

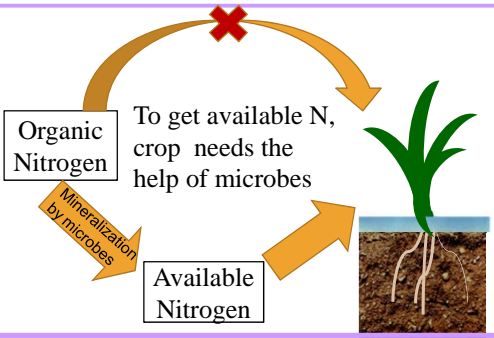
# 404. SOIL MICROBIAL BIOMASS NITROGEN OF PADDY SOIL AS AFFECTED BY ORGANIC OR CHEMICAL FERTILIZER APPLICATION AND SOIL LAYERS



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## INTRODUCTION

- Microbes involved in regulating nutrient cycling process in paddy soil.
- Soil microbial biomass nitrogen (SMBN) can be used as an indicator of soil fertility.
- Organic and chemical fertilizer are main inputs for rice cultivation.



- At each growth stage, different crop canopy and light interception.
- Upper thin layer of paddy soil is an important place for Blue Green Algae (Cyanobacteria) which is a photosynthetic organisms.

## Hypothesis

- Growth stages, soil layers and types of fertilizer might be factors relationg to size of SMBN.

## OBJECTIVE

-To investigate the effect of manure and chemical fertilizer application on SMBN in upper layer and lower layer with reference to growth stages.

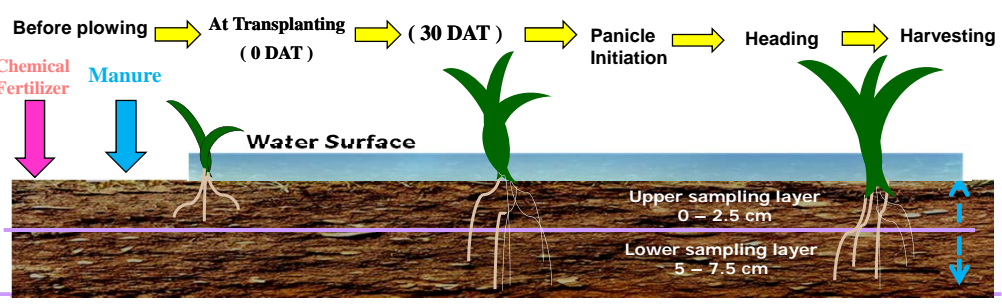
## MATERIALS AND METHODS

**Soil Type** : Sandy clay Loam  
**Rice variety** : Sasanisiki  
**Location** : Yamagata University Experimental farm  
**Sampling times** : 6 times

**Experimental Design**: Randomized complete block  
**Replication** : 3  
**Method of Analysis** : Chloroform Fumigation and Extraction (Inubushi et. al. 19910)

### Treatments

- Control** : No fertilizer, No manure
- Manure** : 40 tons / ha(fresh weight) were applied annually for 6 years
- Chemical fertilizer**: 68,68,68 kg /ha (N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O) were applied annually for 6 years



## RESULTS

Table . 1 ANOVA of soil microbial biomass nitrogen for 2012 cropping season, ns, non significant, \*\*,significant at 1% level

Source of Variation	F value	P value
Treatment ( T )	75.01	<.0001**
Sampling Date (D)	13.07	<.0001**
Soil Layer ( L)	20.67	<.0001**
Treatment x sampling Date ( T x D )	0.93	0.5125 ns
Treatment x Soil Layer ( T x L)	1.39	0.2551 ns
Sampling Date x Soil Layer ( D x L )	2.13	0.0717 ns
Treatment x Sampling Date x Soil Layer ( T x D x L )	0.6	0.8096 ns

Table 2. Total Carbon, total nitrogen, bulk density, C : N of each treatment in different layers at harvesting by Turkey kremar ( n=3). Means with same letter 'a 'within same column or same letter 'A 'within same row are not significantly ( P > 0.05 ) different.

Treatments	Total Carbon (g / kg)		Total Nitrogen (g / kg)		Bulk density (g / cm <sup>3</sup> )		C:N	
	0 - 2.5 cm	5 - 7.5cm	0 - 2.5 cm	5 - 7.5cm	0 - 2.5 cm	5 - 7.5cm	0 - 2.5 cm	5 - 7.5cm
Manure	34.84Aa	37.83Aa	3.31Aa	3.30Aa	0.87 a	0.88 a	10.52	11.46
Chemical Fertilizer	25.53Ba	23.92Ba	2.56 Bb	2.32 Bb	1.03 b	0.97 b	9.97	10.31
Control	23.81Ba	22.73Ba	2.30Bb	2.19Bb	1.02b	1.01 b	10.35	10.38

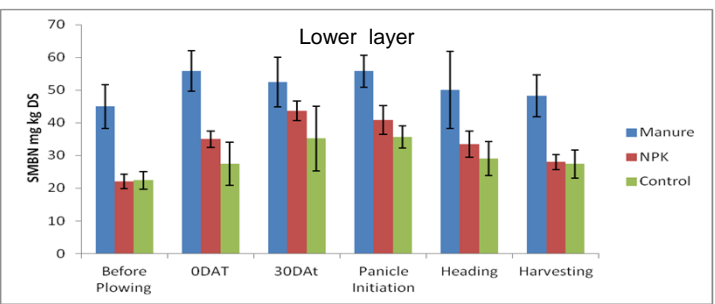
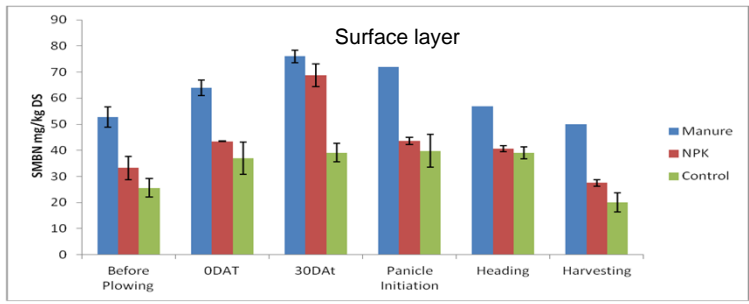


Figure -1 : Contribution of SMBN in each sampling time in upper layer. Vertical bars indicate standard error.

Figure- 2: Contribution of SMBN in each sampling time in lower layer, vertical bars indicates standard error .

## CONCLUSION

1. The highest SMBN was observed in 30 DAT regardless of treatments.
2. Organic matter application gave the highest SMBN, total carbon and nitrogen among treatments in all sampling times.
3. Chemical Fertilizer have no effect on SMBN.