad insects and other small creatures such as spiders, litter layer crustaceans, worms and mulluscs living in association with trees. The net result? Silent, toxic, uninhabitable forests.

See Also Page 12, What You Can Do ⇨

Stand up for trees

9 things you can do

to oppose the proliferation of GE trees

1. SIGN ON

• Sign-on to the letter to the Secretariat of the United Nations Convention on Biological Diversity calling for a ban on genetically engineered trees. Sign on here: *www.wrm.org.uy/subjects/GMTrees/LetterCBD.html*
Or sign on here: Global Justice Ecology *www.globaljusticeecology.org*

2. CALL

• In Canada call and email the Canadian Food Inspection Agency (CFIA) attention Wendy Shearer to voice your strong opposition. Her email address is: *shearerw@inspection.gc.ca* Ph: 613-221-3944
• Your MP and MLA
• Your local and regional TV, radio and print media and news providers and express your concern and desire for more info and coverage

3. TELL

• Everyone who will listen to you about this timely concern
• Garden clubs
• Directors of public gardens

4. WRITE

• Letters to editors of papers and magazines telling them you want to read more info about this issue
• Your MP and MLA telling them you want them to oppose GE trees
• To voice your opposition

5. BE INFORMED & STAY INFORMED

• Contact the newly formed Canadian Biotechnology Action Network (CBAN) Coordinator, Lucy Sharratt, email: *coordinator@cban.ca*
• Join online watch dog organizations such as: *www.globaljusticeecology.org* or *www.stopgetrees.org*

6. TAKE ACTION

• Get an Action Tool Kit by going to: *www.stopgetrees.org*

7. WATCH & SHOW WITH FRIENDS & NEIGHBOURS

• Show the DVD, "A Silent Forest, The Growing Threat of Genetically Engineered Trees," narrated by Dr. David Suzuki. It can be ordered thru: *www.customflix.com*

8. PLANT TREES

• Plant non-invasive, drought tolerant trees

9. SUPPORT

• Local nurseries and garden centres. Tell them about this threat to our trees and ask for their support to help you distribute information

GE Rice Contamination

In the summer of 2006, European countries discovered unlicensed genetically engineered long grain white rice (LLRICE601) from American field trials had contaminated not only American supplies, but those in the European Union. The EU moved in October to compulsory testing of all US shipments to screen for genetic contamination. In the meantime, Indian rice farmers protested field trials of genetically engineered short grain rice, saying it could cost hundreds of thousands of poor farmers their livelihood if Indian crops of GM-free Basmati became contaminated and banned from export. Thailand announced sales of its GE free rice were booming.

The Canadian Food Inspection Agency, while noting the unapproved rice closely resembles an approved strain, instituted testing of shipments and required documentation that imports were free of LLRICE601.

—DB, Reuters, October 31, 2006