

Plant Pathology: Fundamentals, Forecasting, and Biotechnological Applications

Udaybhan Yadav

Department of Botany, Thakur Shyamanarayan Degree College, Kandivali East, Mumbai, Maharahstra-400101

Amita Chandanshive

Department of Botany, Satish Pradhan Dnyansadhana College of Arts, science and Commerce, Thane - 400604

Asmita Prashant Raut

Department of Botany, Sonopant Dandekar Arts, V. S. Apte Commerce and M.H.Mehta Science College, Palghar

Simran Santosh Singh

Department of Biology, Thakur Shyamnarayan College, Kandivali East Mumbai Maharashtra 400101



Published, marketed, and distributed by:

Deep Science Publishing, 2025 USA | UK | India | Turkey Reg. No. MH-33-0523625 www.deepscienceresearch.com editor@deepscienceresearch.com WhatsApp: +91 7977171947

ISBN: 978-93-7185-449-8

E-ISBN: 978-93-7185-282-1

https://doi.org/10.70593/978-93-7185-282-1

Copyright © Udaybhan Yadav, Amita Chandanshive, Asmita Prashant Raut, Simran Santosh Singh, 2025.

Citation: Yadav, U., Chandanshive, A., Raut, A. P., & Singh, S. S. (2025). *Plant Pathology: Fundamentals, Forecasting, and Biotechnological Applications*. Deep Science Publishing. https://doi.org/10.70593/978-93-7185-282-1

This book is published online under a fully open access program and is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0). This open access license allows third parties to copy and redistribute the material in any medium or format, provided that proper attribution is given to the author(s) and the published source. The publishers, authors, and editors are not responsible for errors or omissions, or for any consequences arising from the application of the information presented in this book, and make no warranty, express or implied, regarding the content of this publication. Although the publisher, authors, and editors have made every effort to ensure that the content is not misleading or false, they do not represent or warrant that the information-particularly regarding verification by third parties-has been verified. The publisher is neutral with regard to jurisdictional claims in published maps and institutional affiliations. The authors and publishers have made every effort to contact all copyright holders of the material reproduced in this publication and apologize to anyone we may have been unable to reach. If any copyright material has not been acknowledged, please write to us so we can correct it in a future reprint.

Preface

Plant diseases have affected agricultural pattern and agriculture conditions for hundreds of years. The various crop disease like rust, blight etc. have shown significant impact on people's lives. By Understanding plant diseases and how to manage them is plays an important impact of Agricultural Pattern & Practices.

From the most fundamental ideas to the most cutting-edge biotechnological applications, the book Plant Pathology: Fundamentals, Forecasting, and Biotechnological Applications aims to provide professionals, researchers, and students with a thorough understanding of plant pathology.

The chapters are written in an acceptable manner for UG to PG Students, and they are accompanied by brief summaries, historical timelines, and photographs. Because of interdisciplinary educational system, this book is helpful not only for botany, microbiology, and agricultural sciences undergraduate and graduate programs, but also for researchers and extension agents who need to do some research.

It is my sincere hope that this book will increase knowledge about plant diseases and spur more research to improve food safety and farming sustainability.

Dr. Udaybhan Yadav Dr. Amita Chandanshive Dr. Asmita Prashant Raut Simran Santosh Singh

INDEX

Chapter	Content	Page No.
01.	Introduction of Plant Pathology: Definition and objectives of Plant Pathology, Terms and concepts in Plant Pathology, Phenomenon of infection, Pathogenesis.	1-47
02.	Plant pathogenic organisms: Fungi, Prokaryotes	48-55
03.	Plant pathogenic organisms- Fungi : General Characters of fungi, Nomenclature & Classification	56-142
04.	Plant pathogenic organisms- Prokaryotes- Eg.: Plant Viruses, Viroids	143-156
05	Defense mechanism in plants - Structural and bio-chemical (pre and postinfection)	157-166
06.	Plant disease epidemiology: Plant Disease Forecasting & Remote Sensing	167-184
07.	General principles of plant diseases management	185-187
08.	Regulatory methods of Plant Pathogens: Cultural methods, Biological control and PGPR, Physical Methods, Chemical methods, Host plant resistance.	188-255
09	Application of biotechnology in plant disease management: PTC, Gene Cloning, Transgenic Plants, Integrated plant disease management (IDM)	256-270