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Soil microbial diversity and related soil functioning in urban parks

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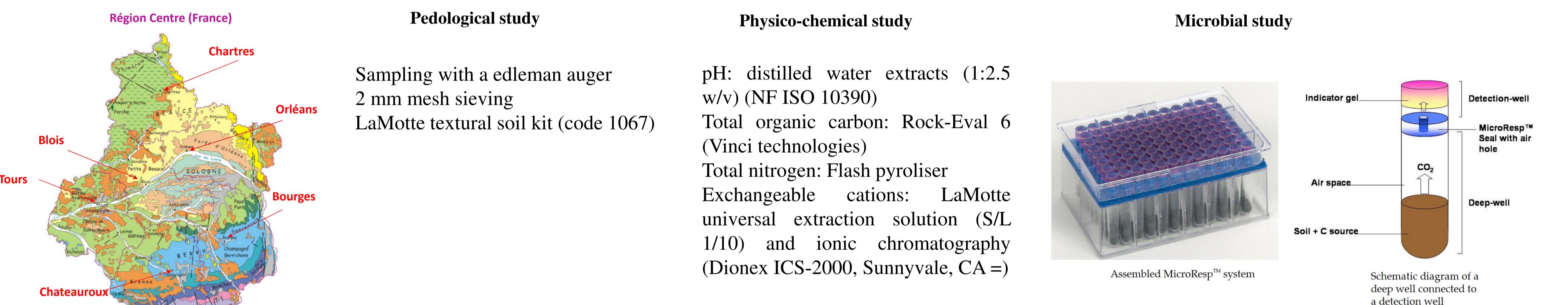
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Introduction

The main thrust of this work was to improve the knowledge concerning soil biodiversity and related ecosystem services in soils from urban parks in several cities of the Région Centre, France. In this work, the pedological, geochemical and microbiological characteristics of surface soils were investigated in order to make an inventory of soil fertility in several urban parks of the major cities of the Région Centre, France. The effects of agricultural practices on biomass, community structure and activity of micro-organisms were investigated in these soils in parallel with the determination of various pedo-physical and chemical parameters.

