



SECOND JOINT MEETING ON SOIL AND PLANT SYSTEM SCIENCES

BOOK OF ABSTRACTS

SPSS2021 

20-23 September 2021 | Online - Torino, Italy

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)
Società Italiana di Pedologia (SIPe)
Società Italiana della Scienza del Suolo (SISS)



20-23 September 2021 | Online - Torino, Italy



The organizing committee
Biogeochemistry & Soil Science Group
UNITO, DISAFA



Poster

Soil anoxic conditions cause structural alterations of G3 kiwifruit roots

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Italy, the third largest producers of kiwifruit producing in the world, has lost 10% of its production in recent years because of the spread of the Kiwifruit Vine Decline Syndrome (KVDS / moria), which leads to a gradual deterioration of the plant that starts from the roots. KVDS symptoms have been observed in different areas and have often been associated with water stagnation and anoxic soil conditions, resulting in root rot. Kiwifruit is a species adapted to hot-humid environments and requires large amounts of water. At the same time, it is also extremely sensitive to waterlogging, whose deleterious effects can arise if a rapid drainage of excess water does not occur in the soil, with the consequent establishment of soil anoxic conditions. Kiwifruit roots, and in particular meristems, have a high oxygen consumption and are therefore more sensitive to anoxia. Therefore, at low oxygen concentrations, they are the first tissues to be damaged. Early symptoms associated with KVDS are root browning, disappearance of absorbent roots, morphological and anatomical alterations, and tissue rupture and decomposition, resulting in blockage of xylem vessels, followed by late symptoms, such as leaf necrosis, shoot wilting and, in its acute phase, plant death. Unfortunately, the causes of KVDS are still unknown. On this basis, an experimentation was started in a kiwifruit orchard (*Actinidia chinensis*, var. *deliciosa*) affected by KVDS and located Latina (Lazio Region, Italy), in order to investigate the potential causes and suggest solutions to counter this physiopathy. Root samples from healthy plants were collected and compared with samples from plants with KVDS. Macroscopically, the roots affected by KVDS were rotting and with reddish sections, showing a loss of rhizodermis and cortical parenchyma. Damage to the root system was observed, with tissue breakdown and decomposition, rhizodermis flaking, cortical area with loss of cell turgor, initial decay of the stele, and clear detachment of the cortex from the central conducting tissues. Waterlogging and the resulting decrease in oxygen around the roots had a negative, rapid and significant effect on the physiological state and on kiwifruit growth. To ensure optimal growth of kiwifruit plant, a sustainable and innovative soil management will be applied to reduce compaction and increase aeration.

With the support of the Zespri Innovation project "Water and soil management of G3 in Italy" Gi21020.

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