MYCOLOGY
&
PLANT PATHOLOGY

WILT DISEASE OF TOMATO
(SPECIAL REFERENCE TO JHARKHAND INDIA)

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DEDICATION

SMT. SHIKHA LAYEK

PREFACE

This book is the outcome of more than thirty five years' experience of Dr. Subhas Chandra Layek, as a teacher of botany, during his twenty five years have been given to a graduate and post graduate course on the various branches of Botany and ten years to a course which combined with this consideration a parallel study of the most important cultural and inoculation methods used by the practical bacteriologist and mycologist at the present day.

As my name (Dr. Sanjiv Layek) appears on the title-page of this volume, it is necessary that I should exactly state what part I had in its preparation. I had no doubt originally engaged to undertake the work, finding etc. from multiplicity of engagements from PhD thesis of Dr. Subhas Chandra Layek (who is no more) and reference to other publication. I thought the best course I could take was to recommend doctorate work done by Dr. Subhas Chandra Layek to the publishers; a gentleman well known in academic fraternity. The whole of the work has therefore been prepared on the basis of the doctorate work done by Dr. Subhas Chandra Layek, the manuscript and proof sheets being submitted and suggested such additions as seemed needful, subjoining occasionally a few notes. As the work is intended for students, the author has had no hesitation in repeating what has been stated in former chapters where it has been thought to prove useful. I have no doubt that the same high character will justly apply to this as to doctorate work done by Dr. Subhas Chandra Layek.

The following pages represent in a much extended form the lectures and laboratory exercises given by the author before his botanic classes at the Sidho Kanhu University and before public audiences elsewhere. The arrangement of the text has been suggested by the needs of the classroom and from an

acquaintance with similar work in other colleges and universities in India and other parts of the world. It is hoped that the book and the suggestions, as to teaching which it contains, will appeal to those responsible for similar courses.

The keys are given with the anticipation that they will prove useful to the student and teacher who desire laboratory experiments on wilt disease of tomato. The illustrations have been chosen with care, and credit is given in all cases for those borrowed from other books and monographs.

The author hopes that the book is reasonably free from misleading statements, and that it will prove useful to the teaching and student body. The experiments, case which are given in detailed form are designed to acquaint the student with the methods that are used in the cultural investigation of the wilt disease of tomato. It is also designed to introduce the student to the highly important subject of Technical Mycology and Pathology. The modern demands for investigators trained in technical mycology and Pathology are many. The health bureaus of our large cities need men and women, who can make a similar study of the other food supplies.

The complete book is divided into four parts for clear cut understanding to readers. Part I includes introduction of wilt disease of tomato, Part II gives emphasis on materials and methods - experiments, Part III focusses on a case of Santhal Pargana Division and Part IV provides notes and conclusion.

Tomato (Lycopersicon esculentum Mill) is the third most important vegetable crop in India and is ranked only after potato and sweet potato. It is grown in most home gardens to supply the need of the family, in most market gardens and many green houses to supply the need of the local market. Sclerotia of the

test fungus are produced in vast number and remain viable for a very long time in the fields. They cause infection and wilting disease in tomato plants.

Lastly, no single method is likely to eliminate wilt disease of tomato, caused by O. texanum var. parasiticum but it can be greatly reduced if a concerted effort is made and the following measures adopted. Repeated ploughing of the field in the month of May and June in order to expose the sclerotia to very high temperatures, maintenance of adequate soil moisture in the field, addition of nitrogen or potash or phosphate fertilizers, incorporation of enough green manure in the field at least 15 days before growing of tomato plants, showing of tomato with chilli as mixed crop, and incorporation of effective fungicides in the soil would minimize the Ozonium wilt of tomato.

✍ ***Dr Subhas Chandra Layek***
Author

✍ ***Dr Sanjiv Layek***
Editor

A C K N O W L E D G E M E N T

We owe a great debt to my colleague Dr. Rajendra Pandey M.Sc., Ph.D, F.S.S.E, Former Registrar and Principal, P.G. Deptt. of Botany, S. P. College, S. K. University, Dumka, who introduced me to study wilt disease, guided, encouraged and provided facilities throughout the course of this investigation entitled "Studies on wilt disease of tomato caused by Ozonium texanum var. parasiticum common in Santhal Pargana Division."

Our special thanks to Dr. Sanjay Kumar Sinha, Professor-in-charge, and Principal, S.P. College, Dumka for all necessary support for this text book.

