



SOCIETA' ITALIANA DI CHIMICA AGRARIA

PhD Winter School

***Feeding the world: the contribution of research
in agricultural chemistry to sustainable development***

9-12 February 2015, Piacenza, Italy

Organizing Committee: Gian Maria Beone, Luciano Cavani, Stefano Cesco, Claudio Ciavatta, Tanja Mimmo, Roberto Terzano, Marco Trevisan

Book of Abstracts

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Organizing Committee:

Beone Gian Maria - UCSC
Cavani Luciano – UniBO
Cesco Stefano – UniBZ
Ciavatta Claudio – UniBO
Mimmo Tanja - UniBZ
Terzano Roberto - UniBA
Trevisan Marco – UCSC

Chairmen and Coordinators of the Working Groups:

Beone Gian Maria – UCSC
Laudicina Vito Armando - UniPA
Renella Giancarlo – UniFI
Spagnuolo Matteo - UniBA
Terzano Roberto - UniBA

Speakers:

Astolfi Stefania – UniTUS
Cavani Luciano – UniBO
Carminati Andrea - UniGoettingen
Ceccherini Maria Teresa - UniFI
Cocozza Claudio – UniBA
Cozzolino Vincenza – UniNA
Del Buono Daniele – UniPG
D'Imporzano Giuliana – UniMI
Grigatti Marco – UniBO
Lucini Luigi – UCSC
Manoli Chiara – ILSA S.p.A.
Martin Maria – UniTO
Mimmo Tanja – UniBZ
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Pii Youry – UniBZ
Prinsi Bhakti – UniMI
Said Pullicino Daniel – UniTO
Schievano Andrea - UniMI
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Suman Michele – Barilla S.p.A.
Tomasì Nicola – UniUD
Vigani Gianpiero – UniMI
Zaccone Claudio - UniFG
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The aim of the School is to bring together in a friendly environment experienced researchers and young scientists in order to share their ideas and solutions about issues related to sustainable development in agriculture. Many different aspects regarding soil, plant and environment will be covered including field applications and methodological approaches. At the end of the day, working group activities will try to provide answers to specific research and practical problems raised by the participants.

Final program

9 February 2015

afternoon: arrival and registration

15.00-15.15 Introduction of the School

15:15-16:15 Presentation of the participants (Roberto Terzano, DiSSPA, University of Bari, Italy)

16:15-16:30 Break

afternoon session: **THE SOIL-PLANT-MICROORGANISMS SYSTEM**

Chair: Gian Maria Beone (UCSC, Piacenza, Italy)

16.30-17.10 Claudio Zaccone (SAFE, University of Foggia, Italy) Introduction to the Soil System

17:10-17.50 Gianpiero Vigani (DiSAA, University of Milan, Italy) Understanding plant nutrition for a sustainable agriculture

17.50-18.30 Youry Pii (FaST, University of Bolzano, Italy) An underground tale: contribution of microbial activity to plant nutrients acquisition

18:30 Get together: wine party and poster exhibition (sponsored by "Azienda Vitivinicola La Celata" and "Salumificio La Rocca")

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10 February 2015

morning session SUSTAINABLE AGRICULTURAL PRODUCTIONS

Chair: Vito Armando Laudicina (DiSAF, University of Palermo, Italy)

9.00-9.45 Matteo Spagnuolo (DiSSPA, University of Bari, Italy) – **Adriano Sofo** (SSAFAA, University of Basilicata, Potenza, Italy) Sustainable farming systems: compromises and advantages in horticulture

9.45-10.30 Maria Martin – Daniel Said Pullicino (DiSAFA, University of Torino, Italy) Sustainable rice cropping systems: linking soil processes to functions

10.30-11.00 Break

11.00-11.45 Daniele Del Buono (DSA3, University of Perugia, Italy) – **Elga Monaci** (D3A, Polytechnic University of Marche, Ancona, Italy) Agrochemicals: some generalities, plant metabolism and sustainable uses

11.45-12.30 Luciano Cavani (DipSA, University of Bologna, Italy) – **Chiara Manoli** (ILSA S.p.A.) The use of biostimulants in agriculture: a collaborative overview

12.30-13.00 Open discussion (*under supervision of the Chair*)

13.00-14.30 Lunch break

afternoon session: **Keynote lecture** and **WORKING GROUPS**

14.30-15.30 Keynote lecture: Andrea Carminati (Div. Soil Hydrology, Georg-August University of Goettingen, Germany) Root water uptake: roots and rhizosphere traits that increase plant drought tolerance

15.30-16.30 Poster Session

16.30-18.30 Working group activities (under the supervision of speakers and coordinators)

Working group 1 “Sustainable agricultural productions” – Coordinator: V.A. Laudicina

