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Preface

The Fifth International Workshop on *Azospirillum and Related Microorganisms*, held from September 6–8, 1991 in Wennigsen (Hannover), Germany, was organized by the University of Hannover, Institute of Biophysics and the ENEA (Italian National Agency for New Technologies, Energy and Environment), Progetto Biotecnologie Roma, Italy. During the last 10 years, four *Azospirillum* Workshops have been organized by Prof. Klingmüller at the University of Bayreuth, Germany.

Azospirillum, one of the most interesting rhizosphere bacteria, has during the past 18 years attracted ever increasing scientific interest for several reasons: it can utilize atmospheric nitrogen and contribute to the plant nitrogen nutrition, it can improve the plant nutrient uptake and contribute the balance the root environment through protection against pathogens, equilibrate nutrient flow and immobilize chemical fertilizers in the soil. *Azospirillum* is also very interesting genetically because it carries in its genome parts which complement *Rhizobium* symbiosis plasmids (*sym*-plasmid), and Agrobacterium infectivity genes (*hsn*-genes). However, the functions of these genes in *Azospirillum*, that are probably connected to plant interaction, have not yet been clarified.

Since the first International Workshop on *Azospirillum* in 1981, important work has been done in clarifying the mechanisms involved in the *Azospirillum*-plant association. The Wennigsen Workshop, which included also related microorganisms with similar characteristics, was divided into four sessions: Field trials, Physiology, Genetics and Ecology. On the subject of field experiments, there is more information on inoculant formations and proper delivery of the organisms in the field. In Italy, inoculants have been sold already for the last two years. In France, permission was granted recently to use commercial inoculants of *Azospirillum*. By using 15N isotope dilution techniques, it was estimated that in Brazil some cultivars of sugar cane are able to fix up to 80 kg of atmospheric nitrogen/ha per season. The organisms involved are from different species, but *Acetobacter diazotrophicus* is the most interesting and intensively studied bacterium. For evaluation of population and identification of *Azospirillum* and other associated N_2-fixing microorganisms, modern methodologies, such as monoclonal antibodies combined with ELISA techniques, determination of DNA patterns after treatment with restriction enzymes, probes based on ribosomal RNA and marking of genes such as *nif* with

reporter genes to follow colonization of root surface and intercellular spaces and nitrogenase activity have been studied. On the physiology of *Azospirillum*, the most discussed issue was on the production of indole-3-acetic acid by several biosynthetic pathways including the indolacetamide pathway, which was recently demonstrated to be present in *A. brasilense*. The composition and role of exocellular polysaccharides in aggregation of bacterial cells and their adsorption to root was extensively discussed.

During the Workshop, a wealth of information was presented in 30 oral presentations and 36 posters. Eighty scientists from 16 different countries participated in the workshop. Each manuscript was reviewed by two independent referees, and most of them are published in this issue. We would like to express our thanks for the excellent organization of the special issue of *Symbiosis*, devoted to this Workshop, to Prof. Margalith Galun and to Mrs. Miriam Balaban.

Our special thanks go to all the members of the Scientific (Jos Vanderleyden and Ernst-Georg Niemann) and the Organizing Committee, who were able to overcome all difficulties and are fully responsible for the success of the meeting. Many thanks are due to Mrs. Roswitha Fendrik for her excellent management of the organization before and during the workshop. Without the generous financial support provided by ENEA, by the DFG (Deutsche Forschungsgemeinschaft), Hannoversche Hochschulgemeinschaft and the University of Hannover, this Workshop would not have been possible.

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