Book Description

This book delves into the fascinating worlds of algae exploring their biology, ecology, and significance in various ecosystems and human applications. Algae Explore the diversity of algal forms, from microscopic phytoplankton to large seaweeds. Understand their classification, structure, life cycles, and ecological roles. Learn about their critical roles in decomposition, nutrient cycling, and symbiotic relationships. Understand the crucial roles of algae and fungi in ecosystems, including their interactions with other organisms and contributions to biogeochemical cycles. Discuss the impact of algae on environmental health, including their roles in pollution control and bioindication. Investigate the economic and industrial significance of algae. Topics include the use of algae in biofuels, pharmaceuticals, and as food sources, as well as the role of fungi in biotechnology, fermentation, and bioremediation

About the Editors:

Dr. Meenakshi is an accomplished Associate Professor of Botany at Career Point University in Kota, Rajasthan, with a total teaching experience of 8 years. She holds a Ph.D., M.Phil., and M.Sc., in Botany and B.Ed. in Education also has specialized in biotechnology. Her research interests include plant tissue culture, biotechnology, and growth hormones. She has published 8 papers in various reputable journals and has authored one book on the effect of growth hormones on potatoes in vitro. Additionally, she holds three patents related to her research work.

Dr. Anita Singh is an accomplished academician with a Ph.D. in Botany from the University of Kota, Rajasthan. With a robust background in Plant pathology and taxonomy, she has garnered extensive experience in various laboratory techniques, including colorimetry, spectrophotometry, chromatography, electrophoresis, DNA isolation Bacterial, and Fungal culture. Her research prowess is evident from her 11 published papers, covering diverse topics such as quantification of enzymes in plant diseases, seed-borne mycoflora survey, and biological management of wilt pathogens. Dr. Anita Singh's patent application on lipid quantification in Fusarium further underscores her innovative contributions to the field.

Dr. Teena Agrawal did her Ph.D. in plant taxonomy, she did her research work through CSIR-NET JRF fellowship, she has also qualified for SLET,GATE competitions with good rank, she has supervised Ph.D. students, working on phytochemistry of the angiosperms trees with the microbiological and pharmacological applications, she has number of research papers in international and national journals with Scopus indexed and UGC care listed. She has also written some books on different plant aspects. She has attended many conferences and workshops on plant sciences to learn and know the various aspects of the plant world.

