EFFECTS OF IN VITRO BACTERIAL INOCULATION (BACILLUS SUBTILIS) ON THE RESPONSE TO PEG-INDUCED WATER STRESS IN MEDICAGO SATIVA L.

CALVIO C.*, BALESTRAZZI A.*, GALIZZI A.*, PIANO E.**, CARBONERA D.*, CONFALONIERI M.**

*) Department of Genetics and Microbiology, University of Pavia, Via Ferrata 1, 27100 Pavia, Italy
**) CRA - Centro di Ricerca per le Produzioni Foraggere e Lattiero-Casearie, Viale Piacenza 29, 26900 Lodi, Italy

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It is known that water stress has a strong impact on plant growth and development, causing lower yields and, possibly, crop failure. Plants can interact with several microorganisms able to enhance their growth ability under adverse environmental conditions. The plant growth-promoting bacteria (PGPBs) exert beneficial effects by different mechanisms, among which increased nutrient availability and reduced ethylene production in planta. PGPBs can also produce auxins, cytokinins and gibberellins, promoting plant growth through phytohormone-mediated signaling pathways.

The beneficial effects of the gram-positive bacterium Bacillus subtilis have been documented in field crops challenged with abiotic stresses. However, information concerning the mechanisms involved in the B. subtilis-plant interaction are still scanty.

In the present work, we tested a wild type B. subtilis strain (NCIB3610) for its ability to support the in vitro growth of alfalfa (Medicago sativa L.) seedlings in presence/absence of water stress induced by PEG6000. Different bacterial concentrations were tested during plant cotyledon inoculation and the occurrence of both leaf-associated epiphytic and endophytic B. subtilis populations was assessed at different times following inoculum. The effects of bacterial inoculation on alfalfa biomass production were also evaluated.