EuroSciCon

5th Annual Congress on

Plant & Soil Science

February 28-March 01, 2019
London, UK

Bhoopander Giri, J Plant Physiol Pathol 2019, Volume 7
DOI: 10.4172/2329-955X-C1-029

Glomeromycotan fungus*, Rhizophagus* intraradices improves plant tolerance to salt stress by modulating physiological and biochemical processes under saline conditions

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Soil salinity is one of the most severe problems in agriculture as it decreases crop production up to 20% of irrigated land worldwide and is expected to result in ~ 50% land degradation by the middle of the 21st century globally. In fact, about 1% of world agricultural lands are being deteriorated each year due to accumulation of salts and global agricultural loss due to salinity is estimated about US $12 billion a year. High levels of salt in soils affect all aspects of plant physiology and metabolism, including reduction in photosynthesis, inhibition of the enzyme activities, cell division and expansion, and membrane organization, which altogether inhibit plant growth and survival. Mycorrhizal fungi are ubiquitous soil microorganisms that establishmutual symbioses with the majority of higher plants and ascertain a direct physical link between soil and roots. Among these Arbuscular *Mycorrhizal Fungi (AMF)* are most common. These fungi are key component of the natural ecosystems and predominantly occur in the salt- affected environments. The inoculation with AMF improved tolerance of its partner to salt stress and mitigated salt-induced ionic imbalances in plants and lowered lipid peroxidation and electrolyte leakage that substantiated the fact that AMF inoculation lessen membrane damage due to salt stress. Further, AMF exhibited a regulatory effect on the translocation of Na + ions to the shoot tissues. AMF alleviated adverse effect of salinity and prevented excessive uptake of Na + in root and mesophyll cells. AMF improved activity of ROS scavenging enzymes, accumulation of antioxidants and synthesized more α-tocopherol may be due to the formation of more and bigger plastoglobules. The increased osmolytes accumulation confirm improved osmotic adjustment and better capacity to scavenge free radicals in mycorrhizal than nonmycorrhizal plants. The study revealed that AMF could modulate physiological and biochemical responses and help host plant in mitigating adverse effects of salinity stress.

Biography

Bhoopander Giri pursued his PhD in the area of mycorrhizal research in the Department of Botany from the University of Delhi, India. He is currently working as an Assistant Professor in the Department of Botany at Swami Shraddhanand College of University of Delhi. He has worked as a Post-Doctoral Fellow at the School of Life Science, JNU and the International Center for Genetic Engineering and Biotechnology and as an Associate Fellow at The Energy and Resources Institute (TERI), New Delhi. He is a Recipient of DST Young Scientist Fellowship, and Raman Post-Doctoral Fellowship for United Sates of America (2014-2015). He is a Life Member of many prestigious academic societies, like Indian Science Congress Association, Association of Microbiologists of India (AMI), Indian Society of Mycology and Plant Pathology, Indian Mycological Society, Botanical Society of America, International Symbiosis Society, International Society of Applied Life Sciences. He has served as a General Secretary (2013-2015) for International Symbiosis Society (ISS), USA. He has published more than 37 papers in the national and international peer-reviewed journals, and books. He has edited a book entitled "Root Biology" published by Springer Nature.

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