

# Intensive biofuel planting poses risk to human health

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The race to meet carbon-neutral biofuel targets could put human health and food crop production at risk unless it is carefully planned, according to new research.

A new study, led by Professor Nick Hewitt of Lancaster University, examined changes in [ground level ozone](#) in [response](#) to projected land use change associated with future biofuel cultivation.

Publishing in the journal *Environmental Science & Technology*, the researchers found that it would be possible to grow enough biofuel [crops](#) in Europe to meet EU biofuel targets but this could only be done relatively safely if the right crops were planted in the right places – away from highly populated areas.

Biofuels—usually derived from specialist crops such as [poplar](#), willow or eucalyptus —offer alternative energy sources to carbon-intensive fossil fuels.

However, many plant species grown for biofuel emit more isoprene, an [ozone](#) precursor, than the traditional crops and vegetation they replace.

Too much ozone poses a well-documented risk to [human health](#) – 22,000 premature deaths are linked to ground-level ozone exposure in Europe every year. It can also damage food crops including two of the most commercially important food crops in Europe, maize and wheat.

Species of poplar with high biomass yields emit more isoprene than lower-yielding poplar. Planting large areas of higher yield poplar close to densely populated areas could result in increases in ground level ozone, which in turn could increase the number of ozone-related premature deaths.

Because background levels of ground-level ozone across Europe are already high, the study found that even small increases in ozone resulting from the large scale planting of poplar, willow or eucalyptus would add to the likelihood of damaging concentrations occurring.

Professor Nick Hewitt said: "In coming years we can anticipate a rapid expansion in poplar plantations in Europe driven by EU carbon-reduction initiatives. The current focus in policy-making circles and the biomass industry is on maximising yields but this should not be the only consideration. High yielding crops also produce the most isoprene and have the greatest impact on air quality and human health."

Co-author Dr Oliver Wild said: "Our model results show that the large-scale planting of poplar as a biofuel feedstock in Europe may increase ground-level ozone concentrations across the region. This deterioration in air quality will lead to small but quantifiable impacts on human health and mortality and crop yields, the magnitudes of which will vary with the type of poplar cultivars used and the chosen locations of large plantations.

"We demonstrate that mitigation of these impacts could be achieved through European-wide strategic planning of plantation siting. For example a decision could be made to cultivate poplar on a large scale in areas of Europe with low population density and less intensive agriculture."

**More information:** "Impact of Biofuel Poplar Cultivation on Ground-

Level Ozone and Premature Human Mortality Depends on Cultivar Selection and Planting Location." *Environ. Sci. Technol.*, 2015, 49 (14), pp 8566–8575 [DOI: 10.1021/acs.est.5b00266](https://doi.org/10.1021/acs.est.5b00266)

Provided by Lancaster University

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