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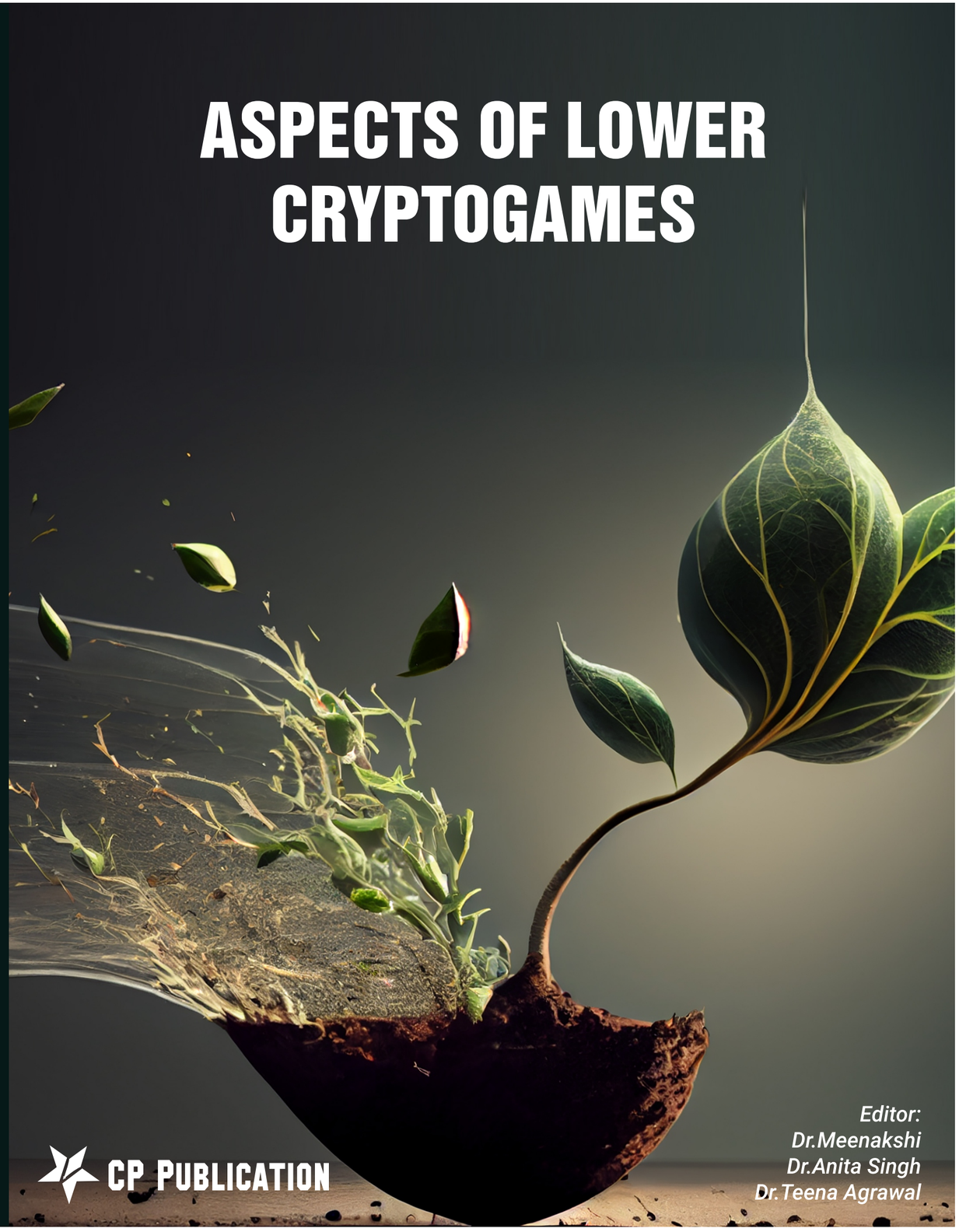

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Aspects of Lower Cryptogames

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Preface

Nowadays a very wide range of topics in botany are taught to the students of competition and B.Sc. M.Sc. degree courses. Understanding of algae is very important for the students to acquire a profound knowledge of botany. In view of this aspect, and with an experience of teaching and research for both basic and applied sciences, I felt that a concise book having all the pteridophytes and paleobotany required would be much more comfortable for the students to learn and carry with them. In this edited book, I have tried my best to incorporate all topics of algae.

It gives me great pleasure to present this book as a reference to students of all disciplines of all Major Indian and foreign Universities, Colleges and Schools. This book is written in a simple language with relevant concepts and fundamentals. I assure that this simple presentation of the reactions in this book will certainly enlighten and help all teachers and students to acquire a good command on the subject. I express my wholehearted thanks to the publication team for their sustained interest in the publication of this book. They have done a wonderful job with the neat presentation and quality printing. A lot of thanks are due to all faculty of Basic and Applied Sciences for their support, help and cooperation all through the preparation of this book.

I would also like to thank Pramod Maheshwari Sir, the Managing Director and Chairman of Career Point University, Kota. I profusely thank HOD and Dean for their inspiration, goodwill and unstinted support during the writing of the book. I express my gratitude and love to every member of my family for their constant encouragement and support to all my academic adventures.

I feel a deep sense of gratitude to all the students and the teaching community who have lent me their support and encouragement in bringing out this book. I would welcome any suggestions to improve the quality and preparation of the text of the book.

