

#### 404. SOIL MICROBIAL BIOMASS NITROGEN OF PADDY SOIL AS AFFECTED BY ORGANIC OR CHEMICAL FERTILIZER APPLICATION AND SOIL LAYERS

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**Introduction:** The rice grows in the reciprocal and interaction ecosystem between soil-microorganism-rice and atmosphere. Soil microbial biomass (SMB) plays an important role in soil fertility because of their involvement in the regulating nutrient cycling process in soil. Understanding the effect of organic and chemical fertilizer on soil quality parameters (such as SMB) is of central importance to concepts of sustainability. The size of soil microbial biomass nitrogen (SMBN) might be influenced by fertilization practices and more researches about the effect of fertilization on SMBN are needed. In addition, the size of SMBN might be affected by rice canopy at different growth stage. Because light and space are important factors for the growth and development of surface soil-inhabiting microorganisms and also SMBN in rice paddy. The surface soil layer of paddy fields are active sites of microbial activity related to organic matter production by photosynthetic algae and cyanobacteria. Therefore, it is supposed that surface layer might have higher level of SMBN compare to that of lower layer. **Objective:** The aim of this study is to investigate the effect of organic matter and chemical fertilizer application on SMBN in two soil layers at different rice developmental stages. **Material and Method:** A field experiment was conducted in Yamagata University farm in 2012. Two soil layers (0-2.5 cm and 5-7.5 cm) were collected at before plowing, transplanting, 30 days after transplanting (DAT), panicle initiation, heading and harvesting. Three fertilizer treatments (Control, Chemical fertilizers, Organic matter) were arranged at randomized complete block design with three replications. The method of chloroform fumigation and extraction under atmospheric pressure was used for analysis of SMBN. Total carbon and nitrogen were estimated by NC analyzer. For statistical analysis, differences among treatments, sampling dates and between soil layers were assessed by using analysis of variance (three factor ANOVA). **Results:** 1. There is a significant difference in SMBN among treatments, sampling times and soil layers. 2. Application of organic matter gave the highest SMBN in all sampling times. 3. Among sampling times, the highest SMBN was observed in 30 DAT regardless of treatments. 4. Higher SMBN in upper layer than those in lower layer was observed. 5. Total carbon (TC) and nitrogen (TN) of soil with organic matter treatment were significantly higher than those of other treatments. **Conclusion:** These results indicated that manure application has significant effect on SMBN, TN and TC. The size of SMBN is strongly affected by rice growth stages and soil layers (depths).

**Key words:** Soil Biomass Nitrogen, paddy soil, growth stages, cultural practices, soil layer

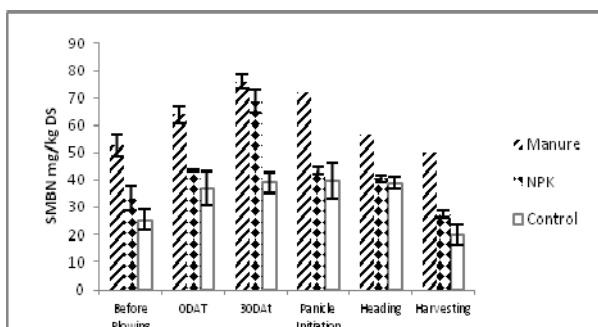


Figure: The status of SMBN under application of organic and chemical fertilizer application in upper (0 – 2.5 cm) layer in different rice growth stages.

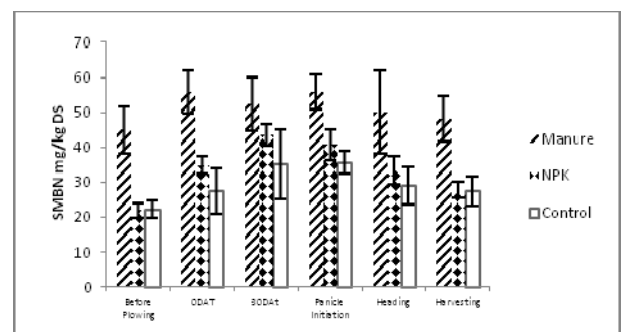


Figure: The status of SMBN under application of organic and chemical fertilizer application in lower (5 – 7.5 cm) layer in different rice growth stages.