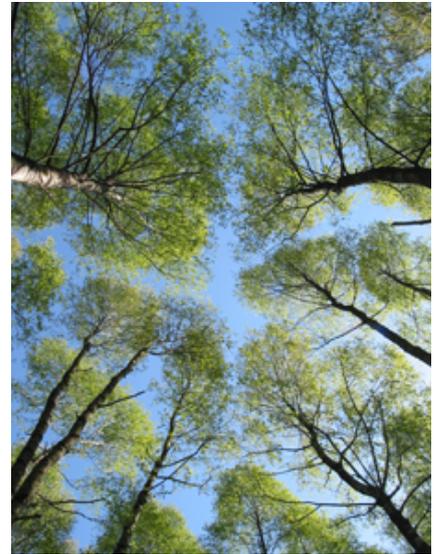




This Q&A addresses key issues tackled by COST Action FP0905 and it is designed to explain why it is important to do research on genetically modified (GM) trees.

## 1 What are GM trees?

Genetically modified trees are plants whose DNA is modified using genetic engineering techniques. In most cases the aim is to introduce a new trait to the plant which does not occur naturally in this species. Examples include resistance to certain pests, diseases or environmental conditions, or modified wood characteristics, such as lower lignin content.



## 2 What are the most concrete benefits of genetically modified (GM) trees?

Climate change represents a threat to forests, as their natural growing regions could change to such an extent that trees can no longer grow or survive. In relation to global change, an increase of GM tree plantations can be a benefit since it can reduce the pressure to harvest and destroy natural forests. An increase of GM tree plantations could therefore be beneficial to reduce the pressure to harvest natural forests. On the one hand, retention of natural forests may be the main contribution to mitigating climate change effects; on the other hand, establishing GM tree plantations that can be used to offset carbon emissions would also be a positive step to tackle climate change.

## 3 Why do we do research on GM trees?

Research in this field of forestry is necessary in order to develop trees with novel characteristics or enhanced performance. The goal is to supply the increasing demand for timber products, and to spare natural and semi-natural forests which are disappearing at high rates.

## 4 Is this COST Action advocating the need for a wider use of GM trees?

No, it is not. This COST Action is an independent research group examining the possibilities of improving trees using novel genetic engineering, providing technical solutions and options. This scientific network is also improving our understanding of the requirements for GM trees risk-assessment in order to inform breeders and recipient countries. Whether GM trees are cultivated and used depends on individual countries' political decision. COST Action FP0905 is providing an improved scientific basis to help decision-makers make an informed choice. Also, COST does not fund research itself, but the networking aspect of researchers' cooperation.

## 5 Are GM trees already in use?

Some GM plantations for commercial use are present in Brazil (e.g. Eucalyptus) and in China (e.g. Populus). No statistics are available to date, but one of the aims of the COST Action is to have information on the extent of commercial GM tree cultivation in the world.

## 6 Can modified genes flow and contaminate wild trees?

Gene flow is a normal reproductive process in trees and can thus occur between GM trees and wild types if they are in the same location. The consequences of modified genes flowing to wild trees are an important feature of the environmental risk assessment of GM trees, and are carefully examined in all cases. Techniques to manage gene flow, such as the introduction of sterility genes, are also being studied and developed.

## 7 Are there risks related to GM tree plantations?

Possible risks have been assessed and evaluated during the past 20 years in more than 700 field trials with GM trees worldwide – including fruit trees and perennial shrubs. To date, no risk has been detected.

## 8 Can GM trees produce effects on human health?

Conventional trees (i.e. all trees, both cultivated and wild trees occurring in Europe) naturally affect human health. Many people are sensitive to pollen from certain species; some trees produce irritants when touched while others are poisonous. Plant breeding and GM techniques are being used to reduce impacts on humans, e.g. by reducing or eliminating pollen production, or changing the amount of allergenic proteins produced by plants. It is thus anticipated that GM trees will either have similar effects as wild trees, or reduced levels of impacts on human health.

## 9 Can GM trees produce side effects on the environment?

Trees often form the climax vegetation in undisturbed environments – establishing themselves on a given site for given climatic conditions in the absence of human interference after a long time – and supporting complex food webs, hence depicting feeding connections in a given ecological community. Breeding, introducing different or alien species and genetically modifying trees all have the potential to alter these complex relationships in a receiving environment. For example the introduction of *Pinus radiata* and *Eucalyptus* into areas where these species did not naturally occur has had major environmental impacts. Therefore, each novel GM tree needs to be carefully assessed to determine its environmental impacts compared with non-GM trees. In particular, the consequences of these impacts must be considered by each country on the basis of their acceptability.

## 10 What is the role of this Action within GM tree-related research?

The principal aim of the Action is to coordinate state-of-the-art knowledge and research on GM trees, and ultimately provide scientific recommendations for effective implementation of EU legislation on GMOs.

A great deal of knowledge and information on environmental effects and biosafety of transgenic trees has been collected in many countries over the past 15 years. This should now be integrated and compiled in a European 'knowledge platform'.

Researchers' collaboration from both in and outside Europe is fundamental to favour scientific knowledge exchange worldwide and improve a scientific basis for biosafety of transgenic trees. The Action also aims at summarising these results in a GM tree database, which currently does not exist.

Available information today mostly relates to crops. Integrated and complete information on transgenic forest trees must be made available to national and international organisations, European institution and agencies that have to evaluate and regulate the introduction of transgenic trees to the European market.

This COST Action is the first worldwide example of cooperation on GM tree research. The Action is hence making an important contribution to current debates in the EU on the cultivation and commercialisation of GM plants.

## 11 Which are the research priorities of the Action?

This Action is focusing on key aspects related to the biosafety of genetically modified trees such: 1) gene containment strategies, 2) methods to monitor GM trees in the whole production chain, 3) risk assessment of GM trees and 4) socio-economic and cost/benefit analyses in relation to the use of GM trees in plantations.



#COSTActionFP0905

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