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Nitrous oxide emissions from beech leaves

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Nitrous oxide (N_2O) emission estimates from forest ecosystems are currently based on emission measurements from the soil surface. Agricultural and wetland plants have been found to serve as a conduit for N_2O to the atmosphere, while the possible effect of tree canopies on N_2O emissions from forest ecosystems have been ignored. We measured transpiration mediated N_2O emissions from beech (*Fagus sylvatica* L.) seedlings in laboratory conditions. Soil-free roots of a seedling were enclosed into an air-tight pot with elevated concentration of N_2O in the solution. Emissions of N_2O from the beech leaves were measured by enclosing the foliage inside a separate shoot chamber and measuring N_2O concentration inside the chamber during an enclosure. We found that N_2O dissolved in soil water can be taken up by beech roots and emitted to the atmosphere via transpiration stream. These N_2O emissions were comparable in magnitude to the emissions measured from temperate forest soils. Although, the N_2O emissions, measured in the laboratory, are likely to be an overestimate of the natural emissions, this source may significantly account for the N_2O emission budget from forest ecosystems.