



Temporal Evolution of Bacterial Endophytes Associated to the Roots of *Phragmites australis* Exploited in Phytodepuration of Wastewater

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OPEN ACCESS

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Specialty section:

This article was submitted to
Microbiotechnology,
a section of the journal
Frontiers in Microbiology

Received: 27 March 2020

Accepted: 25 June 2020

Published: 17 July 2020

Citation:

Vassallo A, Miceli E, Fagorzi C, Castronovo LM, Del Duca S, Chioccioli S, Venditto S, Coppini E, Fibbi D and Fani R (2020) Temporal Evolution of Bacterial Endophytes Associated to the Roots of *Phragmites australis* Exploited in Phytodepuration of Wastewater. *Front. Microbiol.* 11:1652. doi: 10.3389/fmicb.2020.01652

Improvement of industrial productions through more environment-friendly processes is a hot topic. In particular, land and marine environment pollution is a main concern, considering that recalcitrant compounds can be spread and persist for a long time. In this context, an efficient and cost-effective treatment of wastewater derived from industrial applications is crucial. Phytodepuration has been considered as a possible solution and it is based on the use of plants and their associated microorganisms to remove and/or transform pollutants. In this work we investigated the culturable microbiota of *Phragmites australis* roots, sampled from the constructed wetlands (CWs) pilot plant in the G.I.D.A. SpA wastewater treatment plant (WWTP) of Calice (Prato, Tuscany, Italy) before and after the CW activation in order to check how the influx of wastewater might affect the resident bacterial community. *P. australis* specimens were sampled and a panel of 294 culturable bacteria were isolated and characterized. This allowed to identify the dynamics of the microbiota composition triggered by the presence of wastewater. 27 out of 37 bacterial genera detected were exclusively associated to wastewater, and *Pseudomonas* was constantly the most represented genus. Moreover, isolates were assayed for their resistance against eight different antibiotics and synthetic wastewater (SWW). Data obtained revealed the presence of resistant phenotypes, including multi-drug resistant bacteria, and a general trend regarding the temporal evolution of resistance patterns: indeed, a direct correlation linking the appearance of antibiotic- and SWW-resistance with the time of exposure to wastewater was observed. In particular, nine isolates showed an interesting behavior since their growth was positively affected by the highest concentrations of SWW. Noteworthy, this study is among the few investigating the *P. australis* microbiota prior to the plant activation.

Keywords: *Phragmites australis*, phytodepuration, wastewater, endophytes, antibiotic resistance, metal resistance