Book of Abstracts

Agritech - Spoke 2 Mid-Term Meeting

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Agritech – Spoke 2

ORAL PRESENTATIONS

Please note that the abstracts are sorted by the last name of the presenting author.

Belowground features in agrosystems: task 2.1.2 activities

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Soil and belowground plant structures play a key role in resilience, productive and environmental functions of agroecosystems. Among activities of task 2.1.2 ecosystem services of hypogean plant structures and soil microbial communities are addressed by the University of Basilicata unit through microcosm, mesocosm and field experiments and methodological work on segetal species.
Five mesocosm experiments were set up with the specific aims of investigating: root architecture and the capability of roots to produce sheaths at the soil-plant interface as a trait useful for wheat resilience and rhizosphere relations in unreliable water supply conditions; screening belowground traits diversity for soft wheat breeding; soil physical-chemical properties related to earthworms; root architecture and exudates of pure and consociated legumes and grasses (collaboration within T2.1.2 units with the university of Catania). A collaboration with University of Napoli Agritech units is aimed at ongoing characterizing belowground plant products with 13C–CPMAS NMR in solid and liquid state mass spectrometry and gas/liquid chromatography.
We conducted methodological work on rhizosheath, and published a method aimed at incorporating root features in the agronomic evaluation of organic materials: we propose root hairs as indicators of fertilizer and amendment quality and we developed a GIS (Geographic Information System)-based procedure to this end.
We also worked on two field experiments, one specifically set up on indicators of belowground features of crops and pollinator-strip herbaceous plants, the other for the study of bioindicators based on soil microalgae and cyanobacteria (SM&C) communities in an olive orchard managed with sustainable (S_{mng}) or conventional (C_{mng}) techniques for 22 years. Among results the S_{mng} vs. C_{mng} soils had significantly higher microalgae ($2.210 \cdot 10^4$ vs. $0.872 \cdot 10^4$ g^{-1} soil), and cyanobacteria ($0.408 \cdot 10^2$ vs. $0.240 \cdot 10^2$ g^{-1} soil). Dominant species detected by light microscopy and 16S/18S/ITS rDNA metagenomics were *Trebouxia*, *Euglena*, *Chaetophora* green algae genuses, and the diatom *Cymbella* in C_{mng} and *Anabaena* cyanobacterial genus, *Oedogonium* and *Scenedesmus* green algae, and the diatoms *Navicula* and *Pinnularia* in S_{mng}. Soil management caused different profiles of intra- and extracellular SM&C metabolites, with an up-modulation in S_{mng} of the biosynthetic pathways of secondary metabolites, hormones, fatty acids and lipid, some with growth-promoting properties.
Results will aim at providing management guidelines, indicators for agrosystem evaluation and criteria for the choice of crops and wildplant/pollinator strips based on belowground ecosystem services. Activities contribute to key exploitable results of Spoke 2 such as improved knowledge on soil biodiversity and functionality, and protocols and bioindicators for evaluating the impact of agroecological strategies on farmland biodiversity.

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TASK 2.1.2