

Annexure- V

Course Title: Basics of Plant Virology

Credits:4-0-0

Course objectives:

The course aims to give an introduction to the origin, evolution, taxonomy, structure, transmission, replication, diagnostics and control strategies of plant viruses. Viruses evolve very fast, cause serious diseases in economically important plants, and pose serious threat to agriculture and food security. Knowledge about plant viruses would prepare the graduates for addressing these issues.

Course outcomes:

On successful completion of this course, the students should be able to:

- 1) understand the origin and evolution of viruses, the history of virology, taxonomy of viruses, and differentiate between viruses and virus-like infectious agents.
- 2) describe structures and genome organisations of plant viruses and various events involved in virus replication.
- 3) describe various methods to study and diagnose plant viruses.
- 4) strategise control measures, and devise applications of plant viruses.

Syllabus

Unit 1: Introduction to plant viruses and virus-like infectious agents

Introduction to plant viruses, history of virology, origin and evolution of viruses, virus taxonomy. Defective particles, satellite nucleic acids and satellite viruses, viroids, prions, bacteriophages and virophages.

Unit 2: Virus structure and replication

Structure of viruses, genome organization and expression of viral genomes. Replication of RNA and DNA Viruses: entry, genome replication, transcription, translation, assembly and exit with emphasis on TMV, Caulimo virus, Tobacco Mosaic Virus, Tomato leaf curl virus.

Unit 3: Methods to study plant viruses

Host range, transmission, movement and symptomatology of plant viruses. Propagation, purification and characterization of plant viruses. Physical, biochemical, serological and molecular methods of virus detection, diagnosis and assay.

Unit 4: Plant virus control and applications

Conventional control of plant viruses, quarantine, conventional resistance to plant viruses, transgenic approach of virus control, antiviral compounds. Applications of plant viruses in biotechnology, nanotechnology, medicine and human health.

Suggested Readings:

- 1) Roger Hull. Comparative Plant Virology. Academic Press. 2009. ISBN: 978-0123741547

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- 2) Alan J. Cann. Principles of Molecular Virology. 6th Edition. Academic Press. 2015.
ISBN: 978-0128019467
- 3) J. Carter and V. Saunders. Virology: Principles and Applications. John Wiley & Sons Ltd. 2013. ISBN: 978-1119991427
- 4) S.J. Flint, L.W. Enquist, V.R. Racaniello, A.M. Skalka. 2009. Principles of Virology. American Society for Microbiology. ISBN: 978-1555814434
- 5) D.M. Knipe and P.M. Howley. Fields Virology. 2013 Lippincott Williams and Wilkins
ISBN: 978-1451105636

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