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

CIHEAM BARI

IHSS NATURAL ORGANIC MATTER RESEARCH

Organized by

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SIPe Società Italiana di Pedologia Italian Society of Pedology

SISS Società Italiana della Scienza del Suolo

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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Programme

9:00-13:00 **Registration**

13:00-14:00 **Light lunch**

14:00-14:30 **Opening ceremony**

Session I: Natural and agricultural soil systems

Chairs: Tommaso Chiti and Antonio Gelsomino

14:30-15:15 **Invited speaker**

Takashi Kosaki *President, International Union of Soil Sciences (IUSS)*
Harmonization of natural and agricultural soil systems for sustaining society

15:15-15:30 **Antonello Bonfante, A. Basile, J. Bouma**
Exploring the effect of varying soil organic matter contents on current and future moisture supply capacities of six Italian soils

15:30-15:45 **Ronen C.A. Francis, M.N. Wuddivira, G.A. Gouveia, D. Bramble**
Structural and hydraulic feedbacks in humid tropical soils amended with aglime and organic residues

15:45-16:00 **G. Brunetti, Francesco De Mastro, A. Traversa, F. Nigro, C. Cocozza**
Impact of different soil management on soil microbial community

16:00-16:30 **Coffee break**

16:30-16:45 **Andrea Ciurli, D. Sega, G. Renella, L. Giagnoni, R. Pastorelli, A. Zamboni, Z. Varanini**
$FePO_4$ nanoparticles as a source of nutrients: effects on plant transcriptome and on soil microbial communities and functions

16:45-17:00 **Eleonora Grilli, M. Bastidas, M. Bijl, S. Carvalho, E. Coppola, T. La Mantia, C.A.R. Machado, M. Mastrocicco, M. Rossana, F. Pulido, M.J. Roxo, F.A. Rutigliano, P. Quatrini, A. Sarmento, S. Castaldi**
Drivers of soil quality in agro-ecosystems and managed forested lands of Mediterranean areas under increasing climatic risk

17:00-17:15 **Simone Priori, R. Barbetti, L. Meini, A. Morelli, A. Zampolli, L. D'Avino**
Field scale economic land evaluation based on spatial variability of soil functions

17:15-18:00 **Poster presentations (Session I)**

18:00-19:00 **General Assembly (SISS)**

8:30-18:00 **Pedological and cultural excursion**

18:00-19:00 **General Assembly (SIPe)**

Session II: Soil pollution and food safety

Chairs: Valeria Ancona and Paola Castaldi

9:00-9:45 **Invited speaker**

Fabio Terribile *University of Naples "Federico II", Italy*
An operational tool to challenge land take at the European scale

9:45-10:00 **Antonio G. Caporale, P. Adamo**
In vitro bioaccessibility of potentially toxic elements in particle-size fractions from an industrial soil of south Italy

10:00-10:15 **Erika Di Iorio, L. Circelli, C. Colombo, A. Paltseva, M. Deeb, Z. Cheng**
Use of Vis-NIR Spectroscopy to predict the impact of different amendments on Pb and As bioaccessibility in urban soils

10:15-10:30 **Albert Kobina Mensah, B. Marschner, S.M. Shaheen, J. Rinklebe**
Arsenic in an abandoned gold mine spoil in Ghana: effects of pH, geochemical fractionation and potential mobilisation

10:30-11:00 **Coffee break**

11:00-11:15 **Elio Padoan, A.H. Couto, F. Ajmone Marsan**
Potential release of zinc and cadmium in soils contaminated by heavy metals under flooding

11:15-11:30 **Giovanni Garau, A. Porceddu, B. Manunza, P. Castaldi**
Municipal solid wastes as gentle remediation options for the (bio)chemical recovery of As and trace metal-polluted soils

11:30-11:45 **Tommy Pepè Sciarria, S. Zangarini, L. Trombino, F. Adani, F. Tambone**
Phosphorus recovery from liquid fraction of digestates by struvite crystallization