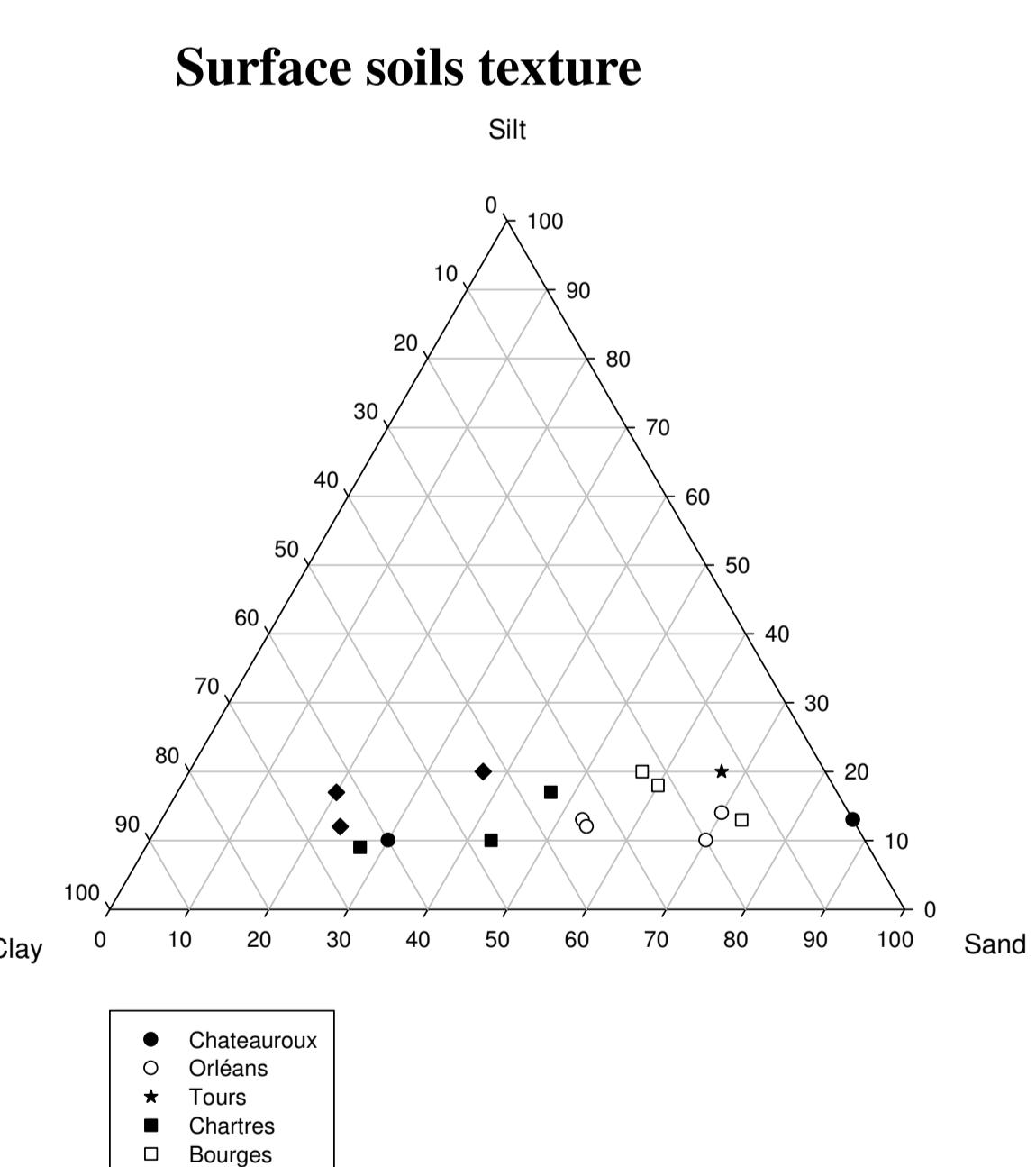
Material and methods

The microbial biomass and community level physiological profiles were determined by using the MicroResp™ system in topsoils. Surface soil samples (0-20 cm) were also evaluated for physico-chemical characteristics such as the organic carbon and nitrogen concentrations, conductivity and pH together with their structure and texture and other soil physical parameters.



Results

- Large green area (type 1): Lacustrian Limestone (Oligocene)
Parc de l'Arrou, Blois
- Neighborhood green area (type 2): Flint clay
Parc Central, Chartres
- Historical park (type 3): Sand and lacustrian limestone (Eocene)
Parc Pasteur, Orléans
- Semi-natural area and woodland (type 4): Jurassic Limestone and marls
Prairie St-Gildas, Châteauroux
Jardin Lazenay, Bourges
- Family gardens (type 5): Cretaceous sup. chalk and sands
Jardins familiaux de la Bergeonnerie, Tours