Working group 2 “Environment and waste management” – Coordinator: M. Spagnuolo

Working group 3 “New methods in agricultural research” – Coordinator: G. Renella

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11 February 2015

morning session INNOVATIONS IN AGRICULTURE FOR A SUSTAINABLE DEVELOPMENT

Chair: Matteo Spagnuolo (DiSSPA, University of Bari, Italy)

9.00-9.30 Stefania Astolfi (DAFNE, University of Tuscia, Viterbo, Italy) Sustainable strategies for the biofortification of crops with essential micronutrients

9.30-10.00 Nicola Tomasi (DiSA, University of Udine, Italy) New solutions to improve soilless productions

10.00-10.30 Vincenza Cozzolino (CERMANU, University of Naples Federico II, Italy) Sustainable agriculture: the key role of arbuscular mycorrhizas in agroecosystem services.

10.30-11.00 Break

11.00-11.45 Giuliana D'Imporzano – Andrea Schievano (RICICLA Group, DiSAA, University of Milan, Italy) Agroenergy, energy crops and renewable fertilizers.

11.45-12.30 Claudio Coccozza (DiSSPA, University of Bari, Italy) – **Marco Grigatti** (DiSA, University of Bologna, Italy) Compost and digestate production and their safe re-utilization in agriculture

12.30-13.00 Open discussion (*under supervision of the Chair*)

13.00-14.30 Lunch break

afternoon session: **Keynote lecture** and **WORKING GROUPS**

14.30-15.30 Keynote lecture: Johan Six (DESS, ETH, Zurich, Switzerland) Soil carbon sequestration: from mechanisms to predictions

15.30-16.30 Selected presentations by PhD students

16.30-18.30 Working group activities (under the supervision of speakers and coordinators)

Working group 1 “Sustainable agricultural productions” – Coordinator: V.A. Laudicina

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12 February 2015

morning session: INNOVATIVE METHODS IN AGRICULTURAL CHEMISTRY RESEARCH

Chair: Giancarlo Renella (DiSPAA, University of Florence, Italy)

9.00-9.30 Luigi Lucini (UCSC, Piacenza, Italy) High resolution mass spectrometry based metabolomics: from data acquisition to mining and chemometrics

9.30-10.00 Bhakti Prinsi (DiSAA, University of Milan, Italy) Proteomic approaches to study plant biochemistry

10.00-10.30 Tanja Mimmo (FaST, University of Bolzano, Italy) Methods applied in the authentication and traceability of agricultural products

10.30-11.00 Break

11.00-11.30 Anita Zamboni (Dept. of Biotechnologies, University of Verona, Italy) Plant genomics as an essential component of green system biology

11.30-12.00 Maria Teresa Ceccherini (DiSPAA, University of Florence, Italy) Soil Metagenomics: a history of conquests

12.00-12.30 Michele Suman (Barilla S.p.A., Parma) Food safety issues from the industrial perspective: an *helicopter* view & a focus on analytical strategies devoted to mycotoxins risk prevention

12.30-13.00 Open discussion (*under supervision of the Chair*)

13.00-13.30 Poster prize ceremony and conclusions

lunch and departure

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Effect of decreasing levels of Fe availability on S assimilation pathway in durum wheat (*Triticum durum* L.) seedlings

Silvia Celletti, Stefania Astolfi

DAFNE, University of Tuscia, Viterbo, Italy, cellsil@libero.it

Iron is an essential element required for many crucial cellular functions. Studies in many different organisms have shown that Fe deficiency induces several responses including increased uptake of Fe from the environment. In plants, it is achieved through the activation of several components of the Strategy I and II Fe uptake system. Wheat belongs to Strategy II plants and therefore cope with Fe deficiency by increasing both the synthesis and secretion of phytosiderophores (PS), and the uptake of Fe-PS complexes. Besides the processes described for Strategy II, sulfate assimilation pathway is known to be induced upon Fe deprivation in various plant species (maize, barley and wheat), most likely because PS are derived from nicotianamine, whose precursor is methionine.

Aim of this study was to investigate if sulfate assimilation rate could be modulated in an Fe concentration-dependent manner. To this purpose, durum wheat seedlings were grown hydroponically for eight days with Fe(III)-EDTA concentrations ranging from 0 to 75 μM .

The amount of PS released by roots gradually increased with decreasing external Fe concentrations, this result being correlated to the increase in root thiol concentration. This was supported by roots showing higher activity of both ATP sulfurylase and O-acetylserine(thiol)lyase, the first and the last enzyme of S metabolism, respectively.

These preliminary results suggest that the capability to induce sulfate assimilation pathway when plants sense the onset of Fe limitation seems to correlate with the general S use efficiency of a plant species as an ecological adaptation to Fe deficiency.

List of participants

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