

PERSPECTIVES IN
MYCOLOGICAL RESEARCH

VOL. 1

S. K. HASSI
R. C. RAJA
S. M. SINGH



**INTERNATIONAL BIOSCIENCE SERIES
VOLUME XII**

**PERSPECTIVES IN MYCOLOGICAL RESEARCH
(VOLUME - I)**

(Prof. G.P. Agarwal Festschrift Volume)

Edited by

**S.K. HASIJA
R.C. RAJAK
S.M. SINGH**

**Department of P.G. Studies & Research in Biological Sciences
Rani Durgavati Vishwavidyalaya, Jabalpur**

1987

**Today & Tomorrow's Printers and Publishers
24B/5, Deshbandhu Gupta Road
Karol Bagh, New Delhi-110005**

© 1987. Publishers and Editors

All rights reserved. Printed in India. No part of this publication may be reproduced. Stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior permission of the publisher.

ISBN 81-7019-303-6 (India)

ISBN 1-55528-145-1 (USA)

Composed by

J.D. Electric Composer Ltd.
24B/5, D.B. Gupta Road
Karol Bagh, New Delhi-110005

Printed at

Goyal Offset Printers
Shahzada Bagh, Delhi-110035

Published by

Today & Tomorrow's Printers and Publishers
24B/5, D.B. Gupta Road
Karol Bagh, New Delhi-110005 (India)

INTERNATIONAL BIOSCIENCE SERIES
VOLUME XII

P R E F A C E

'Perspectives in Mycological Research' a festchrift in two Volumes is brought about in honour of Prof. G.P. Agarwal *former Head, Department of Biological Sciences and Dean, Faculty of Life Science, Rani Durgavati University, Jabalpur* on his supranuation and in humble dedication to his outstanding researches in the field of Mycology, Plant Pathology and Microbiology. All the contributors of the volume are closely associated with Prof. Agarwal.

A symposium on Perspective in Mycological Research was also organised to felicitate Prof. G.P. Agarwal on October 19th & 20th, 1986 by his students and well wishers. The present volume (Vol. I) includes the proceedings of the symposium. It incorporates original research papers on various aspects of mycology and covers important areas like, taxonomy of fungi, physiology of fungi, aerobiology, medical mycology, mycology in biotechnology and mycology in polluted environment. The present volume contains 38 research articles in various fields to benefit all mycologists of the country and abroad in both teaching and research.

The Editors are thankful to all the delegates/contributors for their authoritative and thought provoking articles which were presented during the symposium. Financial help given by Department of Science & Technology, New Delhi and Madhya Pradesh Council of Science & Technology, Bhopal to organise the symposium is gratefully acknowledged.

Editors are also thankful to their colleagues Dr. S.C. Pathak, Dr. M. Oommachan, Dr. K.S. Verma and to others staff members and students of the department for giving all the help in various manner in preparation of the volume, and to M/s. Today & Tomorrow's Printers and Publishers for undertaking the publishing work of this volume.

S.K. Hasija
R.C. Rajak
S.M. Singh

CONTRIBUTORS

ABBASI, P.

Department of Botany, Gorakhpur University, Gorakhpur.

AGNIHOTRI, S.K.

Department of Botany, Dr. Harisingh Gour University, Sagar.

AGRAWAL, S.C.

Department of Botany, Dr. Harisingh Gour University, Sagar.

BILGRAMI, R.S.

Department of Botany, Bihar University, Muzaffarpur.

CHANDRA, SUDHIR

Department of Botany, University of Allahabad, Allahabad.

CHATTERJEE, APARNA

Department of Biological Sciences, Rani Durgavati University, Jabalpur.

CHATURVEDI, V.P.

Department of Medical Mycology, Vallabhbhai Patel Chest Institute, University of Delhi, Delhi.

CHILE, S.K.

Department of Botany, Dr. Harisingh Gour University, Sagar.

DE, KANTISHREE

Department of Biological Sciences, Rani Durgavati University, Jabalpur.

