Effects of phosphorus fertilization on methane fluxes in a tropical leguminous forest plantation in Sumatra, Indonesia

Abstract: P application may stimulate methane (CH_4) uptake from tropical forest soils by enhancing methanotrophic activity and root growth, which mitigates the inhibitive effects of N (Zhang et al., 2011), or may stimulate CH_4 production by stimulating methanogenesis activity (David, 1985). Here we examined the effects of P fertilization on CH_4 uptake in an *Acacia mangium* plantation in South Sumatra, Indonesia. For knowing the role of plant roots on the effects, we prepared both root-existing and root-excluded plots. Although CH_4 uptake was larger in P applied soils in both root-existing and root-excluded plots, there were no statistical significance. P application might have stimulated both CH_4 uptake and production, which resulted in not-clear effects of P fertilization on CH_4 fluxes.

Keywords: methane, phosphorus, tropical leguminous plantation

Taiki Mori[1, *], Seiichi Ohta[1], Shigehiro Ishizuka[2], Ryota Konda[1], Agus Wicaksono[3], Joko Heriyanto[3] and Arisman Hardjono[3]

[1] Graduate School of Agriculture, Kyoto University, Kyoto, Kyoto, Japan
[2] Department of Forest Site Environment, Forestry and Forest Products Research Institute, Tsukuba, Ibaraki, Japan
[3] PT. Musi Hutan Persada, Muara Enim, South Sumatra, Indonesia
[*] Corresponding author
Tel: +81757536361
Fax: +81757536372
E-mail: taikimori7@gmail.com
Present and complete correspondence address: Laboratory of Tropical Forest Resources and Environments, Forestry and Biomaterials Science, Graduate school of Agriculture, Kyoto University, Kitashirakawa Oiwake-cho Sakyo-ku, Kyoto, Kyoto, 606-8502, Japan