We are grateful to Dr. Sanjay Kumar Sinha, Professor-in-charge, Principal, S.P. College, Dumka , Dr. B.N. Jha "Vidit", University former Professor and Principal, S.P. College, Dumka for providing necessary facilities and inspiration. I am also obliged to former Prof. A. P. Ambuj, Prof. S.K. Sinha and other teachers of the Deptt. and Sri Amtendu Kumar, lecturer, S.P. Mahila College, Sri T.N. Thakur of the Deptt. and Prof. B. Singh of the Deptt. of Physics (Rtd.) for their continuous encouragement and valuable suggestions.

I (Dr. Subhas) express my deep gratitude to my mother and wish to thank my better half Sikha Layek and my beloved sons Sanjiv, Rajeev and Abhijeet and my daughter Soma, in-laws Srabanti, Chaitali, Shipra and Pranab and grand sons and grandsons and daughters Sanjini, Srijani, Riju, Rishi, Sunny and Pritisha who always encouraged, inspired and persuaded me to complete this work even after their enormous difficulties and troubles.

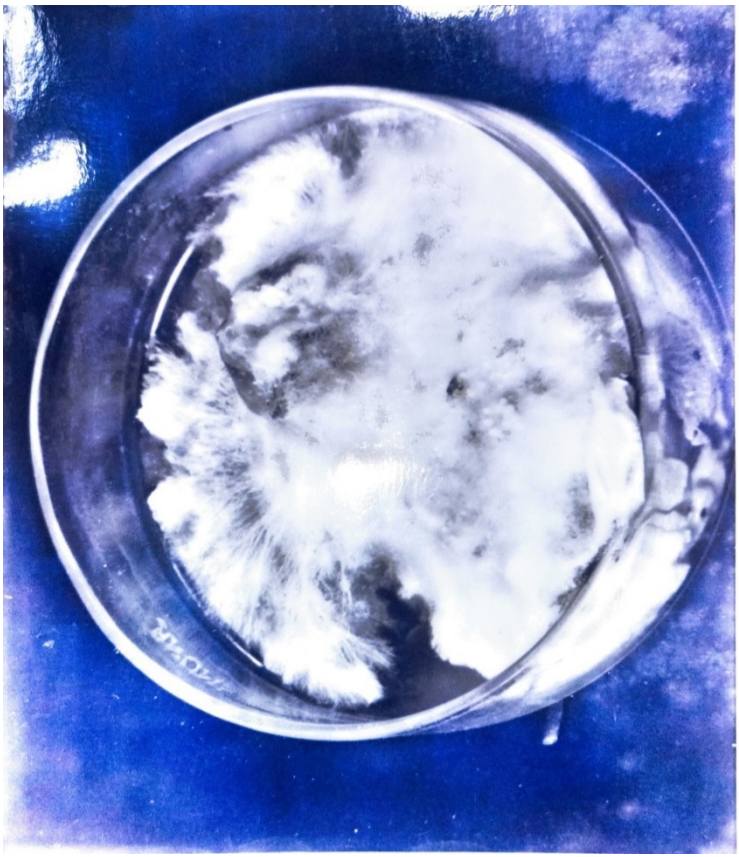
Dr. Subhas chandra layek

Dr. Sanjiv Layek

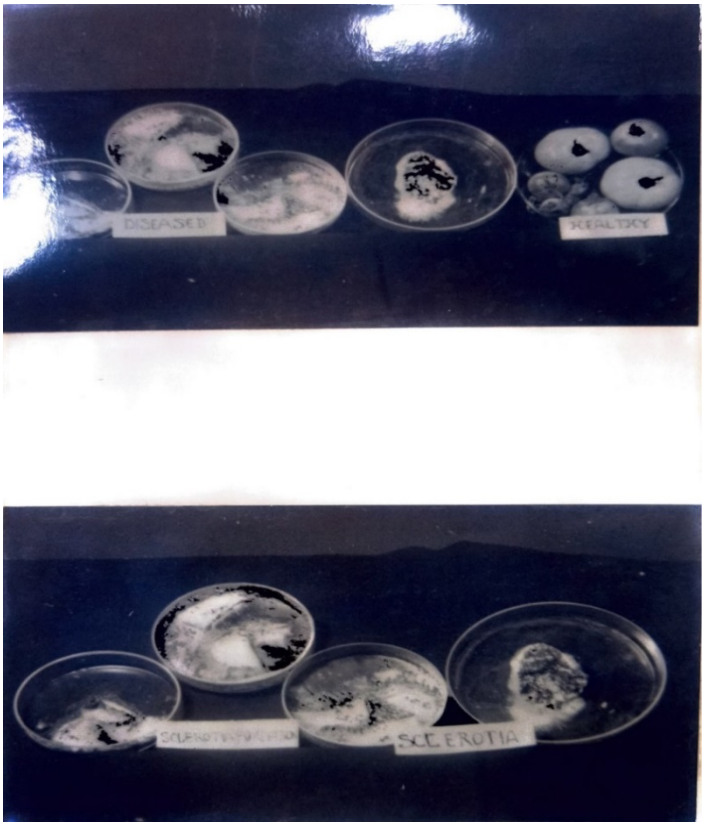
Healthy Fruits of Tomato

Healthy (H) and Diseased(D) Plants of Tomato

A petridish culture of Ozonium texanum var. parasiticum on PDA showing mycelium and young sclerotia

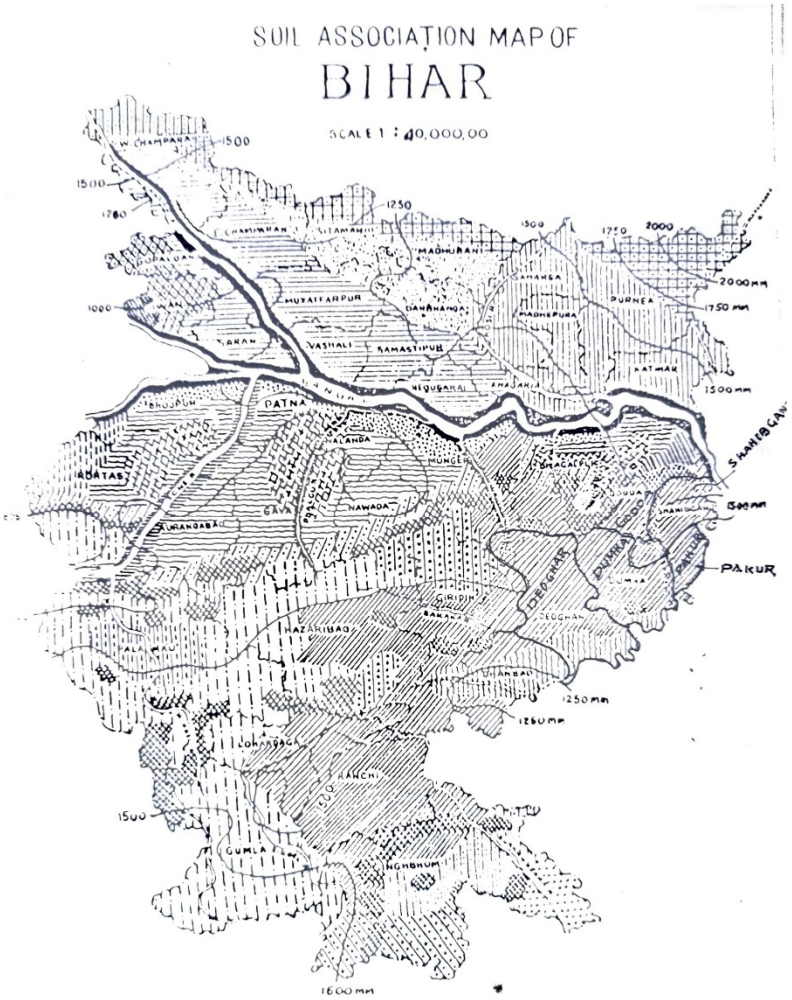


(i) Diseased and healthy fruits of tomato.
(ii) Growth of mycelium and sclerotic formation of <u>Ozonium texanum</u> var. <u>parasiticumon</u> diseased fruits of tomato.



SOIL ASSOCIATION MAP OF BIHAR

SCALE 1: 40,000.00



EQUIVALENT NAMES (GREAT GROUP) ACCORDING TO TAXOLEGEND OF BIHAR SOILS NOMICAL CLASSIFICATION OF SOILS.

