BioMed Research International

Special Issue on

The Singularities of Rhizobia: Recent Findings on These Plant Symbiotic Bacteria

CALL FOR PAPERS

Sustainable crop production and soil management are major concerns, as the continually increasing worldwide population requires a corresponding increase in food production. The extension of arable land is limited, with intensive farming and climate changes being major factors accounting for soil degradation. It is therefore necessary to maximize yields of currently available arable land and to develop strategies to improve yield in poor quality soils. This can involve the use of chemical fertilizers and pesticides, but these represent high costs in agricultural production and they often have detrimental effects on the environment. For all these reasons, the use of plant growth-promoting bacteria has become an important tool in moving towards more sustainable agricultural practices. The symbiosis between rhizobia (N_2-fixing soil bacteria) and legumes is particularly valuable as these symbioses provide nitrogen to legume crops, and they also benefit subsequent crops by increasing the N-content of the soil.

The ability of some soil bacteria to metabolize atmospheric N_2 to ammonia and provide it to some legume species as a nitrogen source, thereby increasing soil fertility, has been known since the end of the 19th century. However, despite the fact that rhizobia and their interaction with their hosts have been extensively studied, some important aspects of these symbioses are continuing to be clarified. Examples are the recent discoveries that rhizobia may be anaerobic and photosynthetic and that the canonical *nod* genes are not indispensable for rhizobia-legume symbioses. The use of rhizobia as field inoculants is still not widespread and further studies are needed to understand the population dynamics upon continuous inoculation. Additionally, rhizobial inoculants rely on natural bacterial isolates and do not yet make much use of genetically modified strains designed to improve agricultural yields. Scientific advances on rhizobia metabolism, competitiveness, and effectiveness are crucial to improve the use of these symbioses in agriculture.

This special issue aims at reporting recent findings on rhizobia research as well as the latest perspectives on the interaction of these bacteria with their host plants. We invite scientists to contribute with original research and review articles that report progresses on the current knowledge of rhizobia as plant growth promoting bacteria. We also encourage submission of manuscripts on the genetics and genomics of these soil bacteria that contribute to a better understanding of all aspects of their dual lifestyle: as plant endosymbionts and as free-living soil bacteria.

Potential topics include but are not limited to the following:

- Rhizobia as plant growth promoting bacteria, particularly under adverse environmental conditions (abiotic and biotic stresses)
- Updates on the genomics of nitrogen-fixing organisms
- Rhizobial metabolic pathways that may contribute to soil fitness or improved nodule occupancy
- Rhizobial entry mechanisms and competitiveness among rhizobial strains
- Updates on the mechanisms underlying rhizobia-host specificity
- Latest advances in understanding rhizobial symbiotic performance
- Engineering of the nitrogen-fixing symbioses: the bacterial partner
- Phylogenetics of nitrogen-fixing bacteria

Authors can submit their manuscripts through the Manuscript Tracking System at https://mts.hindawi.com/submit/journals/bmri/microbiology/tsrh/.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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