Jacinthe, P.A., Tedesco, L.P., and Barr, R.C., 2006, Soil properties and trace gas fluxes in a newly restored riparian forest: Soil Science Society of America International Meeting, 2006 Nov.

Soil Properties and Trace Gas Fluxes in a Newly-Restored Riparian Forest.

Pierre-Andre Jacinthe, Lenore Tedesco, and Robert C. Barr.

IUPUI, Dept of Earth Sciences, 723 W Michigan St, SL 122, Indianapolis, IN 46202

Although the contribution of riparian forests to stream water quality is well documented, information is lacking with regard to the exchange of trace gases between riparian soils and the atmosphere. This information is important given the implication of trace gases (CO_2, N_2O and CH_4) in the accelerated greenhouse effect. Soil properties and gas emission were measured at experimental riparian forest plots (5 years after restoration) established along the White River near Indianapolis. The study site included afforested plots and unplanted controls. The highest CO_2 (3.2 vs 1.8 mg CO_2-C m^2 d^{-1}) and N_2O (1.04 vs 0.52 mg N_2O-N m^2 d^{-1}) fluxes were recorded in the summer and early spring, and fluxes were generally higher (1.7 fold) close to than away from the river margin. The riparian soils were generally net CH_4 sink with uptake rates averaging -0.26 and -0.44 mg CH_4-C m^2 d^{-1} in the control and afforested plots, respectively. The lowest uptake rates were recorded during the transition from winter to spring and, during that period, negative relationships between CO_2 and CH_4 fluxes were noted. These results highlight the complexity of trace gas dynamics in riparian zones, and will be discussed along with soil biophysical properties, flooding events and variation in water table position at the study site.