IECPS 2024 Conference

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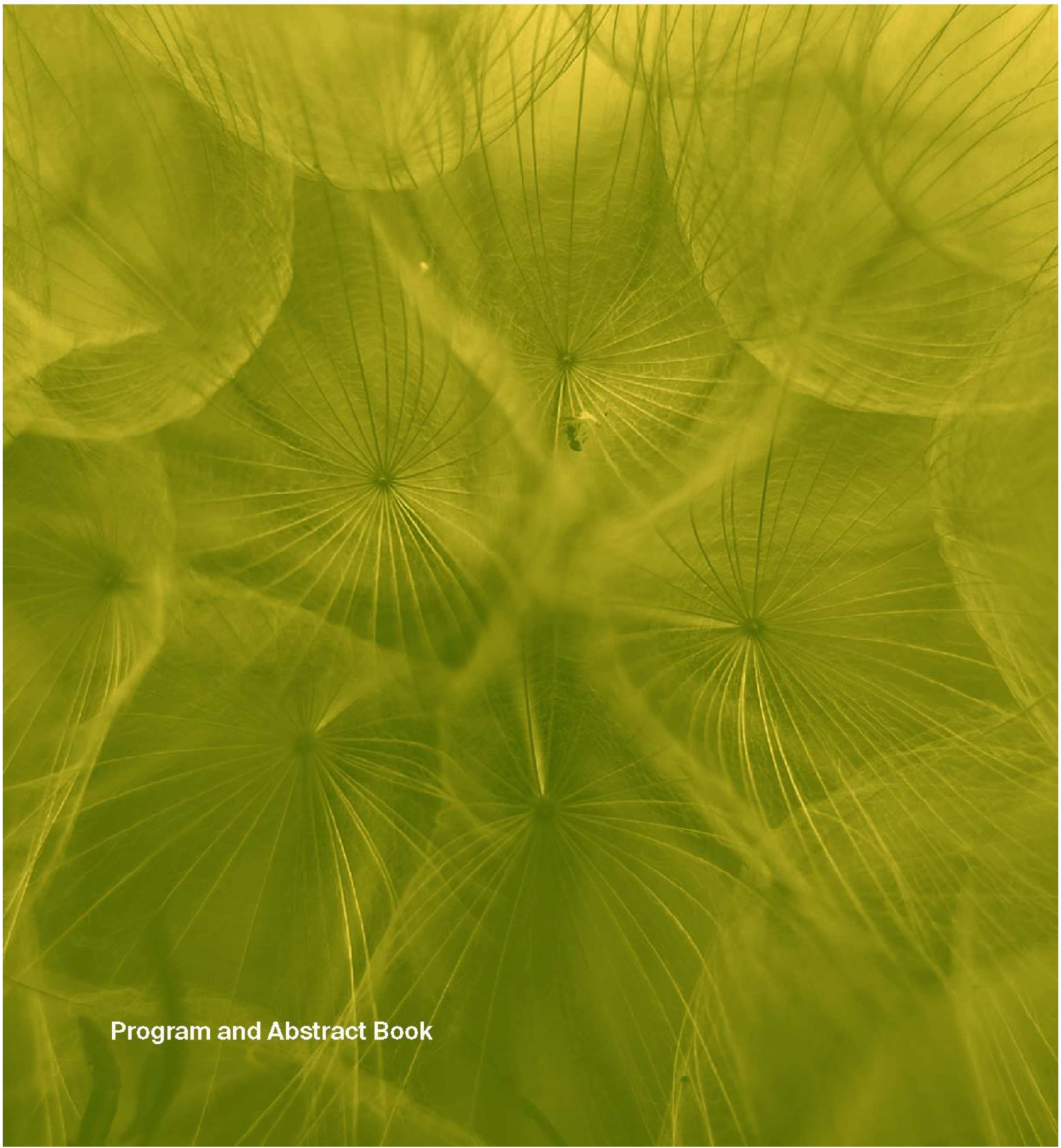
15–17 January 2024 | Online



Program and Abstract Book

The 3rd International Electronic Conference on Plant Sciences

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sciforum-079944: Soil Microalgae and Cyanobacteria Characterization in a Differentially Managed Olive Orchard

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Soil microalgae and cyanobacteria offer potential benefits for sustainable and resilient agriculture. Fixing the CO_2 level through photosynthesis, they contribute to the enrichment of the soil in biomass and organic carbon, as well as to the enhancement of its aggregation and porosity. Being in synergic interaction with other soil microorganisms, they exchange nutrients and contribute to make the plants' development microenvironment more hospitable, through bioactive compounds production promoting their growth, as well as through the prevention of pathogens. Moreover, (N)-fixing cyanobacteria provide nitrogen, an essential nutrient for plant growth. In order to explore the potential biofertiliser, biostimulatant and biopesticide actions of microalgal communities in agricultural soils, the aim of this research was to characterize soil microalgae and cyanobacteria in a Mediterranean olive orchard located in a semi-arid climate (Ferrandina, Basilicata, Italy), with differentially managed sustainable (Smng) or conventional (Cmng) land use for 22 years. The Smng soils had significantly higher algae (2.210×104 g^{-1} soil in Smng and 0.872×104 g^{-1} soil in Cmng), and the same trend was observed for cyanobacteria (0.408×102 g^{-1} soil in Smng and 0.240×102 g^{-1} soil in Cmng). Using light microscopy, with two selective liquid media (with and without N), microalgae and cyanobacteria dominant species were observed and identified by morphological features; Trebouxia, Euglena, Chaetophora green algae genus and Cymbella diatom genus were detected in the conventionally managed soil samples, whereas Anabaena cyanobacterial genus, Oedogonium and Scenedesmus green algae genus and Navicula and Pinnularia diatom genus were identified in the sustainably managed soil samples. Their metabolic activities and the profiling of metabolites were also evaluated; the type of soil management approach produced a distinctive metabolic profile, suggesting a specific influence of the agriculture management type used on the metabolic activity of the soil algae and cyanobacteria. This study was carried out within the Agritech National Research Center and received funding from the European Union Next-GenerationEU (PIANO NAZIONALE DI RIPRESA E RESILIENZA (PNRR)—MISSIONE 4 COMPONENTE 2, INVESTIMENTO 1.4—D.D. 1032 17/06/2022, CN00000022). This manuscript reflects only the authors' views and opinions, neither the European Union nor the European Commission can be considered responsible for them.

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