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## Role of Various Plant Species in Methane Emission from Soil: A Functional Group Based Large-scale Screening of Wetland Plant Species

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### Abstract

Methane is a potent greenhouse gas and wetlands — along with paddy fields — are its single largest natural source. Plants are one of the major biotic factors influencing methane fluxes from wetlands. Various plant species can have a positive or negative impact on methane fluxes, by affecting different mechanisms viz. production, consumption and transport. Therefore, a shift in species composition may have drastic effect on carbon balance of wetland ecosystems. Current knowledge about relative behaviour of species in relation to methane emissions is rather poor. A relationship between methane emissions from wetlands and plant functional groups, if any, may help in estimating current scenarios and also in making model-based predictions, which in turn could assist in designing appropriate mitigation strategies. It is evident that plant species differ in their ability to transport methane. Plant species-specific or growth form-specific differences in transport rates may be acting as an important control on CH<sub>4</sub> fluxes. There have been various attempts to investigate the role of plant species in methane emissions, but generally only a limited number of species were compared, or data were derived from different experiments and conditions making it difficult to come up with general conclusions. We conducted a functional group based, large scale screening study with an aim to evaluate the influence of different plant species on methane emissions from soil, and to find out whether there is a correlation between plant functional groups and the emissions. We also aimed at assessing the variation in plants' ability to transport methane from rhizosphere to atmosphere. The set of plant species comprised of 20 European wetlands species including both forbs and graminoids selected over a range of habitat preference i.e. from low to high productivity. Plants were grown on intact peat cores collected from a nature reserve in northern Switzerland. This experiment has revealed interesting results, which we would like to present in Tropentag 2010.

**Keywords:** Emissions, fluxes, gas transport, methane, species, wetlands