Seasonal dynamics of spontaneous vegetation in a Mediterranean quarry soil under waste-derived organic amendment

Mattia Napoletano[1*], Vincenzo Baldi[1,2], Alessandro Bellino[1], Flavia De Nicola[3], Enrica Picariello[3], Antonio Ernesto Detta[4], Daniela Baldantoni[1,2]

*lead presenter: mnapoletano@unisa.it
1 Department of Chemistry and Biology "Adolfo Zambelli", University of Salerno, Via Giovanni Paolo II 132, 84084, Fisciano (SA), Italy
2 National Biodiversity Future Center (NBFC), Piazza Marina 61, 90133, Palermo, Italy
3 Department of Sciences and Technology, University of Sannio, Piazza Guerrazzi, 82100, Benevento, Italy
4 AMER S.r.l., Località Tempa Pilone 55/1, 84033, Montesano sulla Marcellana (SA), Italy

Organic amendment is an effective strategy to restore degraded soils, particularly in heavily impacted Mediterranean regions where climatic conditions exacerbate the scarcity of organic matter and increase the risk of desertification. Improving the soil's chemical, physical and biological properties through amendant applications can facilitate spontaneous revegetation processes, thereby promoting biodiversity and ecosystem functionality. From a circular economy perspective, the use of soil amendants derived from waste materials can also represent a sustainable solution; however, an integrated assessment of the ecological effects on the soil-vegetation system is required. This research, conducted as part of the EMBRACE Project of National Interest (PRIN 2022 PNRR), aims to evaluate the effectiveness of four organic soil amendants — vermicompost produced from marine waste and stabilised sludges, as well as their respective versions enriched with natural zeolites — in promoting the spontaneous revegetation of a Mediterranean quarry substrate. To this end, the seasonal evolution of the structural and functional biodiversity of the herbaceous community over the course of one year was evaluated. The three biodiversity components (species richness, composition and evenness) were estimated through phytosociological surveys. Taxa were identified at species level and data were collected for Ellenberg indices and Raunkiær biological forms. Relative abundances were assessed based on number of individuals, dry biomass and cover, according to Braun-Blanquet's scale. The results demonstrated the effectiveness of all soil amendants compared to untreated controls in terms of abundance measures, particularly biomass and cover, even in the short term, and a treatment-dependent effect in shaping plant community structure.