Inorganic Fertilizer and Poultry-Litter Manure Amendments Alter the Soil Microbial Communities in Agricultural Systems

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ABSTRACT

Effects of agricultural land management practices on soil phosphorus, diversity, and their influence on soil microbial communities under three agricultural management systems (conventionally, strip-cultivated, and strip-till) were studied. The data were compared with 94 non-agricultural soils. The study was conducted at two sites in Georgia. The soil was collected from three different management systems: conventional tillage, strip-cultivated, and strip-till. The soil samples were analyzed for soil properties, including pH, organic matter, carbon, and nitrogen. The results showed that the microbial communities were different in each of the three management systems.

INTRODUCTION

Diversity Indices

Community Structure and Diversity

Experimental Strategy

Sampling Strategy

Physiological classification

Physiological analysis of soil

Phylogenetic analysis

ERD Fs gene library

Community Structure and Diversity

Sequence Data Summary

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METHODS

Phylogeny

DNA Sequences

Sequence Analysis

Community Structure and Diversity

Experimental Design

Sequence Analysis

Community Structure and Diversity

Sequencing & Phylogenetic Analysis

Phylogenetic Analysis

Sequence Analysis

Community Structure and Diversity

Sequencing & Phylogenetic Analysis

Sequencing & Phylogenetic Analysis

RESULTS

Microbial Communities in Fertilized and Non-Fertilized Treatments

Table 1: Mean values of total microbial PLFA and bacterial PLFA for all treatments.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total Microbial PLFA</th>
<th>Bacterial PLFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>540 ± 12</td>
<td>120 ± 3</td>
</tr>
<tr>
<td>Inorganic</td>
<td>550 ± 15</td>
<td>125 ± 4</td>
</tr>
<tr>
<td>Manure</td>
<td>560 ± 18</td>
<td>130 ± 5</td>
</tr>
</tbody>
</table>

Legend:
A. Gram-positive bacteria
B. Actinomycetes
C. Alphaproteobacteria
D. Betaproteobacteria
E. Gammaproteobacteria
F. Firmicutes

Acknowledgement

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