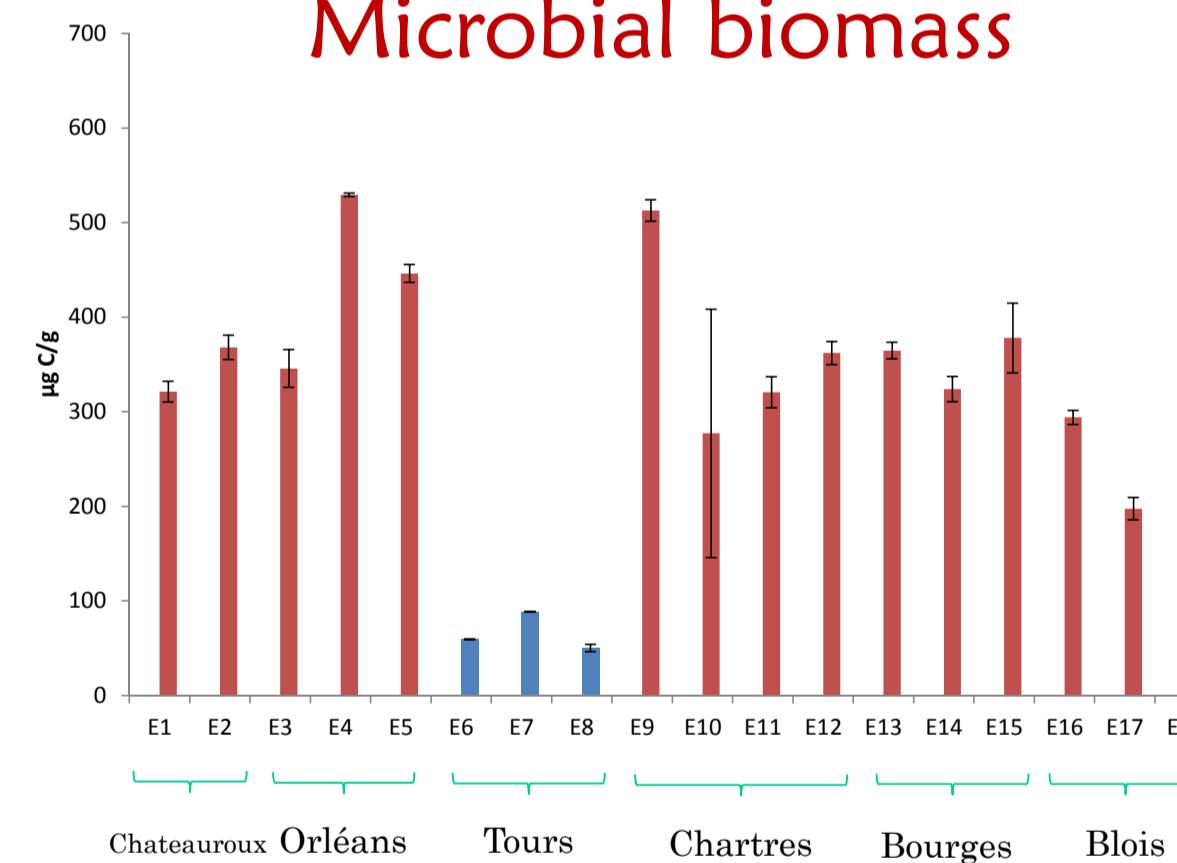


Physico-chemical characteristics of the surface soils

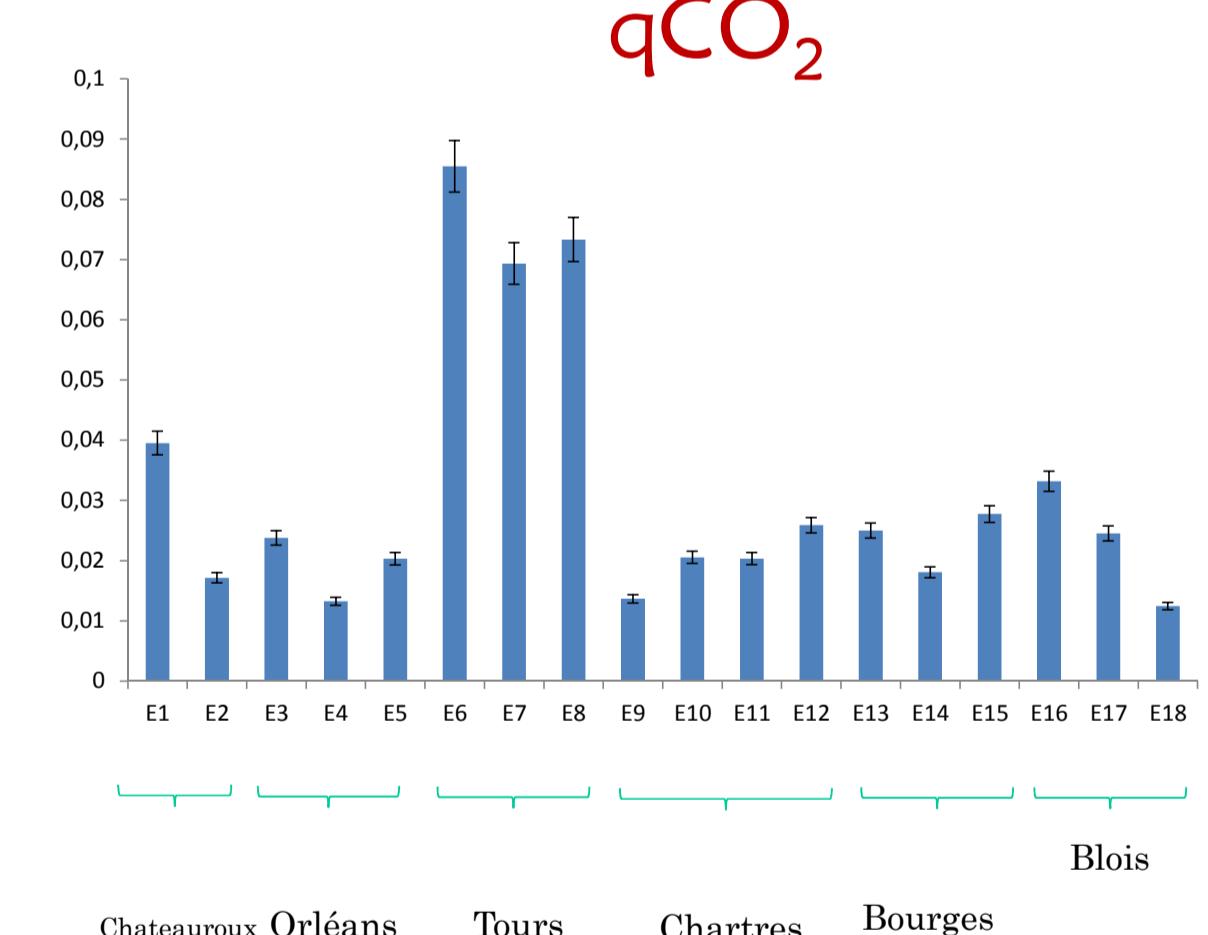
	Chateauroux	Orléans	Tours	Chartres	Bourges	Blois
pH eau	7,1	7,3	7,8	7,6	7,6	7,3
Corga g/kg sol	25,5	69,6	56,6	13,6	30,2	21,7
N g/kg sol	5,1	4,81	3,36	3,6	6,9	5,9
C/N	5,0	14,5	16,8	3,8	4,4	3,7
Mg++ ex. (cmol/kg)	16,97		8,13	8,25	8,48	
K+ éch. (cmol/kg)	12,18		5,17	2,76	6,08	
Ca++ ex. (cmol/kg)	153,9		91,03	2213	153,8	

