New Phytologist

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# Fuelled by trees: international New Phytologist Symposium on 2nd generation biofuels

More than one hundred scientists will discuss recent developments in biofuel production from lignocellulosic biomass at the 26th New Phytologist Symposium 'Bioenergy trees' to be hosted by the National Institute for Agricultural Research (INRA), Nancy, France on 17–19 May 2011 (www.newphytologist.org/bioenergy). Over the last five years the European Commission and US Department of Energy have funded a series of research projects to develop poplars, pines and eucalypts as cheap and environmentally friendly feedstocks for biofuels.

According to the United Nations, food prices hit a record high in January 2011, therefore increasing pressure to introduce bioethanol sources that do not compete with agricultural crops. Lignocellulosic or 2nd generation biofuels are made using lignocellulosic biomass from tree species that can be grown on marginal lands which are unsuitable for food crops. This could replace crop-derived (1st generation, 1st G) bioethanol, currently the most widespread biofuel, and boost the share of biofuels in the transport sector to 10% by 2020.

Processing lignocellulosic biomass into bioethanol has the potential to be a low-cost procedure. However, the recalcitrant nature of lignin (a naturally occurring component that is crucial for plant growth) hinders this process. Francis Martin, a researcher at INRA, Editor of the *New Phytologist* journal and lead organiser of 'Bioenergy trees' hopes that research presented at the symposium and in the journal will further our knowledge of the mechanisms that control cell wall structure and composition. 'We hope that this will lead to the development of novel tree genotypes with enhanced growth traits and lower lignin contents,' Martin explains. The net result would be to improve yield and reduce the costs of bioethanol production.

There are a number of environmental benefits of using lignocellulosic-derived biofuels, compared to 1st G biofuels. In contrast to crops used for bioethanol production, trees are more efficient at nutrient cycling and do not require as much inorganic fertilizer (the production of which has a large carbon footprint) or as much management as 1st G biofuel crops. In addition, 1st G crops must be replanted and grown each year whereas trees such as poplar can re-grow from existing root-stocks following harvesting. These trees can be submitted to several rotations of harvest and re-growth before new individuals need to be planted.

Several talks will be devoted to the Life Cycle Assessment (LCA) of bioenergy poplars. This type of analysis has been used to evaluate the overall environmental impacts associated with the production of poplar-derived biofuel. The results of the LCA indicate that the use of 2nd G biofuels could significantly reduce greenhouse gas emissions. Indeed, bioethanol produced from poplars grown in Western Europe, would have a lower environmental impact compared to petrol. Francis Martin believes that there are additional environmental benefits of using poplar for biofuels. 'Poplar forests would offer diversity in rural landscape,' explains Martin 'and present an opportunity for rural income, social cohesion and other social benefits.'

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French National Institute for Agricultural Research (INRA) carries out mission-oriented research for high-quality and healthy foods, competitive and sustainable agriculture and a preserved and valorised environment.

http://www.international.inra.fr/

ENERGYPOPLAR is designed to develop new poplar trees having both desirable cell-wall traits and high biomass to be used as an efficient, renewable and sustainable source of lignocellulosic feedstock for industrial production of bioethanol.

http://www.energypoplar.eu/

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