DHAMIJA, S.K.

Department of Botany, Govt. Science College, Jabalpur.

DUBE, TARA

Department of Botany, M.H. College of Home Science, Jabalpur.

DWIVEDI, R.S.

Centre for Advanced Studies in Botany, Banaras Hindu University, Varanasi.

GALAIAH, K.

Department of Botany, Osmania University, Hyderabad.

GIRISHAM, S.

Department of Botany, Kakatiya University, Warangal.

GUPTA, B.K.

Department of Botany, Gorakhpur University, Gorakhpur.

GUPTA, CHATURBHUJI

Department of Botany, Gorakhpur University, Gorakhpur.

GUPTA, R.C.

Department of Biological Sciences, Rani Durgavati University, Jabalpur.

GUPTA, SUDHA

Department of Botany, M.H. College of Home Science, Jabalpur.

HASIJA, S.K.

Department of Biological Sciences, Rani Durgavati University, Jabalpur.

HASIJA, KIRAN

Department of Biochemistry, Govt. Medical College, Jabalpur.

JAMALUDDIN

Forest Research Institute, Jabalpur.

KAMAL

Department of Botany, Gorakhpur University, Gorakhpur.

KEHRI, HARBANS KAUR

Department of Botany, Allahabad University, Allahabad.

KHAN, A.R.

Department of Biological Sciences, Rani Durgavati University, Jabalpur.

KHAN, M.A.

Department of Biological Sciences, Rani Durgavati University, Jabalpur.

KHAN, Z.U.

Department of Medical Mycology, Vallabhbhai Patel Chest Institute, University of Delhi, Delhi.

KHARE, KARUNA

Department of Biological Sciences, Rani Durgavati University, Jabalpur.

KHULBE, R.D.

Department of Botany, Kumaon University, Nainital.

KINI, SUDHA

Department of Medical Mycology, Val-
labhbhai Patel Chest Institute, Univer-
sity of Delhi, Delhi.

KUMAR, R.

Department of Botany, Gorakhpur Uni-
versity, Gorakhpur.

LAL, S.K.

Department of Botany, Govt. Science
College, Jabalpur.

MATHUR, POONAM

Department of Botany, University of
Allahabad, Allahabad.

MANIVERGHESE, K.I.

Department of Mycology and Plant
Pathology, M.A.C.S. Research Institute,
Pune.

MANOHARACHARY, C.

Department of Botany, Osmania Univer-
sity, Hyderabad.

MEHROTRA, B.S.

Department of Botany, University of
Allahabad, Allahabad.

MISRA, R.P.

Department of Biological Sciences, Rani
Durgavati University, Jabalpur.

NANDAN RATNA

Department of Microbiology, Osmania
University, Hyderabad.

PANDEY, ALKA

Department of Biological Sciences, Rani
Durgavati University, Jabalpur.

PANDEY, A.K.

Department of Biological Sciences, Rani
Durgavati University, Jabalpur.

PANDEY, SADHANA

Department of Biological Sciences, Rani
Durgavati University, Jabalpur.

POLASA, H.

Department of Microbiology, Osmania
University, Hyderabad.

PRASAD, S.S.

Department of Botany, Bihar University,
Muzaffarpur.

RAJAK, R.C.

Department of Biological Sciences, Rani

Durgavati University, Jabalpur.

RAMARAO, P.

Department of Botany, Osmania Univer-
sity, Hyderabad.

RAO, V.G.

Department of Mycology and Plant
Pathology, M.A.C.S. Research Institute,
Pune.

RANDHAWA, H.S.

Department of Medical Mycology, Val-
labhbhai Patel Chest Institute, Univer-
sity of Delhi, Delhi.

RADDY, S.M.

Department of Botany, Kakatiya Univer-
sity, Warangal.

REDDY, KRISHNA V.

Department of Botany, Kakatiya Univer-
sity, Warangal.

SAHU, S.K.

