



HAL
open science

Functional profiles of soil microbial populations under various climatic conditions and agricultural practices in Burkina-Faso

S Bourgerie, Mikael Motelica-Heino, Bertrand Sajaloli, E Yengué, D Morabito

► To cite this version:

S Bourgerie, Mikael Motelica-Heino, Bertrand Sajaloli, E Yengué, D Morabito. Functional profiles of soil microbial populations under various climatic conditions and agricultural practices in Burkina-Faso. First Global Soil Biodiversity Conference - Assessing soil biodiversity and its role for ecosystem services, Dec 2014, Dijon, France. , 2014. insu-01118131

HAL Id: insu-01118131

<https://insu.hal.science/insu-01118131v1>

Submitted on 18 Feb 2015

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Functional profiles of soil microbial populations under various climatic conditions and agricultural practices in Burkina-Faso

S. Bourgerie ¹, M. Motelica-Heino ², B. Sajaloli ³, E. Yengué ⁴, D. Morabito ¹

¹ LBLGC, Université d'Orléans, France

² Institut des Sciences de la Terre d'Orléans (ISTO), UMR 7327 CNRS-Université d'Orléans, France

³ CEDETE, Université d'Orléans, France

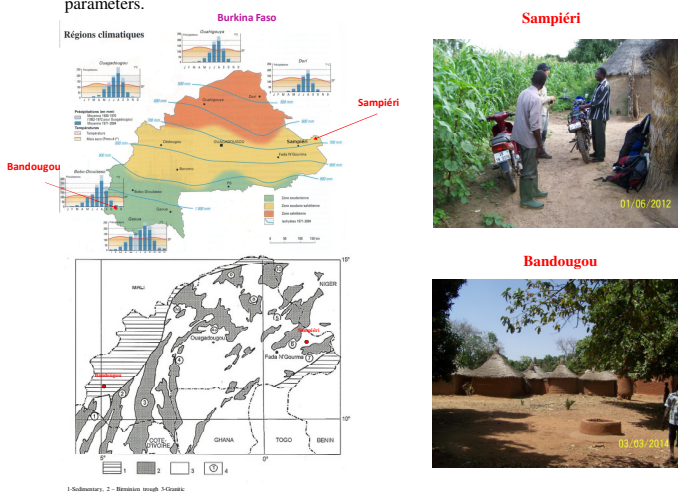
⁴ CITERES, UMR 7324 CNRS-Université de Tours, France

Introduction

BIOSOL is a multidisciplinary scientific program (soil science, agronomy, geography) which aims at understanding and promoting agro-ecological practices among peasant communities in Burkina-Faso. In this work, the pedological, geochemical and microbiological characteristics of agricultural soils were investigated in order to make an inventory of soil fertility. Two sites (villages of Sampiéri and Bandougou) with contrasted pedo-climatic conditions were selected.

Material and methods

The microbial biomass and community level physiological profiles were determined by using the MicroResp™ system in topsoils. Surface soil samples (0-15 cm) were also evaluated for physico-chemical characteristics such as the organic carbon and nitrogen concentrations, exchangeable cations and pH together with their structure and texture and other soil physical parameters.



Pedological study

Sampling with an edelman auger

2 mm mesh sieving

LaMotte textural soil kit (code 1067)

Physico-chemical study

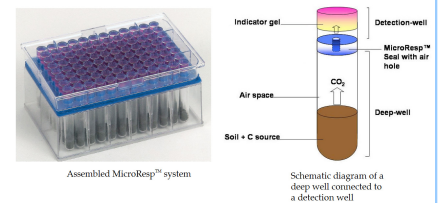
pH: distilled water extracts (1:2.5 w/v) (NF ISO 10390)

Total organic carbon and total nitrogen: Flash pyrolyser

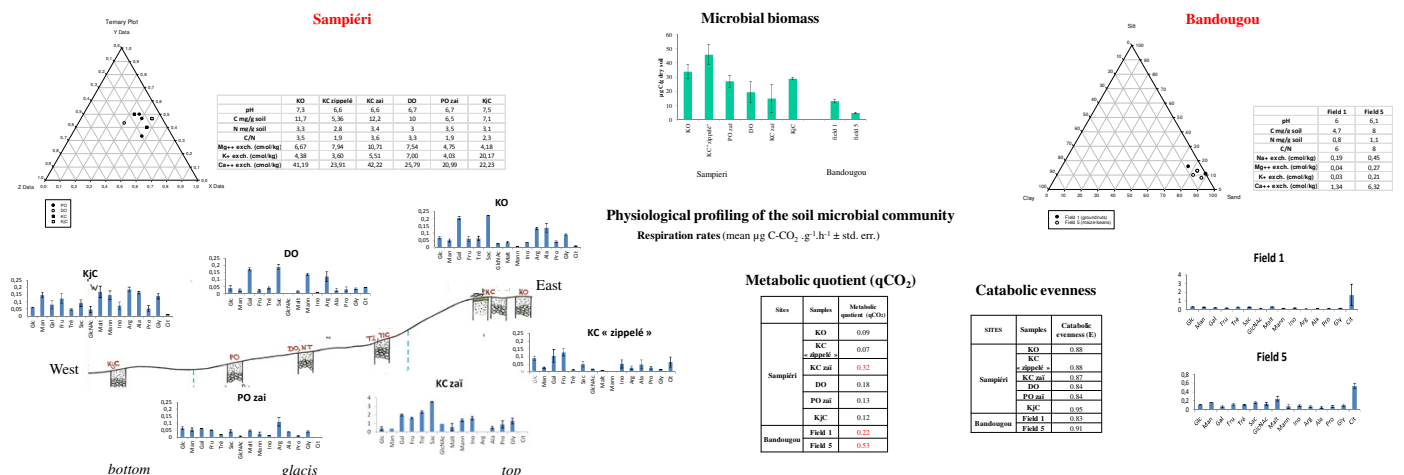
Exchangeable cations: LaMotte universal extraction solution (S/L 1/10) and ionic chromatography (Dionex

ICS-2000, Sunnyvale, CA)

Microbial study



Results



Conclusion

Results indicate that the microbial biomass for all samples are low. Metabolic quotients ($q\text{CO}_2$) are very different and compared to samples from Sampiéri, statistically higher for samples from Bandougou, reflecting disturbed soils for these latter. Catabolic evenness were quite similar for all the samples. The soil ecosystem from Bandougou has significantly influenced the functions of soil microbial community and hence probably its composition. More generally, catabolic diversity of soil microbial community is variable under contrasted climatic and the influence of various cultural practices. This may indicate that the efficiency of soil quality restoration is under the control of many factors which could be further investigated such as the position on the slope along the topo-sequence, the composition of soils and particularly the availability of nutrients and the various cultural practices.