



SECOND JOINT MEETING ON SOIL AND PLANT SYSTEM SCIENCES

BOOK OF ABSTRACTS

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SECOND JOINT MEETING ON SOIL AND PLANT SYSTEM SCIENCES

The soil-plant-environment nexus and emerging challenges across terrestrial ecosystems

Società Italiana di Chimica Agraria (SICA)
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The organizing committee
Biogeochemistry & Soil Science Group
UNITO, DISAFA



Oral

Physical structure and chemical quality of soils in G3 kiwifruit orchards differentially managed

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In the last years, a new physiopathy that hits kiwifruit plants (Kiwifruit Vines decline Syndrome; KVDS) is emerging. We hypothesize that soil compaction and asphyxia could have a priming effect in the emergence of KVDS. On this basis, we characterized soils from three areas of a kiwifruit orchard located in Latina (Central Italy): one with plants showing severe symptoms of KVDS (Mfield), another with plants having intermediate symptoms (Ifield), and the last with healthy plants (Cfield). Soils were characterized physically showing a gradient of compaction, clay/silt content and water content, with the highest values in M and the lowest in C, while not significant differences were found regarding the content of chemical parameters (e.g., organic matter, acidity, and macro- and micro-nutrients). From the analysis of telluric gases it emerged that, following the onset of waterlogging in the soil, the redox potential, a parameter that indicates reducing conditions and so inversely related to oxygen concentration, was found to be significantly lower in Mfield. Higher concentrations of CO₂ and CH₄, two indicators of anoxic soil conditions were found in Mfield. The microscope analysis of the soils showed that Mfield soils had fewer macropores, whose number is directly related to the oxygen content. To improve the physical qualities of the soil and ensure an optimal growth of kiwifruit roots, an innovative management of the soil is necessary, including the application of external organic matter up to a depth of 40 cm, the use of decompacting cover crops (e.g., *Rafanus* spp.), reducing soil compaction and in order to provide the oxygen necessary to mitigate the effects of potentially pathogenic microorganisms, many of which proliferate in anaerobic environments. An adequate soil management is also aimed at facilitating the horizontal and vertical movements of soil water. Our activity will be oriented to the optimization of root and canopy management to balance the relationship between roots and leaves and improve the ability of plants to recover from this physiological decline. Particularly in kiwifruit, where waterlogged and compacted soils are a serious issue, soil physico-chemical quality has a key role not only in terms of fertility and productivity, but it also important to assure plant growth and production.

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