



Rehabilitation of microbial patrimony with *Miscanthus x giganteus* crops on polluted soils

Emilie Bourgeois, Samuel Dequiedt, Mélanie M. Lelievre, Isabelle Lamy,
Folkert F. van Oort, Pierre-Alain Maron, Lionel Ranjard

► To cite this version:

Emilie Bourgeois, Samuel Dequiedt, Mélanie M. Lelievre, Isabelle Lamy, Folkert F. van Oort, et al..
Rehabilitation of microbial patrimony with *Miscanthus x giganteus* crops on polluted soils. 1. Global
Soil Biodiversity Initiative Conference (GSBI), Dec 2014, Dijon, France. 705 p., 2014. hal-02739862

HAL Id: hal-02739862

<https://hal.inrae.fr/hal-02739862>

Submitted on 2 Jun 2020

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.

THE FIRST GLOBAL SOIL BIODIVERSITY CONFERENCE

Assessing soil biodiversity and role in ecosystem services



GLOBAL
SOIL BIODIVERSITY
INITIATIVE

Palais des Congrès, Dijon, France

2-5 DECEMBER 2014

THE FIRST GLOBAL SOIL BIODIVERSITY CONFERENCE

December 2-5, 2014, Dijon, France

Book of Abstracts

PROGRAM AND ABSTRACTS

THE FIRST GLOBAL **SOIL BIODIVERSITY** **CONFERENCE**



GLOBAL
SOIL BIODIVERSITY
INITIATIVE

December 2-5, 2014

Dijon – France

[P1.038]

Rehabilitation of microbial patrimony with *Miscanthus x giganteus* crops on polluted soils

E. Bourgeois^{*1}, S. Dequiedt¹, M. Lelievre¹, I. Lamy², F. van Oort², P.A. Maron¹, L. Ranjard¹
¹INRA Dijon, France, ²INRA Versailles, France

The discharge of urban waste water on farm land has led to a widespread introduction of pollutants into our environment, locally causing acute and diffuse contamination of soils. As a consequence, contaminated soils are unsuitable for crop production and need rehabilitation. One strategy is the establishment of energy crops such as *Miscanthus x giganteus*, a C4 grass used for biofuel production. Although the economical potential of this crop is known, its effects on soil biological properties remain unclear.

The aim of this study was to assess the effects of *Miscanthus* perennial cropping on the microbial properties in a contaminated soil. The work is based on an experimental real field site close to Paris irrigated for more than hundred years by raw wastewater (Pierrelaye, France). Soil microbial communities were characterized in terms of abundance, diversity and composition with molecular tools (soil DNA extraction, estimation of molecular biomass and high throughput sequencing of 16S and 18S ribosomal genes). The impact of perennial crops on microbial communities was assessed by (a) a synchronic study comparing communities between a field under *Miscanthus* for four years and a field managed under conventional cereal cropping (tillage, crop rotations); and (b) by a diachronic study monitoring communities during a two years-period of growth of *Miscanthus* following implantation.

Our results showed that the composition of the microbial community at the site was indicative of polluted state of the soil, with populations involved in PAH and hormone degradations. Perennial cropping significantly increased bacterial and fungal diversity, richness and equitability. Such perennial cropping stimulated bacterial and fungal *genera*, known to live in association with roots and/or to degrade easily organic matter via copiotrophic attributes. The establishment of *Miscanthus* appears as a good strategy to stimulate microbial resources in polluted sites and favorable for their rehabilitation.

Keywords: microbial diversity, rehabilitation, polluted soil, miscanthus