Dr. Meenakshi Kumari, Dr. Anita Singh &Dr. Teena agrawal

Book Description

Algae: Foundations, Applications, and Innovations is a comprehensive textbook designed to cater to both undergraduate and postgraduate students pursuing studies in botany, microbiology, environmental science, and related fields. This book delves into the fascinating worlds of algae exploring their biology, ecology, and significance in various ecosystems and human applications. Algae Explore the diversity of algal forms, from microscopic phytoplankton to large seaweeds. Understand their classification, structure, life cycles, and ecological roles. Learn about their critical roles in decomposition, nutrient cycling, and symbiotic relationships. Understand the crucial roles of algae and fungi in ecosystems, including their interactions with other organisms and contributions to biogeochemical cycles. Discuss the impact of algae on environmental health, including their roles in pollution control and bioindication. Investigate the economic and industrial significance of algae. Topics include the use of algae in biofuels, pharmaceuticals, and as food sources, as well as the role of fungi in biotechnology, fermentation, and bioremediation. Explore the medical implications, including the benefits of fungal-derived antibiotics and the challenges posed by fungal pathogens.Discover cutting-edge research and emerging technologies involving algae and fungi, such as genetic engineering, synthetic biology, and their applications in sustainable development. Discuss future trends and potential breakthroughs in algal research, including their roles in addressing global challenges like climate change, food security, and renewable energy. Each chapter is equipped with learning objectives, detailed illustrations, and real-world examples to facilitate understanding and engagement.

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Editors

Dr. Pushpendra Yaduvanshi

Dr. Meenakshi is an accomplished Associate Professor of Botany at Career Point University in Kota, Rajasthan, with a total teaching experience of 8 years. She holds a Ph.D., M.Phil., and M.Sc., in Botany and B.Ed. in Education also has specialized in biotechnology. Her research interests include plant tissue culture, biotechnology, and growth hormones. She has published 8 papers in various reputable journals and has authored one book on the effect of growth hormones on potatoes in vitro. Additionally, she holds three patents related to her research work.

With a strong commitment to both teaching and research, she has actively participated in online classes and completed several online courses to enhance her knowledge in various fields, including genomics and herbal medicine. She has also presented her research findings at numerous national and international conferences and seminars, earning recognition and awards for her contributions to the field of botany. Dr. Meenakshi's expertise extends beyond academia, as she has served as a reviewer for several scientific journals and actively engages in faculty development programs to improve her teaching skills. Her dedication to advancing botanical research, coupled with her passion for educating future botanists, makes her a valuable asset to the academic community. She has several research papers, book chapters, and books to his credit in international SCI journals and membership of many scientific and research societies.

Dr. Anita Singh

Dr. Anita Singh is an accomplished academician with a Ph.D. in Botany from the University of Kota, Rajasthan. With a robust background in Plant pathology and taxonomy, she has garnered extensive experience in various laboratory techniques, including colorimetry, spectrophotometry, chromatography, electrophoresis, DNA isolation Bacterial, and Fungal culture. Her research prowess is evident from her 11 published papers, covering diverse topics such as quantification of enzymes in plant diseases, seed-borne mycoflora survey, and biological management of wilt pathogens. Dr. Anita Singh's patent application on **lipid quantification in Fusarium further underscores her innovative contributions to the field**.

In addition to her academic achievements, Dr. Anita Singh has pursued numerous online courses, enhancing her skills in areas ranging from publishing ethics to plant biology and immunology. She also holds teaching experience spanning over 22 years, including her current position as an Associate Professor at Career Point University, Kota. Dr. Anita Singh's dedication to continuous learning and research, coupled with her extensive expertise in botanical sciences, makes her a valuable asset to any academic or research-oriented institution. Presently, she is serving as an Associate Professor in the Department of Botany at Career Point University, Kota (Rajasthan). Her fields of research are plant pathology. She has several research papers, book chapters, and books to his credit in international SCI journals and membership in many scientific and research societies.

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CHAPTER 11

Chlorophyceae:Oedogonium

Dr. Meenakshi Kumari

ABSTRACT

Oedogonium is a genus of filamentous green algae with significant ecological and biotechnological importance. Its role in primary production, nutrient cycling, and potential biotechnological applications underscore the value of ongoing research into its biology and environmental interactions. Enhanced understanding of Oedogonium can contribute to advancements in ecological monitoring, sustainable biofuel production, and innovative bioremediation strategies.Oedogonium provides valuable insights into the mechanisms of algal growth, cell differentiation, and reproduction. Its straightforward morphology and well-defined reproductive structures make it an excellent model for studying these processes.