


SECOND JOINT MEETING ON SOIL AND PLANT SYSTEM SCIENCES

BOOK OF ABSTRACTS

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The soil-plant-environment nexus and emerging challenges across terrestrial ecosystems

Società Italiana di Chimica Agraria (SICA)
Società Italiana di Pedologia (SIPe)
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The organizing committee
Biogeochemistry & Soil Science Group
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Session 3

SOIL AND PLANT SCIENCES IN SUSTAINABLE FOOD PRODUCTION AND CROPPING SYSTEMS

Poster

Physiological and biochemical responses to water stress in rocket (*Eruca sativa* Mill.) and interplay with biostimulant treatment

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Rocket is a cultivated leafy vegetable, widespread in the Mediterranean area. This species belonging to the Brassicaceae family is appreciated for its pungent aromas and flavours, mainly due to the content of glucosinolates (GSLs) and their hydrolysis products. Stress conditions, such as N-starvation and salinity, induce deep changes at physiological and biochemical levels, affecting the yield and the quality of the leaves. Biostimulants are innovative agronomic tools with very different characteristics, able to induce positive effects on plant growth and to improve the plant ability to face with stress conditions. Although water paucity is a recurring stress, until now, the biochemical and physiological responses of rocket grown under drought (water stress - WS) have been poorly investigated.

The present study aimed to analyse some parameters known to be involved in the response to WS in rocket leaves. Moreover, effects induced by the application of a commercial biostimulant MEGAFOL® (Valagro S.p.A) were studied, both in control and in WS conditions.

WS negatively affected the biomass and water content of leaf tissue. This effect was accompanied by an evident reduction of stomata conductance (gs) and net CO_2 assimilation (Pn), whilst the water use efficiency increased. In addition, WS induced a typical osmotic response, as proved by the increase in the contents of sucrose, reducing sugars, and amino acids. Moreover, the ionomic analysis revealed an increase of Ca and Cu concentrations under WS. According to an active plant response to stress condition, an increase in proline and ascorbic acid contents was also founded, as well as an increase of the antioxidant capacity, evaluated by the DPPH method. Interestingly, in the stressed plants treated with the biostimulant some of these parameters resulted differently affected. In details, a lesser reduction of Pn and a lower increase in proline content and in the antioxidant capacity were observed. Taken together, the results highlighted a positive effect of biostimulant treatment on plant ability to counteract WS. WS also induced an increase in the content of total GSLs and a decrease in total flavonols. The quantification of individual GSLs and flavonols, performed by LC-ESI-MS/MS, revealed significant differences induced both by the stress condition and the biostimulant treatment, suggesting specific changes in rocket secondary metabolism.