

**TEXT BOOK (Volume-I)**  
**BASICS OF PLANT PATHOLOGY**

**Editors:**

**Proposed Content:**

	<b>Title</b>	<b>Name of Contributor (s)</b>
<b>1</b>	<b>Introduction to Plant Pathology</b>	
	<ul style="list-style-type: none"> <li>• Definition</li> <li>• Objectives</li> <li>• Relationships to other sciences</li> <li>• Importance of plant diseases</li> </ul>	
<b>2</b>	<b>The concept of disease in plant</b>	
	<ul style="list-style-type: none"> <li>• <b>Definitions of plant disease:</b> working definition, Horsefall and Diamond, American Phytopathological Society and British Mycological Society</li> <li>• Recent concept of disease</li> </ul>	
<b>3</b>	<b>History of Plant Pathology</b>	
	<ul style="list-style-type: none"> <li>• <b>Brief history of development of plant pathology:</b> Significant contributions</li> <li>• <b>History of Plant Pathology in India</b></li> </ul>	
<b>4</b>	<b>Causes of Plant Disease I : Inanimate causes</b>	
	<b>Causes of Plant Disease II: Animate causes</b> <ul style="list-style-type: none"> <li>• Brief introduction of plant pathogenic microorganisms and few examples of diseases they cause</li> <li>• Fungi, bacteria, mollicutes, fastidious vascular bacteria, actinomyces virus, viroids, flagellate protozoa, algae, parasitic higher plants</li> </ul>	
<b>5</b>	<b>Classification of plant diseases</b>	
	<b>Basis of classification</b> <ul style="list-style-type: none"> <li>❖ <b>Nature of major causal agents:</b> e.g. infectious/non-infectious</li> <li>❖ <b>Organs attacked:</b> e.g. fruit disease/ leaf disease/root disease etc.</li> <li>❖ <b>Symptoms produced:</b> e.g. rust/smuts/ wilts etc.</li> <li>❖ <b>Group of microorganism involved:</b> e.g. fungal/bacterial/viral etc.</li> <li>❖ <b>Occurrence:</b> e.g. endemic/epidemic/sporadic/pandemic</li> <li>❖ <b>Production and spread of inoculums</b></li> </ul>	
<b>6</b>	<b>Development of disease in plants</b>	
	<ul style="list-style-type: none"> <li>• Disease triangle</li> <li>• Development of disease cycle and life cycle of pathogen</li> <li>• Different events of disease cycle or pathogenesis</li> <li>• Parasitism and Pathogenicity</li> </ul>	
<b>7</b>	<b>Plant-pathogen interaction</b>	

	<ul style="list-style-type: none"> <li>• How pathogens attacks plants</li> <li>• Mechanical, biochemical weapons</li> <li>• Plant Defense system against pathogens</li> </ul>	
<b>8</b>	<b>Fungi as plant pathogen</b>	
	<ul style="list-style-type: none"> <li>• Difference between fungi and plants</li> <li>• Definition of fungi (Alexopoulos,1962)</li> <li>• Vegetative structure: Thallus (eucarpic, holocarpic), hyphae, mycelia, intercellular, intracellular, the septa</li> <li>• A typical fungal cell: its organs and their functions</li> <li>• The specialized somatic structures: Rhizoids, Appressorium, Haustorium, Hyphopodium</li> <li>• Vegetative reproduction</li> <li>• Asexual Reproduction and Sexual reproduction in Fungi</li> </ul>	
<b>9</b>	<b>Plant Pathogenic Prokaryotes</b>	
	<ul style="list-style-type: none"> <li>• Prokaryote Vs Eukaryote</li> <li>• Five kingdom classification (<b>Whittaker,1969</b>)</li> <li>• Classification of Plant Pathogenic bacteria</li> <li>• Structure and composition of bacterial cell</li> <li>• General morphology: Coccus, bacillus, spirillum, vibrio, filamentous, stalk, bud etc.</li> <li>• Reproduction in bacteria</li> </ul>	
<b>10</b>	<b>The Plant Pathogens: Other than bacteria</b>	
	<ul style="list-style-type: none"> <li>• <b>Mollicutes:</b> General characters and disease caused by phytoplasma, spiroplasma</li> <li>• <b>Fastidious vascular bacteria, actinomycetes:</b> General characters and diseases they cause</li> <li>• Flagellate Protozoa, Green Algae and parasitic higher plants</li> </ul>	
<b>11</b>	<b>Plant Pathogens: Viruses and Viroids</b>	
	<ul style="list-style-type: none"> <li>• Definition of virus</li> <li>• Structure of plant viruses:</li> <li>• Classification</li> <li>• Transmission and reproduction of viruses</li> </ul>	
<b>12</b>	<b>Survey and Surveillance of plant diseases</b>	
	<ul style="list-style-type: none"> <li>• Concept and Objectives of survey, surveillance</li> <li>• Types of surveillance</li> <li>• Difference between survey &amp; surveillance</li> <li>• Methods of survey</li> <li>• Disease surveillance reports</li> <li>• Disease monitoring</li> <li>• Satellite and remote sensing</li> </ul>	
<b>13</b>	<b>Epidemiology and Plant Disease Forecasting</b>	
	<ul style="list-style-type: none"> <li>• Concept of plant disease epidemic, importance of forecasting, method of forecasting, Requirements or conditions for disease forecasting time</li> </ul>	
<b>14</b>	<b>Principles of disease management and concept of IDM</b>	
	<ul style="list-style-type: none"> <li>• Principles of disease management</li> <li>• Concept of IDM</li> <li>• Goals of IDM</li> </ul>	