1. PALEUDDLLS, UDIPSAMMENTS SUB-HIMALA-YAN HILL FOREST SOILS
2. PASMMAQUENTS, UDIFLUVENTS, RECENT ALLUYIUM – TARAI SOILS.OCHRAQUALFS.
3. SAMMAGUENTS, UDIFLUVENTS, RECENTALLUVIUM - NONCALCAREQ -US - NION SALINE AQUIC USTIFLUVENTS.
4. ODIFLUVENTS, USTIFLUVENTS, HARYOU-NG ALLUVI-UM-NOW CALCAREOUS-NON SALINE AQUENTS, USTOG-WREPTS.
5. CALCIOR THENTS, CALCUIUSTOCNREPTS YOUNG ALLUVIUM-CALCAREOUS AND CALCIHAPLAQUENTS
6. CALCIORTHENTS WITH SALIC PHASEYOUNG ALLUVIUM-CALCA-REOUSSALINE-SALINE ALXALI USTOCHREPTS.
7. HAPLAQUENTE, USTOCHREPTSNON-CALCAREOUSALLUVIAL SOILS.
8. ODIFLUENTS, FLUVAQUENTS, RECENT ALLUVIUM CALCAREOUS. CIUDIPSAMMENTS.
9. AMAQUENTS, UDIFLU QUENTS.RECENT ALLUVIUM-YELLOWISH TO REDDISH YELLOW-CIUDIPSAMMENTS. NONCALCAREOUS-NON SALINS.
10. PELLUSTERTS, UDICPELLUSTERTS.TAL LAND SOILS-LIGHT GREY-DARK GREY MEDIUM TO HEAVY TEXTURED SOILS.
11. CHROMUSTERTS, PELLUSTERTS. OLD ALLUVIUM GREY-GREYISH YELLOW – HEAVY TEXTURED SOILS WITH CRACHING.
12. PALEUSTALFS, HAPLUSTALFS, HAR-OLD ALLUVIUM - REDDISH YELLOW – YELLOW LAQUENTS.GREY CATENARY SOILS.
13. PATRUSTALFS, NATRUDALFS, ARI-OLD ALLUVIUM-GALINE & S ALINE ALKALI SOILS PALEUSTALFS.
14. ALEUSTALFS, HAPLUSTALFS. OLD ALLUVIUM-YELLOWISH RED – YELLOW SOILS OF FOOT HILLS.

15. EUDORTNENTS, DYSTOCHREPTS, OCW-HILL & FOREST SOILS OF STEEP SLOPES AND RAQULTS, RUDUSTALFS.HIGHLY DISSECTED REGION.
16. HAPLUDULTS, OCMRAQULTS, RHOD-RED-YELLOW – LIGHT GREY CATEN-ARY SOILS.PLUSTULTS, RWDDUSTALFS.
17. LUSTALFS, HAPLUDULTS, PALE-YELLOW-REDDISH YELLOW MEDIUM DEEPLTS. LIGHT TEXTURE CATENARY SOILS.
18. THKAGULTS, RWODUSTALFS, PALE-PALE YELLOW – YELLOW – PINKISH DEEP FULTS. CATENARY SOILS ON MICARCRUS SCHISTS.
19. RAPLUSTULTS, HAPLUSTFLFS, REDDISH YELLOW-YELLOW-GREYISH YELLOW RHDDUSTALFS, HAPLDULTS.DEEP CATENARY SOILS ON COAL BELT.
20. TELLUDERTS, USTORTHENTS, UPCAND GREY – YELLOWISH GREY – HEAVY SOILS PALEUDALFS, PALEUSTULTS.ON SEDENTARY AND ALLIED ROCKS.
21. PALENUMULTS, CMROMUDULTS, YELLOW RED – YELLOW – BLACK CATENARY PALEUDERTS, PALEUSTULTS. SOILSON RAJMA-HAL TRAP ROCKS.
22. DUSTULTS, USTORTNENTS, RED YELLOW – CHOCOLATE SOILS OF IRON ORE SDUSTALFS, PELLUSTERTS. REGION
23. HUDDUSTULTS, CHROMUSTERTS, MIXED RED – YELLOW BLACK CATENARY SOILS DUTGRTNENTS, HAPLUDALFS. OF SINGHBHUM.
24. PEINTMUSTULTS, PLINTHAQULTS, RED YELLOW GROUND WATER LATERITE SOILS.PLINTNUSTALFS.

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XXVI. Effect of different levels of soil moisture on the development of wilt of tomato plants caused by O. texanum var. parasiticum in inoculated series

XXVII. Effect of different soil composition on the development of wilt of tomato plants caused by O. texanum var. parasiticum in inoculated series

XXVIII. Effect of soil application of urea on the development of wilt of tomato plants caused by O. texanum var. parasiticum in inoculated series

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XXX. Effect of soil application of single super phosphate on the development of wilting of tomato plants caused by O. texanum var. parasiticum in inoculated series

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