



“Gheorghe Asachi” Technical University of Iasi, Romania



INOCULATION WITH “EFFECTIVE MICROORGANISMS” OF *Lolium perenne* L.: EVALUATION OF PLANT GROWTH PARAMETERS AND ENDOPHYTIC COLONIZATION OF ROOTS

L. Baffoni, M. Accorsi, F. Gaggia, S. Bosi, I. Marotti, B. Biavati,
D. Di Gioia, G. Dinelli

Department of Agroenvironmental Sciences and Technologies, University of Bologna, viale Fanin 44, 40127 Bologna, Italy

Abstract

Lactobacilli, bifidobacteria and various yeasts are worldwide known as probiotic microorganisms. They are part of the natural gut microbiota of both humans and animals, they have a long history of consumption and they are present in almost all fermented foods. Recently they have been also exploited as “Effective Microorganisms” (EM) for the production of bio-fertilizers to promote plant growth and control diseases in sustainable agriculture systems. This work focuses on the effect of inoculation of a commercial product, containing lactobacilli, bifidobacteria, yeasts and aerobic bacteria on perennial ryegrass (*Lolium perenne* L.), hydroponically grown for five weeks. Perennial ryegrass is a cool-season turfgrass species that is widely used on home lawns, sports fields, and golf courses due to its rapid establishment and superior traffic tolerance. Following an activation process to revitalize the microorganisms, the inoculation was performed via the irrigation system, combined or not with seeds imbibitions with the same product. Six different treatments were compared: 1- EM combined with seed imbibition; 2- EM without seed imbibition; 3- filtered EM combined with seed imbibition; 4- filtered EM without seeds imbibition; 5- control (mineral Hoagland solution), 6- commercial plant hormones rich solution. Data on aboveground and underground biomass were collected with special regard to root development representing a critical issue for the maintenance of lawns and sport fields. Soil and root microbiota have been studied by DGGE analysis. qPCR has been performed to assess the *Lactobacillus* colonization of the radical tissues. In all experimental conditions no significant effect of different treatments was observed at the leaf level, while EM and phytohormone treatments induced significant effects on root development, with an average increase of total root length equal to 35% and 70%, respectively. Among treatments significant differences in root fresh weight were observed, while the effects of treatments on root dry weight were negligible. As regards microbiological data, DGGE evidenced different microbial profiles in EM treated plants compared to control and phytohormone treatment, which were comparable. EM seed imbibition induced the greatest microbial diversity at the root level. qPCR revealed a significant increase of *Lactobacillus* spp. in EM treated roots. A potential colonization of this microbial group at root level could be an important feature to improve plant resistance against pathogens. In conclusion, considering these preliminary results, a potential use of EM as bio-fertilizer could be hypothesized: open field trials are necessary to assess the robustness of the obtained results.
