

PATH 171: PLANT PATHOGENS AND PRINCIPLES OF PLANT PATHOLOGY (2+2)

Theory

1. Introduction
2. Important plant pathogenic organisms- different groups- fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa and phanerogamic parasites with examples of diseases caused by them.
3. General Characters of fungi- Definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction in fungi (asexual and sexual).
4. Nomenclature-Binomial system of nomenclature, rules of nomenclature, classification of fungi. Key to divisions and sub-divisions.
5. Division I: Myxomycota, Class: Plasmodiophoromycetes, Order: Plasmodiophorales,
Division II: Eumycota
6. Subdivision: Mastigomycotina, class: Chytridiomycetes (Chytridiales), Oomycetes (Peronosporales).
7. Subdivision: Zygomycotina (Mucorales),
8. Subdivision: Ascomycotina, class: Hemiascomycetes (Taphrinales), class: Plectomycetes (Eurotiales), class: Pyrenomycetes (Erysiphales, Clavicipitales), class: Loculoascomycetes (Pleosporales),
9. Subdivision: Basidiomycotina, class: Teliomycetes (Uredinales, Ustilaginales) class: Hymenomycetes (Aphylllophorales)
10. Subdivision: Deuteromycotina: class: Coelomycetes (Sphaeropsidales), class: Hyphomycetes (Hyphomycetales, Agonomycetales).
11. Prokaryotes: classification of prokaryotes according to Bergey's Manual of Systematic Bacteriology. General characteristics of bacteria and examples of phytopathogenic bacteria, fastidious vesicular bacteria, phytoplasmas and spiroplasmas.
12. Plant viruses-general characteristics and examples of plant diseases caused by viruses.
13. Viroids- general characteristics and examples of diseases caused by viroids.
14. Definition and objectives of Plant Pathology. History of Plant Pathology.
15. Terms and concepts in Plant Pathology. Survival and Dispersal of Plant Pathogens.
16. Phenomenon of infection – pre-penetration, penetration and post penetration.

17. Pathogenesis – Role of enzymes, toxins, growth regulators and polysaccharides.
18. Defense mechanism in plants – Structural and Bio-chemical (pre and post-infection).
19. Plant disease epidemiology – Meaning and importance, difference between simple and compound interest diseases – Factors affecting plant disease epidemics – host, pathogen, environment and time factor.
20. Plant Disease Forecasting – Meaning, advantages, methods in forecasting and examples.
21. Remote sensing – Meaning, scope, objectives, advantages.
22. General principles of plant diseases management – Importance, general Principles – Avoidance, exclusion, eradication, protection and therapy, immunization.
23. Regulatory methods – Plant Quarantine and Inspection – Quarantine Rules and Regulations.
24. Cultural methods – Rouging, eradication of alternate and collateral hosts, crop rotation, manure and fertilizer management, mixed cropping, sanitation, hot weather ploughing, soil amendments, time of sowing, seed rate and plant density, irrigation and drainage.
25. Biological control and PGPR – Scope and importance – Role and mechanisms of biological control and PGPR with examples. Plant growth promoting rhizobacteria.
26. Physical Methods – Heat treatments, soil solarization, hot water treatment, hot air treatment, control by refrigeration and radiation.
27. Chemical methods – study of different groups of fungicides.
Methods of application of fungicides.
28. Host plant resistance – Importance – disease resistance, tolerance, susceptibility and disease escape. Horizontal and vertical resistance – Method of management of resistance. Immunization – Systemic acquired resistance.
29. Application of biotechnology in plant disease management – Importance, production of pathogen free plants through tissue culture techniques.
30. Development of disease resistant transgenic plants through gene cloning.
31. Integrated plant disease management (IDM) – Concept, advantages and importance.

References

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