

# Scientist stuns experts by saying trees worsen greenhouse effect

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Hamburg- A leading expert in Germany has spawned a major scientific debate by claiming that trees put millions of tons of methane into the atmosphere every year exacerbating the greenhouse effect. Amid controversy, Dr Frank Keppler of the Max Planck Institute for Chemistry has reaffirmed findings by his team in Mainz, Germany, in January 2006 that they had detected methane exhaled from living plants.

"I am 100 per cent confident that plants emit methane," he told Chemistry World magazine, insisting that as yet unpublished research would confirm his findings once and for all.

Keppler's unexpected discovery has caused heated debate among biologists and atmospheric chemists. Though bacteria in soil or decaying matter produce methane in anaerobic conditions, there seems to be no reason or mechanism for living plants to emit the gas in an oxygen-rich environment.

The implications of the findings are worrying: on a global scale, Keppler estimated, methane emissions from plants and trees could amount to hundreds of millions of tonnes a year, throwing scientists' understanding of the greenhouse gas's sources and sinks way off kilter.

But many researchers have queried the global impact, suggesting that Keppler's scale-up calculations, based on methane emission per unit of metabolically active mass of plant, were a gross overestimate.

Yet until recently, no published research has questioned Keppler's central discovery that plants can emit methane in the first place.

Recently, however, rival researchers reported that plants emit virtually no methane whatsoever.

Tom Dueck, of Wageningen University in the Netherlands, says his team's independent investigations are the first published results to show that plants' methane emissions are negligible or zero. That means their contribution to the global methane budget, and potentially to climate change, simply isn't worth worrying about.

The Dutch group did not repeat Keppler's experiment exactly, Dueck said, "because it was not methodologically sound." Instead, his team boosted the sensitivity of their methane measurements by growing plants in an atmosphere saturated with a heavy carbon isotope,  $^{13}\text{C}$ .

If the plants subsequently emitted methane ( $^{13}\text{CH}_4$ ), it would be easy to spot above the background of light ( $^{12}\text{CH}_4$ ) methane in the air. Photo-acoustic spectroscopy (a laser-based measuring technique) was used to detect the gas.

Dueck said it showed that even a large mass of plants produced negligible methane emissions – at most 0.3 per cent of Keppler’s values.

So if Dueck’s team is correct, where did Keppler go wrong? Dueck suggests that Keppler’s team might have forgotten that gas trapped in plants’ intercellular spaces, and in air pockets in the soil, could diffuse out and be counted as “emitted” by the plant in their experiment.

But Keppler rejects this, saying that this sort of methane desorption could only be partially responsible for the amounts of gas he found.

Indeed, he suggests that Dueck’s use of heavy isotopes may have actually changed the plants’ metabolic preferences, killing off their methane emissions. Dueck counters that no literature reports suggest this might be a problem.

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