



Agricultural Microbiology

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The Authors



Dr. R.P. Pareek, Emeritus Professor, has about forty years' experience of research and teaching undergraduate and post graduate students at various universities. He had guided about twenty M.Sc.(Ag) and Ph.D. students for their theses research.

Dr. Pareek did his graduation in Agriculture from S.K.N. College of Agriculture, Jobner, Rajasthan securing 8th place among top ten students. He earned his Master's (1968) and Doctorate (1972) Degrees from Indian Agricultural Research Institute (IARI), New Delhi in Microbiology. He is a gold medalist in his Master's Program.

Dr. Pareek had his first appointment (1972) as Assistant Soil Microbiologist at Punjab Agricultural University, Ludhiana, Punjab. He shifted to G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand (1977) as Sr. Research Officer and later became Professor of Soil Microbiology in 1987. His area of research all through was biological nitrogen fixation. He was Visiting Scientist at International Rice Research Institute, Los Banos, Laguna, Philippines from 1987 to 1989.

After superannuation in June 2003, he was granted Scientist Emeritus with a research project on biofertilizer production by ICAR. However, he preferred to join Birla Institute of Scientific Research (BISR) at Jaipur, Rajasthan as Principal Project Scientist with a research project financed by Department of Biotechnology, Govt. of India. He was with BISR till 2008. Dr. Pareek also has an experience of teaching UG, PG and research scholars at some private universities.



Navneet Pareek presently holding a post of Professor and Group Leader, Soil Quality Consortium in the Department of Soil Science at G.B. Pant University of Agriculture and Technology, Pantnagar, US Nagar, Uttarakhand, India. He was first appointed in 2001 as Assistant Professor in the Division of Soil Science and Agricultural Chemistry at Shere-E-Kashmir University of Agricultural Science and Technology of Jammu, Jammu. He is engaged in teaching and has about 18 years experience of teaching students in the universities. Presently he is teaching various Under Graduate and Post Graduate courses in Soil Science and Soil Microbiology. He is guiding

research scholars of Master's and Doctoral programmes and also advising under graduates. He has guided about 05 M.Sc. (Ag) and 02 Ph.D. students till date.

His research pertains to increasing efficiency of biofertilizers of various useful soil microorganisms, namely, rhizobia and plant growth promoting rhizospheric microorganisms (PGPRM). He is also involved to seek the role of PGPRs particularly in diseases suppression. He is associated with many projects related to the nutrient management for hill and plains. Apart from teaching, right now his whole time associated with All India Coordinated Research Project (AICRP) on Pulses Improvement, a national research project having centers at different Agricultural Universities, and working on harnessing the potential of rhizospheric microorganisms including rhizobia of grain legumes. He is also associated in AICRP on LTFE (Long Term Fertilizer Experiments) in the university.

He has published more than 40 peer reviewed papers in Journals of national and international repute in the field of soil and microbiology. He has written 13 book chapters, 03 technical bulletin and many popular scientific articles for the magazines related to agriculture field.

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PREFACE

Agriculture as a subject or discipline is quite interesting. It mainly deals with farming. A student of agriculture needs the knowledge of many disciplines. Agricultural Microbiology is one of those disciplines. It is basically Soil microbiology which is an applied science interwoven with the threads of microbiology and soil science disciplines. In agriculture there is an involvement of crop plants, soil and microorganisms. Microbes live with plants even after their death in soil and decompose them to release nutrients and synthesize soil organic matter. Though Agricultural microbiology is a small component of Agriculture discipline, yet microorganisms play pivotal roles such as release of nutrients from organic and inorganic fraction of soil and nitrogen fixation.

While teaching the course of Agricultural microbiology the authors observed that there is need of a book containing the subject matter which could be easily understood and assimilated by undergraduate students. Though there are books available on the subject but they are not meant only for undergraduate students. The book exclusively covers course content recommended by Deans' Committee of ICAR. The book has five sections dealing with basics of microorganisms, soil biota and their ecology, geobiochemical cycles, exploitation of agriculturally useful microorganisms, food and water microbiology. The authors have tried to be brief, to the point and make the subject interesting and palatable. It has been tried to keep language simple and easy to assimilate.

Large numbers of books, reviews and websites have been consulted in writing the book. Authors of the book are grateful to those authors whose materials have been consulted. We are highly thankful and sincerely acknowledge the websites from where we copied diagrams. The personal help rendered in reading the manuscript and extending suggestions by Dr. M.C. Bardiya and Dr. K.C. Khandelwal is highly appreciated and we gratefully acknowledge their help.

Authors

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INTRODUCTION