Department of Botany, Govt. Adarsh
P.G. College, Raipur.

SANGHI, NEELIMA

Department of Bio-Sciences, Rani Durga-
vati University, Jabalpur.

SARAN, KUM-KUM

Department of Botany, University of
Allahabad, Allahabad.

SHUKLA, R.V.

Department of Botany, C.M.D. College,
Bilaspur.

SINHA, I.B.P.

Department of Botany, Bihar University,
Muzaffarpur.

SINHA, A.K.

Department of Botany, Bihar University,
Muzaffarpur.

SINGH, S.M.

Department of Biological Sciences, Rani
Durgavati University, Jabalpur.

SINGH, R.K.

Centre for Advanced Studies in Botany,
B.H.U., Varanasi.

THAKUR, M.K.

Department of Biological Sciences, Rani
Durgavati University, Jabalpur.

TIWARI, K.L.

Department of Botany, Govt. Adarsh
P.G. College, Raipur.

USHARAM, P.

Department of Botany, Osmania Univer-
sity, Hyderabad.

VERMA, R.K.

Department of Botany, Gorakhpur Uni-

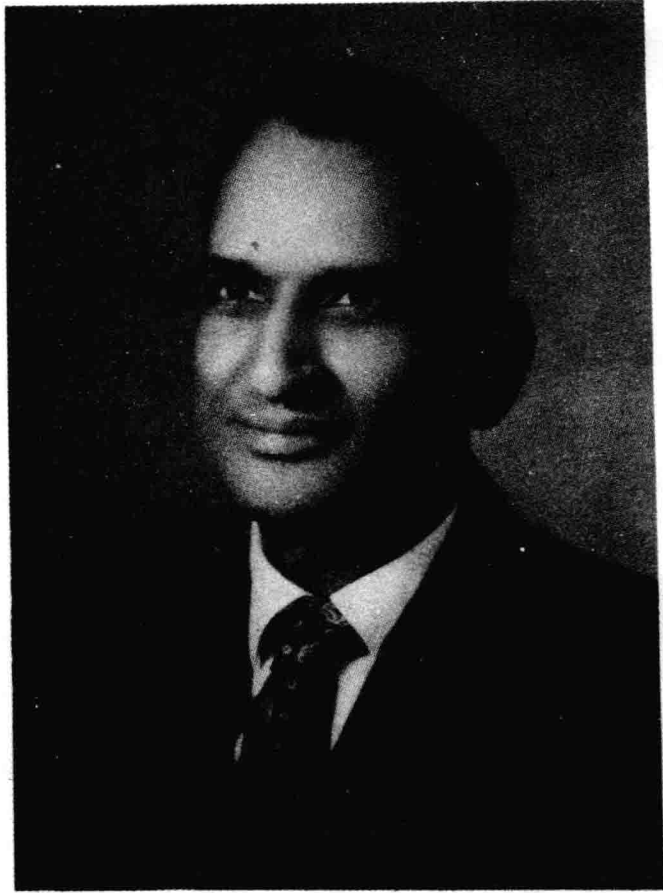
versity, Gorakhpur.

VYAS, K.M.

Department of Botany, Dr. Harisingh
Gour University, Sagar.

WOLF, F.T.

Department of General Biology, Vander-
bilt University, Nashville, Tenn.



PROF. G.P. AGARWAL

PROF. G.P. AGARWAL : A BIOGRAPHY

Professor G.P. Agarwal, was born on 10th July, 1926 at Karwi (Banda), U.P. He obtained his M.Sc. in Botany in 1951 and D. Phil. in Mycology and Plant Pathology in 1955 from the University of Allahabad. For his D. Phil. degree he worked under the renowned and eminent Plant Pathologist, Professor R.N. Tandon.

