Research project of counterparts funded at UNJA

Name	Counterpart	Title
Damris Muhammad, Linda Handayani, Samsidar	**A05**	Impact of land transformation and the factors that regulate nitrogen fluxes in the soils of the Rainforest Transformation System as a function of soil depths

Background

Transformation of tropical lowland forest affects soil nitrogen (N) fluxes to the atmosphere. The soils of palm oil plantation are the most affected. However, application of fertilizer for long period of time in the palm oil plantation may contribute to the availability and cycling of N in the soils. The majority of studies measured soil N emission at the soil surface. However, there is limited information on N emission at different soil depths. The OBJECTIVE of this study is to measure and quantify soil N emission to the atmosphere in oil palm plantations compared to that of secondary forest in Jambi region as a function of soil depth.

Methods

Static PVC chambers covered by a rubber septum were installed at random in palm oil plantation and in secondary forest at depths of 0, 5 and 10 cm below soil surface. Gas was collected from inside the chamber by inserting a syringe needle through the chamber septum at 0, 2, 4, 6 and 8 weeks after installation.

Results

The highest N emissions were found at the soil surface. The concentration for secondary forest was 0.218±0.069 mg N m-2 d-1 and that for oil palm plantation 0.225±0.071. The concentrations decrease with soil depth. At the soil surface equivalent N emission was found for both systems. However, in the deep soil layer emission for the oil palm plantation was significantly higher (figure 1). The figure compares the soil N emission values between secondary forest and palm oil plantation at different soil depths. The application of fertilizer in the palm oil plantation seems to influence soil N emission to the atmosphere. Because there is a greater N emission from the deep soil layer of palm oil plantation, it is possible that the deep soil emission contributes a greater fraction soil N emission at the surface.

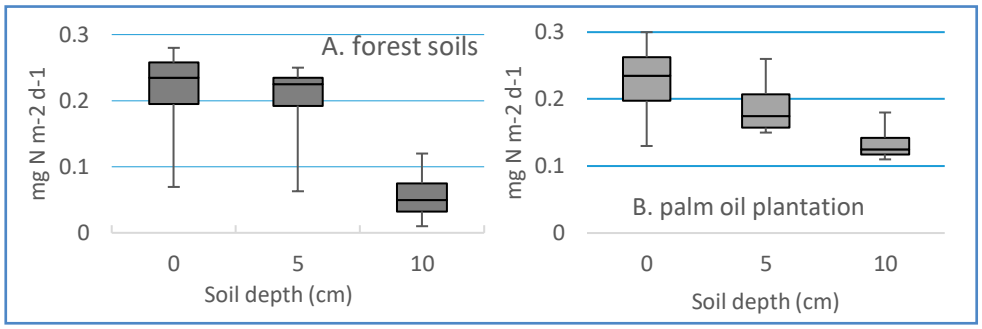

Figure 1. Soil nitrogen emission from forest (left, A) and palm oil plantations (right, B) at various depths.