11:45-12:45 **Poster presentations (Sessions II and III)**

12:45-14:00 **Lunch**

Session III: Organic amendments and soil quality

Chairs: Paloma Campos and Claudio Cocozza

14:00-14:45 **Invited speaker**

José María García-Mina Freire *Vice President, International Humic Substances Society (IHSS)*
Discriminating the action of root applied- and foliar applied-humic acid on plant growth

14:45-15:00 **María Teresa Cieschi, M. Caballero-Molada, I.V. Perminova, J.J. Lucena**
Are iron humates slow iron release fertilizers?

15:00-15:15 **Massimo Zilio, F. Tambone, F. Bedussi, F. Adani**
Environmental impact of the use of digestates in agriculture: an open field approach

15:15-15:30 **Daniela Pezzolla, L. Regni, P. Proietti, E. Albertini, S. Ciancaleoni, G. Marozzi, G. Gigliotti**
Agronomic reuse of olive wastewater and changes on soil chemical properties and microbial community

15:30-16:00 **Coffee break**

16:00-16:15 **A. Ioppolo, Armando V. Laudicina, L. Badalucco, A. Micalizzi, F. Saiano, E. Palazzolo**
Citrus hydrolates as natural biostimulants of soil microorganisms

16:15-16:30 **Beatrice Giannetta, R. Balint, D. Said Pullicino, C. Plaza, M. Martin, C. Zaccone**
Redox-driven mineralogical changes in Fe (hydr)oxides across particle-size SOM fractions

16:30-16:45 **Mariia Pukalchik, O. Yakimenko, K. Kydralieva, V. Terekhova**
Artificial intelligence approach to predict changes in biological properties of the heavy metal polluted soils after organic-based amendments addition

16:45-17:45 **General Assembly (SICA)**

18:00 **Transfer to the social dinner venue**

19:30 **Social dinner**

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

Chairs: Ivana Cavoski and Andrea Ertani

9:00-9:45 **Invited speaker**

Philip J. White *Programme Leader, The James Hutton Institute*
Improving nutrient acquisition by plants from the soil

9:45-10:00 **Fabrizio Araniti, M.R. Abenavoli**
Metabolic changes induced by *Cuscuta campestris* Yunck. on the host species *Artemisia campestris* subsp. *variabilis* (ten.) Greuter as a strategy to increase the parasitization success

10:00-10:15 **A. Mannucci, L. Mariotti, Antonella Castagna, M.F. Quartacci, A. Trivellini, A. Mensuali-Sodi, A. Ranieri**
Hormone responses to UV-B irradiation: what happens in leaves and roots of tomato plants?

10:15-10:30 **Emilia Dell'Aversana, M. van Oosten, A. Maggio, P. Woodrow, P. Carillo, G.M. Fusco**
Omeprazole enhances NUE through increased nitrogen uptake and assimilation in corn

10:30-11:00 **Coffee break**

11:00-11:15 **Begoña Miras-Moreno, G. Colla, Y. Rouphael, M. Cardarelli, M. Trevisan, L. Lucini**
Defining the active biostimulant fractions of a plant-derived protein hydrolysate using an integrated molecular fractionation and metabolomics approach

11:15-11:30 **Bhakti Prinsi, L. Brancadoro, O. Failla, L. Espen**
Proteomic changes in the roots of three grapevine rootstocks in response to nitrate availability

11:30-11:45 **L. Zanin, S. Gottardi, W. Biała, R. de Brito Francisco, S. Venuti, F. Valentinuzzi, T. Mimmo, S. Cesco, B. Bassin, M. Jasiński, E. Martinoia, R. Pinton, Nicola Tomasi**
Identification of an isoflavonoid transporter required for the nodule establishment of the *Rhizobium-Fabaceae* symbiotic interaction