Microbial parameters

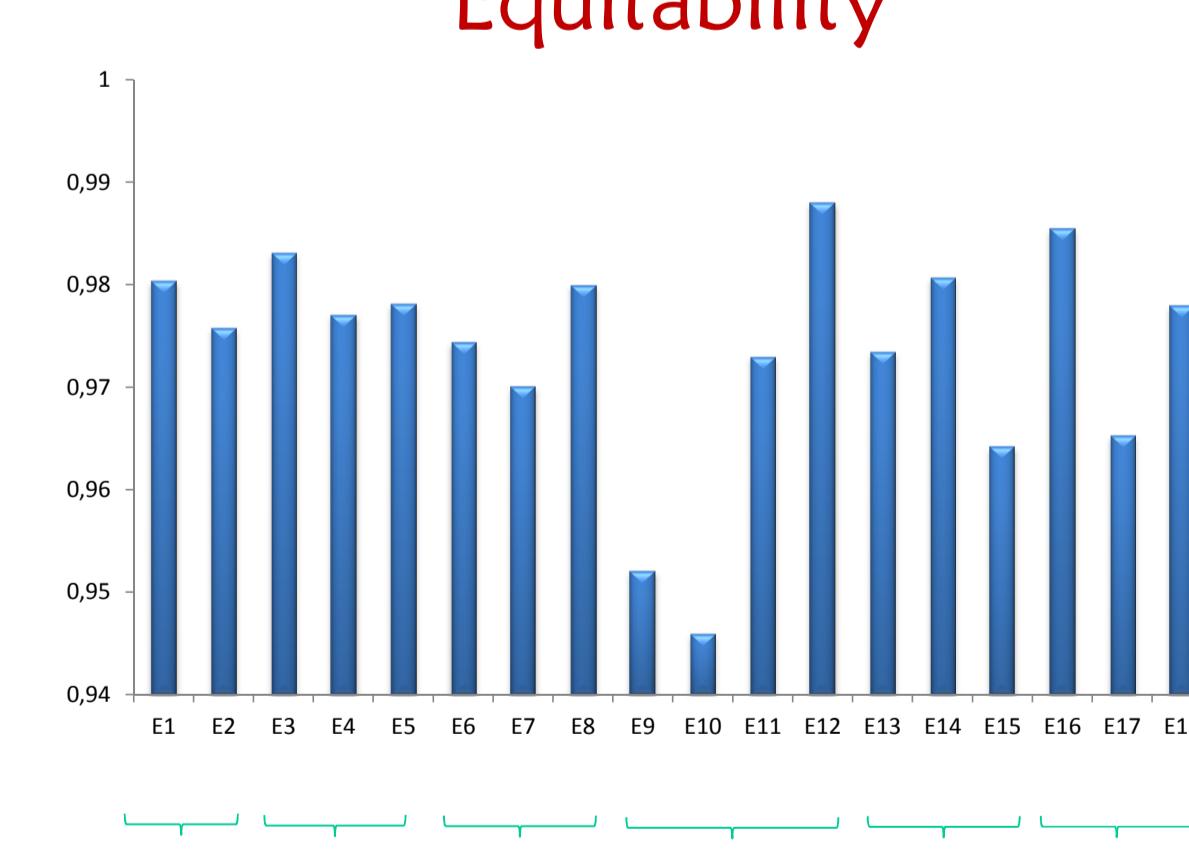
Microbial biomass



qCO₂



Equitability



Conclusion

Results from this study showed that except for one site the microbial biomass for all samples was high. Metabolic quotients (qCO₂) were in contrast variable for the different parks whether Shannon diversity indexes were quite similar for all the samples. The soil ecosystem 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 the influence of various gardening practices and geological contexts. .