



## HARNESSING PLANT GROWTH PROMOTING FEATURES FOR THE RESTORATION OF AN URBAN SOIL IN MILAN

Castiglione S<sup>1,2\*</sup>, Gentile A<sup>1,2</sup>, Di Stasio L<sup>1,2</sup>, Oliva G<sup>1</sup>, Tangredi D.N.<sup>1</sup>, Piccolo P.<sup>1</sup>, Guarino F.<sup>1,2</sup>, Cicutelli A.<sup>1,2</sup>, Vigliotta G.<sup>1,2</sup>

\*lead presenter: scastiglione@unisa.it

<sup>1</sup>Department of Chemistry and Biology “A. Zambelli”, University of Salerno, Fisciano, 84084, Italy

<sup>2</sup>NBFC, National Biodiversity Future Center, Palermo, 90133, Italy

The recovery of degraded and/or contaminated urban soil, by safe green technologies, is one of the challenges of the near future. In this regard, the combined use of plants and microorganisms represent a promising, economical and eco-friendly Nature Based Solutions approach. However, before its application on a real scale, it is also necessary to consider the biodiversity of the area to be redeveloped, including the characterization of the soil and plant microbiota.

In our research, soil and root samples were collected in a contaminated urban area of Milan (Italy) and employed to identify the corresponding culturable and un-culturable bacterial communities. For each sample culturable community was quantified by count plate method, then molecularly characterized by Next-Generation-Sequencing (NGS) analysis, using the DNA Barcoding of the 16S rRNA.

The results highlighted a microbial density (as colony-forming-units  $\text{mg}^{-1}$  DW) of the rhizospheric community 10 to 100 times greater than that of the bulk soil. In contrast,  $\alpha$  – and  $\beta$ - biodiversity analysis revealed greater biodiversity in the case of the bulk soil. Three hundred bacterial strains were purified to homogeneity and phenotypically and molecularly identified. They showed tolerance with different pollutants (*e.g.*, heavy metals) but also Plant-Growth-Promoting (PGP) features. In this regard, 28.1% of them produced siderophores, 56.2% solubilized phosphates and 40.0% produced 6-8  $\mu\text{g mg}^{-1}$  DW of indole-3-acetic acid (IAA).

A complete characterization of microbial communities will allow to evaluate either their capability to modify or degrade pollutants, directly or in combination with the available vegetation on site, or the one planted for the environmental restoration, other than identify potential Plant-Growth-Promoting-Rhizobacteria (PGPR) to be used in urban sites which undergo bioremediation and environmental recovery.