SOCIETA' ITALIANA DI CHIMICA AGRARIA

PhD Winter School

Rhizosphere at work: soil-plant-microbes interactions, from plant nutrition to soil remediation

17-20 February 2014,Piacenza, Italy

Organizing committee: Tanja Mimmo, Gian Maria Beone, Luciano Cavani, Edoardo Puglisi, Nicola Tomasi, Roberto Terzano, Marco Trevisan, Stefano Cesco, Claudio Ciavatta

Book of Abstracts

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Iron deprivation results in a rapid but not sustained increase of the expression of genes involved in iron metabolism and sulphate uptake in tomato (*Solanum lycopersicum* L.) seedlings

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Characterization of the relationship between sulphur and iron in both Strategy I and Strategy II plants, has proven that low sulfur availability often limits plant capability to cope with iron shortage. Here it was investigated whether the adaptation to iron deficiency in tomato (*Solanum lycopersicum* L.) plants was associated with an increased root sulphate uptake and translocation capacity, and modified dynamics of total sulphur and thiols accumulation between roots and shoots.
Most of the tomato sulphate transporter genes belonging to Groups 1, 2 and 4 were significantly up-regulated in iron-deficient roots, as it commonly occurs under S-deficient conditions. The up-regulation of the two high affinity sulphate transporter genes, *SlST1.1* and *SlST1.2*, by iron deprivation clearly suggests an increased root capability to take up sulphate. Furthermore, the up-regulation of the two low affinity sulphate transporter genes *SlST2.1* and *SlST4.1* in iron-deficient roots, accompanied by a substantial accumulation of total sulphur and thiols in shoots of iron-starved plants, likely supports an increased root-to-shoot translocation of sulphate. Results suggest that tomato plants exposed to iron-deficiency are able to change sulphur metabolic balance mimicking sulphur starvation responses to meet the increased demand for methionine and its derivatives, allowing them to cope with this stress.