高山サイト冷温帯落葉広葉樹林における土壌微生物特性の空間分布
Spatial distribution of soil microbial characteristics in a cool-temperate deciduous forest in Takayama

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1. Introduction

Heterotrophic microorganisms have an important role in nutrients cycling and soil formation through the organic matter decomposition. Therefore, it is important to clarify the spatiotemporal variation in quantitative and qualitative characteristics of soil microbial community and the factor(s) affecting such spatiotemporal variation in considering the matter cycling. Takayama Field Station of Gifu University has studied carbon cycling in a cool-temperate deciduous forest for long term and have clarified that various ecological processes such as soil respiration showed significant spatiotemporal variation. However, the information of soil microbial community is largely limited and especially, the spatial variation of microbial characteristics and factors affecting it still remain unclear. Then, we aimed to describe the spatial distribution of microbial characteristics and clarify the relationships between spatial distribution and environmental factors.

2. Materials and Methods

Our study site was cool-temperate deciduous bload-leaved forest on the northwestern slope of Mt. Norikura, central Japan. The site was dominated by oak (*Quercus crispula*) and birch (*Betula ermanii*, *B. Platyphylla*) and the forest floor is covered with a dense dwarf bamboo (*Sasa senaninsis*) community. A permanent plot of 1 ha was set on a west-facing slope and 100 subplots (each 10 m × 10 m) are distributed along five microtopographic type: ridge (30), northern slope (25), valley bottom (19), southern slope (19) and western slope (7) (Fig.1). Litter (L layer) and mineral soil (0-5 cm of A layer) samples were collected from 100 subquadrat on early May 2013. Some soil properties (e.g., water content, pH, NH_4^+–N, NO_3^-N) were determined. Microbial respiration rate from mineral soil sample was determined by open-flow method with infrared gas analyzer in laboratory condition.

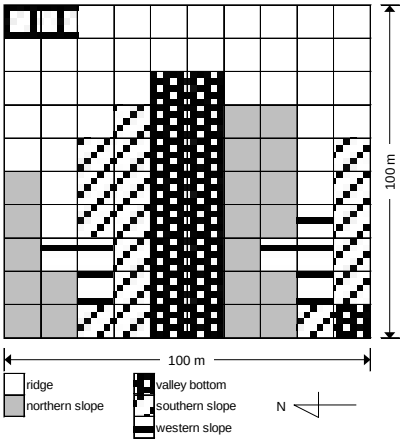

Fig. 1 Topographic characteristics of study site.

3. Results, Discussion and future plan

Average value of microbial respiration rate per gram soil was significantly differed among five the topographic type (one-way ANOVA, $P < 0.01$) and that in ridge (3.6±0.81 μg CO_2–C g^{-1} h^{-1}) was significantly higher than that in valley bottom (2.9±0.78 μg CO_2–C g^{-1} h^{-1}) (Tukey-Kramer test, $P < 0.05$). In this poster presentation, the effects of topography on microbial respiration rate will be discussed based on the differences in environmental factors such as soil water content, litter amount, and soil carbon and nitrogen contents. In addition, soil microbial biomass and community structure will be determined for collected mineral soil samples by phospholipid fatty acid (PLFA) analysis in near future and spatial distribution of microbial biomass, community structure, and respiration activity (respiration rate per biomass) will be clarified.