Professor Agarwal started his career as Lecturer in College of Agriculture at Nagpur in 1955. A year later he moved to Jabalpur and joined Mahakoshal Mahavidyalaya (Now Government Science College). In 1961 he was promoted to the Post- of Asstt. Professor and in 1967 he became Professor of Botany. In 1968 the teaching department of Botany in University of Jabalpur was started and Professor Agarwal became its founder Head of the Department. In the year 1979 the present department of Botany was converted into department of Biological Sciences and Professor Agarwal became the Dean, Faculty of Life Science, the post which he graced till his retirement.

Professor Agarwal is a man of exceptional qualities. He is an excellent teacher, a dedicated researcher, balanced administrator, and with his intellectual superiority, courtesy and generosity he has won many friends and admirers throughout the country. His lucidity in teaching and expression promoted many of his students to take up to teaching profession. With his original and practical vision he built this department. He laid the foundation of the department and under his dynamic leadership in a short span of time, the department has excelled in teaching and research activities. The teaching of M.Sc. in Botany was started in 1973. It was again Professor Agarwal's initiative and foresightedness that he introduced teaching of Microbiology, as a special paper in M.Sc. Botany in 1973. M.Sc. Biological Sciences was started in 1980 and M.Sc. in Microbiology in 1983.

Prof. Agarwal is known for his research contributions in Mycology, Plant Pathology and Microbial Physiology. There has been a regular flow of his research contributions since 1953 onwards. He is author of more than one hundred research papers published in leading national and international journals of repute. Professor Agarwal pioneered the study of phytopathogenic fungi of Jabalpur and published series of papers under the caption "Fungi causing Plant diseases at Jabalpur". He described many new taxa and new records for the country e.g. *Pycnothera cordiae* gen et sp. nov., *Cercocladospora adinae* gen et sp. nov., *Beharia smilacis* sp. nov., *Deighthoniella jabalपुरiensis* sp. nov., *Curvularia verruciformis* sp. nov., *Dactylaria indica* sp. nov., *Sporotrichum xylophila* sp. nov. All fungi described upto 1971 have been compiled and published by him as "Fungi of Jabalpur". A new genus *Agarwalia terricola* gen et sp. nov., was established in recognition of his contribution in the field of Mycology.

Prof. Agarwal's thrust has also been on fungal physiology, Physiology of Parasitism, Medical Mycology and Aerobiology. He and his co-workers have investigated various aspects of physiology and nutrition of phytopathogenic fungi to understand their virulence, survival and adaptability. Nutritional physiology of several pathogens has been worked out by him. Studies on metabolic changes in host due to fungal infection were also investigated. He suggested that disease resistance in fruits largely depends on their phenolic level.

In his presidential address to M.P. Vigyan Academy he emphasised the significance of pectic enzymes in pathogenesis and reported a wise variation in behavior of fungi in pectic enzyme production. In most instances the enzyme was produced inductively. He has concluded that the cultural conditions and length of incubation period of pathogen greatly influences the nature and quantity of enzyme.

His work on production of toxic metabolites by phytopathogen indicated that the thermostable toxic principle produced by the pathogen could cause permeability changes in the host tissues leading to cellular death.

Prof. Agarwal also initiated the study of mycotic infections in human beings and has contributed substantially to this important area of study. Studies on fungal diseases of skin and nails of man, mycotic keratitis (fungal infection of eye), Aspergillosis and Cryptococcosis in bronchopulmonary disorders have been his major fields of stress. The work is being carried further by his students. In the field of aerobiology his emphasis has been fungal aerospora. The work mostly pertained to identifying the air borne plant pathogens and to provide adequate information about disease forecasting.

Currently, he and his co-workers are busy with studies on the insect pest control through entomogenous fungi (biological control) of *Teactona grandis* and *Cicer arietinum*.

Prof. Agarwal is principal investigator of number of projects undergoing in the department. Some of which are as follows:

1. Fungal deterioration of wheat grains and loss in viability in relation to storage method in rural areas of Madhya Pradesh (U.G.C.).
2. Studies in the involvement of Toxins in *Alternaria* blight of Garlic (*Allium sativum* L.) (C.S.I.R.).
3. Studies on entomogenous fungi of M.P. with special reference to biological control of insect pest of crops and forest nursery (U.G.C.).

