



HAL
open science

Characterization of denitrification gene clusters of soil bacteria via a metagenomic approach

Sandrine Demanèche, Laurent L. Philippot, Maude M David, Elisabeth Navarro, Timothy Vogel, Pascal Simonet

► **To cite this version:**

Sandrine Demanèche, Laurent L. Philippot, Maude M David, Elisabeth Navarro, Timothy Vogel, et al.. Characterization of denitrification gene clusters of soil bacteria via a metagenomic approach. 10. Symposium on Bacterial Genetics and Ecology - Coexisting on a Changing Planet, Jun 2009, Uppsala, Sweden. hal-02753844

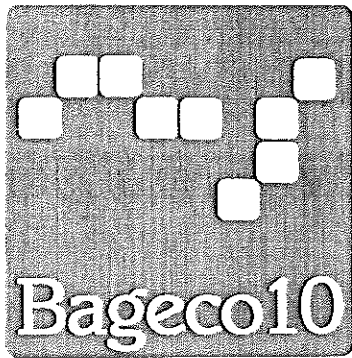
HAL Id: hal-02753844

<https://hal.inrae.fr/hal-02753844v1>

Submitted on 3 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.



BAGECO 10

Bacterial Genetics and Ecology – Coexisting on a Changing Planet

15–19 June 2009 • Uppsala • Sweden

Program & Abstract



Swedish University of
Agricultural Sciences



UPPSALA
UNIVERSITET



We thank all our sponsors for their contribution!

Gold sponsors



The Swedish Research Council for Environment,
Agricultural Sciences and Spatial Planning



Swedish University of
Agricultural Sciences



Silver sponsors



Exhibitors



Local Organizing Committee

Professor Janet Jansson

Department of Microbiology, Swedish University of Agricultural Sciences,
Uppsala, Sweden (janet.jansson@mikrob.slu.se)
Senior Staff Scientist, Lawrence Berkeley National Laboratory, Berkeley, CA,
USA (jjansson@lbl.gov)

Stefan Bertilsson, Uppsala University

Susanne Broqvist, SLU

Sara Hallin, SLU

Conference Secretariat

Academic Conferences

SLU & Uppsala University in cooperation

Tel: +46 18 67 20 84

e-mail: bageco@slu.se

CHARACTERIZATION OF DENITRIFICATION GENE CLUSTERS OF SOIL BACTERIA VIA A METAGENOMIC APPROACH

Sandrine Demanèche¹, Laurent Philippot², Maude M. David¹, Elisabeth Navarro^{1,3}, Timothy M. Vogel¹ and Pascal Simonet¹

¹ Environmental Microbial Genomics Group, Laboratoire AMPERE, UMR CNRS 5005, Ecole Centrale de Lyon, Université de Lyon, 36 avenue Guy de Collongue, 69134 Ecully cedex, France

² Microbiologie des Sols-Géosols UMRA 111, CMSE, Institut National de la Recherche Agronomique, 21065 Dijon cedex, France

³ Laboratoire des Symbioses Tropicales et Méditerranéennes, UMR 113 IRD-CIRAD-SupAgro-UM2, Campus de Baillarguet, 34398 Montpellier cedex 5, France.

Screening of metagenomic DNA libraries to detect clones whose inserts contain genes of interest is one of the technical challenges related to the development of the metagenomic approach.

A technique was developed in which the 77 000 clones of a metagenomic library are spotted on high-density membranes and hybridized with a probe solution consisting of a mixture of oligonucleotides complementary to 14 different genes. The pool of targeted genes included those associated with functions as wide as denitrification, antibiotic resistance, and dehalogenation.

After hybridization, 134 positive clones were detected out of the 77 000 tested, thus providing a drastic selection process. Positive clone DNA was pooled and pyrosequenced, and sequences compared (BLAST) to those obtained by 454FLX pyrosequencing of the original extracted metagenomic DNA.

In the case of the denitrification genes, contig assembly with bioinformatics tools produced 5 contigs containing *nirS*, 4 contigs containing *nirK*, 2 contigs containing *nosZ* and 1 contig containing both *nirK* and *nosZ*. This study demonstrates the potential of metagenomic approaches to characterize functional genes present in small populations (<5%) of the soil microbial community.