

FIRST JOINT MEETING ON SOIL AND PLANT SYSTEM SCIENCES (SPSS 2019)

Natural and Human-induced
Impacts on the Critical Zone and
Food Production

CIHEAM BARI, ITALY
23-26 SEPTEMBER 2019

In collaboration with



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First Joint Meeting on Soil and Plant System Sciences (SPSS 2019)

Natural and Human-induced Impacts on the
Critical Zone and Food Production

PROGRAMME AND ABSTRACTS

CIHEAM Bari, Italy
23-26 September 2019

<https://SPSS2019.azuleon.org>

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PIII.23 Elio Padoan, E. Montoneri, G. Fabbri, P. Quagliotto, A. Baglieri, V. Boero, M. Negre
Ozonization of fermented municipal biowaste to produce value added products

PIII.24 Marco Parlavecchia, E. Loffredo

Sorption-desorption of the fungicide metalaxyl-M onto a silty soil not amended and amended with biochar and vermicompost

PIII.25 Maria Vittoria Pinna, A. Pusino

Which is the biochar most effective in mitigating pollution due to Lumax®?

PIII.26 Salvatore Rapisarda, P. Gioacchini, D. Montecchio, C. Ciavatta, C. Marzadori

Effects of biodegradable plastic on soil functionality

PIII.27 Pere Rovira, C. Bellera, A. Sala

Commercial humic products: do they act as activators of soil microbial activity?

Session IV: Plant responses to natural and human-induced drivers

PIV.1 Francesco Bigaran, D.C. Weindorf, L. Varone, L. Gratani

Characterization of heavy metal pollution in Rome, Italy

PIV.2 Andrea Ertani, S. Nardi, O. Francioso, D. Pizzeghello, A. Tinti, M. Schiavon

Variation in metabolite production and physiological responses of *Zea mays* L. plants in response to application of commercial lignohumates

PIV.3 R. Lizcano Toledo, C. Lerda, Maria Martin, R. Gorra, I. Mania, B. Moretti, D. Sacco, E. Barberis, D. Said Pullicino, L. Celi

Effects of inorganic and organic P availability on N fixing capacity of *Vicia villosa*

PIV.4 F. Trevisan, Mauro Maver, D. Bulgarelli, S. Cesco, T. Mimmo

Characterization of the alkaloid hordenine and its precursors in roots of a modern barley cultivar

PIV.5 Giuseppe N. Mezzapesa, A. Ghannouchi, A. Trani, D. Mondelli, F. Valerio, E.V. Perrino

Ecological variability in 4 wild species of Lamiaceae in the Apulia Region: effects on chemical composition and biological activities of the essential oils

PIV.6 Begoña Miras-Moreno, P. Ganugi, V. Terzi, L. Lucini, M. Trevisan

The impact of selective and non-selective herbicides on the metabolism of tomato plants

PIV.7 V. Cavallaro, M. Caschetto, M. Maghrebi, G.A. Sacchi, Fabio Francesco Nocito

Sulfur isotope mass balance reveals $^{32}\text{S}/^{34}\text{S}$ fractionation during sulfate uptake and translocation in rice

PIV.8 N. Negrini, S. Morgutti, L. Espen, Bhakti Prinsi

Variation in phenolic composition and antioxidant properties in leaves and flowers of green and red basil (*Ocimum basilicum* L.)

PIV.9 Ivana Puglisi, V. Barone, F. Fragalà, P. Stevanato, G. Concheri, A. Baglieri

Effect of microalgal extracts from *Chlorella vulgaris* and *Scenedesmus quadricauda* on germination of *Beta vulgaris* seeds

PIV.10 M. Santin, A. Castagna, M.-T. Hauser, M.B. Miras Moreno, L. Lucini, Annamaria Ranieri

Let the sunshine in! Post-harvest UV-B radiation is able to affect the secondary metabolism in flesh of peach fruit

PIV.14

Soil quality and fertility in an olive orchard managed for 20 years with differential agronomic systems

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Climate change, in terms of increased temperature and extreme precipitation regimes, will have agricultural consequences due to the interrelations between climate, land and water use, soil degradation and landscape changes. Conservation agriculture offers new chances to mitigate the effects of climate change. In sustainable agro-forestry systems, management practices are able to increase carbon (C) inputs into the soil and possibly reduce GHGs emissions due to some revised field operations (e.g., irrigation techniques, use of recycled water, pest and disease management, fertilization, soil and plant farming systems). Carbon enrichment increases biological activities by improving soil structure, as well as the soil moisture and nutrient contents, that are beneficial to plant growth and production. This study reports results on the effects of changed soil practices of an experimental olive orchard from a conventional management (C_{mng} : soil tillage, mineral fertilizers, burning of pruning residues) to a sustainable management (S_{mng} : no-tillage, pruning residues, cover crop retention, and compost application) on soil quality/fertility and soil/plant microbiota. Results show that a 20-year period of S_{mng} (including C inputs at a mean rate of 8-9 t C ha⁻¹ year⁻¹) caused increases in soil organic carbon (SOC) from 1.0-1.3% w/w up to 1.7-2.0% in the topsoil, and in soil water retention (up to 40% more) and permeability (from 13 to 160 mm H₂O day⁻¹). The adoption of a correct irrigation management had a key role in the potential role of orchards in C sequestration (soils become from C sources to C sinks) and in the consequent greenhouse effect mitigation. Indeed, compared to dry areas, wetted soils generally had a higher microbial respiration and SOC mineralization, and a faster bacterial C and N turnover. Finally, the S_{mng} brought beneficial effects on plant yield, that was improved by 30-50%, compared to C_{mng} , and on the levels of a wide range of plant protective secondary metabolites in the xylem sap. The endogenous C additions and the different irrigation systems also affected the reserves of soil nutrients (N, P, K, Ca, Mg) and CO₂ soil emission. Promoting cost-effective sustainable land use strategies can avoid SOC decline, soil erosion and soil degradation, with consequent benefits in terms of soil quality parameters. This is essential for sustaining and improving yield and quality of olive plants.