11:45-12:45 **Poster presentations (Sessions IV and V)**

12:45-14:00 **Lunch**

Session V: Frontiers in plant and soil sciences

Chairs: Silvia Celletti and Daniel Said Pullicino

14:00-14:45 **Invited speaker**

Yiannis Deligiannakis *President, International Humic Substances Society (IHSS)*
Humic-nanomaterials hybrids as fertiliser-delivery technology and antioxidants

14:45-15:00 **Pellegrino Conte**
Applications of fast field cycling NMR relaxometry in soil science

15:00-15:15 **Leonard Barnabas Ebinezer, G. Arrigoni, S. Trevisan, A. Manoli, P. Carletti, C. Francheschi, S. Quaggiotti, A. Masi**
Unravelling the stimulatory mechanism of APR - a novel Biostimulant: Leveraging transcriptomics and proteomics

15:15-15:30 **Ignazio Allegretta, S. Legrand, M. Alfeld, C.E. Gattullo, M. Spagnuolo, K. Janssens, R. Terzano**
Classification of soil aggregates using SEM-EDX hyperspectral data analysis

15:30-16:00 **Coffee break**

16:00-16:15 **L. Beneduce, C. Plaza, Claudio Zaccone**
Does physical fractionation of SOM pools preserve information about microbial taxa distribution and ecological functions?

16:15-16:30 **Maria Chiara Guerrieri, M. Trevisan, E. Puglisi**
Isolation and phenotypic characterization of extracellular PGPR from tomato plant rhizosphere sampless

16:30-16:45 **Simona Vingiani, P. Adamo, A.G. Caporale, S. De Pascale, L.G. Duri, M. Palladino, A. Pannico, Y. Rouphael**
Sustainable space agriculture using MMS1 Martian soil simulant and compost

16:45 **Closing ceremony**

Proteomic changes in the roots of three grapevine rootstocks in response to nitrate availability

Bhakti Prinsi, L. Brancadoro, O. Failla, L. Espen
Dept Agricultural and Environmental Sciences, Production, Landscape, Agroenergy, Università degli Studi di Milano, Milan, Italy

Although the biochemical mechanisms involved in nitrate assimilation are overall known, especially in herbaceous species, specific information on perennial plants, such as grapevine, remain yet incomplete. Few studies have investigated the root responses to nitrate availability in this species. Considering that grafting practice is widely used in viticulture, the role of rootstock in nitrogen metabolism as well as its effects on scion must be better characterized. In this view, the responses of roots to nitrogen availability, as well as to its fluctuations in the soil, are among the main factors that influence plant growth and productivity from both quantitative and qualitative point of view.
The aim of this study was to analyze the metabolic events occurring in the roots of three grapevine rootstocks, M3, M4 and 1103P, in responses to the addition of 10 mM nitrate, after a period in which the plants were grown in absence of nitrogen.
Firstly, the changes of some biochemical parameters (such as nitrate, sugar and amino acid contents) as well as the evaluation of abundances of nitrate reductase and glutamine synthetases by Western blot analyses were used to define the time course of the induction of nitrogen metabolism in roots. Taken together, the results indicated that in all genotypes the nitrogen metabolism significantly increased after 30 h from the addition of nitrate. Moreover, at this time the comparison among the three genotypes revealed a greater assimilative capacity in 1103P.
To gain a better characterization of the biochemical responses in roots, a proteomic comparison among the three genotypes, in control condition and after 30 h of induction, was conducted. Proteomic analyses were performed by GeLC-MS/MS, a technique by which proteins are purified by SDS-PAGE, in-gel digested, and then identified and quantified by mass spectrometry. Functional classification was made according to the bin hierarchical tree developed by MapMan ontology. Only proteins showing at least a fold change of 40% in abundance (Student's t-test, $p < 0.05$) were considered significantly affected by the treatment. This approach allowed the identification of some hundreds of proteins, with high reliability and good reproducibility, revealing in all genotypes changes of proteins/enzymes involved in nitrogen assimilation as well as in metabolic pathways useful to sustain the requests of carbon skeletons and of energy.