4. Biological control of insect pest of teak (*Tectona grandis*) through entomopathogenic fungi (C.S.I.R.).

More than forty students have been awarded Ph.D. degrees and one D.Sc. degree under his supervision.

Prof. Agarwal has also published a book entitled 'Micro-organisms in the laboratory' in collaboration with Dr. S.K. Hasija and has edited a symposium volume entitled "Physiology of Parasitism" in collaboration with Prof. K.S. Bilgrami. He has several honours to his credit. He is founder President of Society of Tropical Forestry Scientist, President of Botany Section of M.P. Vigyan Academy, a Fellow of the National Academy of Sciences, India, Fellow of Indian Phytopathological Society of India and Fellow of Indian Botanical Society.

In addition, Prof. Agarwal was also associated as member of editorial boards of Indian Phytopathology and Biological Bulletin of India, as associate editor of Bulletin of Pure and Applied Sciences, as councillor for the society of Mycology and Plant Pathology and Society for advancement of Botany.

Prof. Agarwal also took active part in extra-curricular activities. He had been an outstanding sportsman and represented University of Allahabad as captain of Volleyball team during his college days. He served as Chairman of Sports Committee of Rani Durgavati University, Jabalpur for several years, was hostel Warden, and also Proctor and treasurer of the University students union and connected with many social organizations of the town.

ACKNOWLEDGEMENT

The present volume incorporates proceedings of the Symposium on Perspectives in Mycological Research held on October 19th & 20th, 1986.

The financial help given by the following agencies is gratefully acknowledged :

1. Department of Science & Technology, Govt. of India, New Delhi.
2. M.P. Council of Science & Technology, Bhopal.

CONTENTS

	Page
Preface	
Contents	
Contributors	
Prof. G.P. Agarwal – a biographic-sketch	
Acknowledgements	
Mycological Education in India and future prospects for Indian mycologists <i>B.S. Mehrotra</i>	1
A notable species of <i>Trimmatostroma</i> (Hyphomycetes) <i>V.G. Rao and K.I. Mani Varghese</i>	5
Some new foliicolous Hyphomycetes from North-Eastern U.P. <i>Chaturbhuji Gupta, P. Abbasi and Kamal</i>	7
Some new species of <i>Pseudocercospora</i> from India <i>B.K. Gupta and Kamal</i>	19
Some new species of Foliicolous <i>Cercoseptoria</i> from North-Eastern Uttar Pradesh <i>P. Abbasi, R. Kumar and Kamal</i>	35
Studies on the Ascomycetes of Madhya Pradesh-II <i>Hypoxylon</i> from Jabalpur <i>R.C. Gupta and R.C. Rajak</i>	43
Some interesting watermoulds and their adaptability in Himalaya <i>R.D. Khulbe</i>	53
Effect of chemical contents of water on seasonal occurrence of aquatic fungi <i>Sudha Gupta and Tara Dubey</i>	63
Studies on Conidial Fungi associated with foam and submerged	

