

Petition in support of forest biotechnology research

Forests are major sources of renewable products and ecosystem services. However, they are under increasing stress as a result of growing demands for forest products, changing climates, and proliferation of forest pests. A wide range of conventional genetic biotechnologies—including selection, hybridization, grafting, exotic biocontrol organisms, and clonal propagation—have long been accepted by most sustainable forest management (SFM) systems as safe and useful tools for promoting forest productivity and adaptation to stress.

Based on many years of research, it is clear that newer forms of biotechnology, specifically genetic engineering and gene editing, are capable of making significant further contributions to forest management. Traits that have been successfully demonstrated in field trials of recombinant DNA (rDNA) trees¹ are diverse, and include those related to productivity, wood quality, pest and stress resistance, protection of endangered species, new bioproducts, and reproduction. Research results also suggests an absence of unique hazards associated with rDNA methods; rather it is the value and novelty of the specific traits imparted, and how they compare to conventional breeding, that are germane to safety assessment.² However, despite the broad outline of effectiveness of rDNA trees, site-specific studies are needed to assess the suitability of specific applications for local conditions and products. In addition, the technology continues to evolve and become more precise, for example with the development of gene editing.

Although much additional research is needed, rDNA trees are currently disallowed in forests certified by the Forest Stewardship Council (FSC) and nearly every other SFM through cross-endorsement by the Programme for the Endorsement of Forest Certification (PEFC), the largest certifier in the world. For example, FSC has multiple policies that ban the use of genetically modified organisms (GMOs) in forestry operations directly,³ and indirectly by requiring an absence of GMOs in sales related chain-of-custody certifications.⁴

The ban prevents organizations certified under FSC and PEFC, plus any endorsed by PEFC, from studying rDNA trees on certified lands for any reason, even to save a native tree species against

¹ We use the term rDNA trees to refer to the several types of biotechnologies that involve direct, recombinant-DNA assisted modification of DNA, including what is commonly called genetic engineering, genetic modification, and gene editing.

² For example see these reviews: [The 20-year environmental safety record of GM trees. 2010](#); [Genetically engineered trees for plantation forests: key considerations for environmental risk assessment. 2013](#); [Lessons from Two Decades of Field Trials with Genetically Modified Trees in the USA: Biology and Regulatory Compliance. 2016](#); [Phenotypic expression and stability in a large-scale field study of genetically engineered poplars containing sexual containment transgenes. 2018](#).

³ FSC International Standard Principle 10.4 - 2014

⁴ SC Standard for Chain of Custody (COC) Certification - 2011a

an invasive pest. They are also precluded from using rDNA organisms for biocontrol, despite advancements in gene editing that can increase precision and reduce off-target effects.

The amount of forests certified under these standards is approximately 470 million hectares⁵. These lands, which total more area than Australia, are in many of the locations where research in technologies to improve forest health are the most needed, and thus could provide the greatest benefit to the environment and society.

Even rDNA tree research outside of certified forest areas is restricted to the point of stopping an organization from developing a useful tree. FSC bans organizations that are directly or indirectly involved in the introduction of genetically modified organisms in forestry operations.⁶

The result of these bans and research restrictions is to stop the very thing SFMs demand they need before making an informed decision: Information. PEFC states that:

As the scientific evidence of potential benefits and dangers of genetically modified organisms (GMOs) and its impact on biodiversity remains insufficient and the society has not completed its debate, the PEFC General Assembly has determined that GMO cannot be considered as part of PEFC certified material.⁷

FSC's precautionary principle approach creates a catch 22 for researchers:

More knowledge and experience are required before it will be possible to assess quantitatively the magnitude of these risks, or their likelihood. Unfortunately, many of the potential negative effects may arise as a result of field research, even from research designed to test such effects. For this reason, not even research into GMOs may be included in certified forests.⁸

The contention that no research with rDNA trees can be conducted safely has been disproven by decades of research that spans the globe. These government approved trials have a record of safety and a lack of effects beyond those expected for other kinds of forestry genetics research.⁹

Given that new technology always demands continued improvement and oversight, rather than forbid rDNA research in certified forests, these systems should be encouraging the development and evaluation of rDNA options, including helping to define safe and responsible means for its conduct.

⁵ [PEFC: Who we are. FSC Home page.](#)

⁶ [Policy for the Association of Organizations with FSC.](#)

⁷ [PEFC: Who we are.](#)

⁸ [FSC Interpretation on GMOs.](#)

⁹ [The 20-year environmental safety record of GM trees. 2010; Genetically engineered trees for plantation forests: key considerations for environmental risk assessment. 2013.](#)

Bans on the use of all types of rDNA contradicts the advice of major scientific organizations worldwide, which have identified the degree of novelty, not the methods employed, as the major consideration in benefit and risk assessment of rDNA organisms. For example, the United States National Academy of Sciences has stated in a number of major reports on rDNA crops that “it is the product that should be regulated...not the process.”¹⁰ The American Society of Plant Biologists stated in its 2014 position statement that in regulation of plant genetic engineering “...scrutiny should focus on the potential for new risks, irrespective of the method of introduction of the trait...”¹¹ The American Association for the Advancement of Science has long advocated against labels that differentiate rDNA products from those produced using other methods.¹²

Bans on rDNA research also disallow gene editing techniques, the most precise system known for improving beneficial traits.¹³ The rDNA ban is also internally inconsistent since certification systems routinely allow the use of cloned, intensively bred, and exotic trees, as well as other advanced technology, in certified forests.

This statement does not endorse all uses of rDNA in forestry, nor does it advocate for unrestricted use in all cases. These technologies are one option to help forests maintain their health, productivity, and provision of ecosystem and social services. They are new tools that require scientific research to evaluate and refine them on a case-by-case basis. We believe that such discovery, development, and analysis should be encouraged, not forbidden, in certified forests.

Given the rapidly growing threats to forests, the need for expanded production of sustainable and renewable forest products and ecological services, and the growing power and precision of biotechnologies, we believe that rDNA research should not be precluded from certified forests. We call for an immediate review of these policies to bring them in line with current scientific evidence, and call for appropriate action taken to rectify them.

¹⁰ The most recent NRC statement on this matter can be found in the 2016 report “[Genetically engineered crops: Experience and Prospects.](#)”

¹¹ [Revised position statement on plant genetic engineering](#), American Society of Plant Biologists.

¹² [Statement by the AAAS Board of Directors On Labeling of Genetically Modified Foods. 2012.](#)

¹³ [Variation in mutation spectra among CRISPR/Cas9 mutagenized poplars. 2018.](#)