leaves of a stream in Andhra Pradesh <i>C. Manoharachary and K. Galaiah</i>	69
Seasonal occurrence and distribution of aquatic fungi in relation to water quality of Jabalpur lakes <i>S.K. Hasija and M.A. Khan</i>	79
Studies on the genus <i>Haplosporella</i> III. Effect of different Hydrogen- ion concentration on the morphology and cultural characters <i>R.C. Rajak and A.K. Pandey</i>	89
<i>In vivo</i> and <i>in vitro</i> production of pectolytic enzymes by <i>Botryodiplodia</i> <i>theobromae</i> and <i>Macrophoma mangiferae</i> , causing soft rot of mango <i>S.S. Prasad and A.K. Sinha</i>	101
Production of pectic and cellulolytic enzymes by two strains of <i>Myrothecium roridum</i> causing fruit rot to Tomato <i>Neelima Sanghi and R.C. Rajak</i>	111
Pectolytic and Cellulolytic enzymes produced by <i>Cylindrocarpon</i> <i>lichenicola</i> , causing corm rot of Taro and <i>Trichurus spiralis</i> , causing tuber rot of Potato <i>P. Usharani and P. Ramarao</i>	117
Influences of <i>Colletotrichum</i> infection on the oxidizing enzymes of different citrus fruits and their importance in resistance <i>Kantishree De</i>	127
Effect of antibiotics on growth, sporulation, spores germination and germ tube elongation of <i>Alternaria tenuis</i> Nees and <i>Pestalotia</i> <i>mangiferae</i> P. Henn. <i>I.B.P. Sinha and R.S. Bilgrami</i>	131
Enzymes of glucose catabolism of <i>Alternaria</i> spp. <i>Kiran Hasija</i>	139
Metabolism of Ascorbic Acid in Piper betle leaves under <i>Phytophthora</i> pathogenesis <i>S.K. Chile and K.M. Vyas</i>	143
Studies on some aspects of <i>Sclerotium rolfsii</i> Sacc. causing Foot rot disease of Barley <i>R.K. Singh and R.S. Dwivedi</i>	151

Biological control of Aflatoxin production and quantitative changes in starch content and Fat acidity value of Wheat grains <i>M.K. Thakur</i>	169
Incidence of trichothecenes producing <i>Fusarium</i> on standing crop of maize <i>V. Krishna Reddy, S.M. Reddy and S. Girisham</i>	177
Effect of foliar feeding of chemicals on the rhizosphere microflora, growth, nodulation and yield in Bakla (<i>Vicia faba</i> L.) <i>Poonam Mathur and Sudhir Chandra</i>	187
Performance of pea raised from Rhizobium - treated seeds under water stress conditions in soil <i>Harbans Kaur Kehri and Sudhir Chandra</i>	197
An integrated approach for mitigating adverse impact of water stress conditions on certain legumes <i>Kumkum Saran and Sudhir Chandra</i>	205
Effect of temperature and relative humidity on the leaf surface mycoflora of Mustard <i>Brassica campestris</i> L. <i>K.L. Tiwari and S.K. Sahu</i>	213
The influence of relative humidity on <i>Beauveria bassiana</i> infectivity in Gram pod borer, <i>Heliothis armigera</i> <i>A.R. Khan and R.C. Rajak</i>	219
Thermophilic fungi in coal-mine soils of Korba Madhya Pradesh I. <i>R. V. Shukla and S.C. Agrawal</i>	225
Aerial surface mycoflora of <i>Trichosanthes anguina</i> in relation to its spoilage <i>R.C. Rajak and Sadhana Pandey</i>	231
Effect of fungicides and antibiotics on endogenous respiration and growth of <i>Curvularia</i> spp. <i>Aparna Chatterjee and S.K. Hasija</i>	237
Studies on seasonal and Diurnal variations in the occurrence of air borne spores of Basidiomycetes <i>R.P. Mishra</i>	243

Environmental biopollutants origin as fungal spores at Jabalpur <i>Karuna S. Verma and Karuna Khare</i>	253
Change in vegetative activity of some moulds in volatile emanations <i>S.K. Agnihotri and S.C. Agrawal</i>	261
Impact of pesticides on some microbial metabolites and biodegradation of pesticides <i>Ratna Nandan and H. Polasa</i>	267
Roel of bats in the ecology of <i>Blastomyces dermatitidis</i> <i>H.S. Randhawa, V.P. Chaturvedi, Sudha Kini and Z.U. Khan</i>	283
Evaluation of antifungal activity <i>in vitro</i> of some new antimycotics against three Keratinophilic fungi <i>Alka Pandey and S.M. Singh</i>	291
Forest tree health and stand management <i>Jamaluddin</i>	299
Some observations concerning applied microbiology in the Peoples Republic of China <i>Frederick T. Wolf</i>	305