	<ul style="list-style-type: none"> <li>• History and milestones in IDM</li> <li>• Principle and components of IDM</li> <li>• Implementation of IDM practices in developing countries</li> </ul>	
15	<p><b>Chemical control</b></p> <ul style="list-style-type: none"> <li>• Formulations of fungicides: Wettable powder, dust, emulsifiable concentrates, Granules, Solutions, Suspension or Slurries</li> <li>• Classification of fungicides based on chemical composition</li> <li>• Fungicide resistance and management</li> <li>• <b>Antibiotics:</b> Mode of action</li> </ul>	
16	<p><b>Management of disease through Host resistance</b></p> <ul style="list-style-type: none"> <li>• Specific and general resistance, monogenic and polygenic resistance, vertical and horizontal resistance</li> <li>• <b>Development of resistant varieties :</b> Selection, hybridization and mutation</li> <li>• <b>Testing of resistant varieties:</b> Selection of area, inoculation of race of the pathogen, cultivation for several years etc.</li> </ul>	
17	<p><b>Cultural methods of disease management</b></p> <ul style="list-style-type: none"> <li>• <b>Production and use of pathogen free propagating material:</b> Dry climate, inspection of field, drying, ageing, cleaning and treatment of seeds, adjustment of harvesting time.</li> <li>• <b>Adjustment of crop culture to minimize disease:</b> Crop rotation, time of sowing, spacing, mixed cropping, irrigation and nutrition</li> </ul>	
18	<p><b>Biological management</b>  History, Definition, Mode of action of biocontrol agents, Description of some biocontrol agents, advantages/limitations, application methods of bioagents</p>	

**TEXT BOOK (Volume-II)**  
**Diseases of Field and Horticultural Crops**

**Proposed Content**

	Title	Name of Contributor(s)
	<b>DISEASES OF FIELD CROPS</b>	
1.	<b>Rice:</b> blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro;	
2.	<b>Wheat:</b> rusts, loose smut, karnal bunt, powdery mildew, <i>Alternaria</i> blight, and ear cockle;	
3.	<b>Maize:</b> stalk rots, downy mildew, leaf spots; <b>Sorghum:</b> smuts, grain mold and anthracnose,	
4.	<b>Bajra:</b> Downy mildew and ergot; <b>Finger millet:</b> Blast and leaf spot	
5.	<b>Groundnut:</b> early and late leaf spots, wilt, ground nut bud necrosis <b>Soybean:</b> Rhizoctonia blight, bacterial spot, seed and seedling rot and mosaic;	
6.	<b>Black &amp; Green gram:</b> Cercospora leaf spot and anthracnose, web blight and yellow mosaic <b>Pigeonpea:</b> Phytophthora blight, wilt and sterility mosaic;	
7.	<b>Tobacco:</b> black shank, black root rot and mosaic <b>Castor:</b> Phytophthora blight;	
8.	<b>Sugarcane:</b> red rot, smut, wilt, grassy shoot, ratoon stunting and PokkahBoeng;	
9.	<b>Cotton:</b> anthracnose, vascular wilt, and black arm; cotton leaf curl	
10.	<b>Sunflower:</b> <i>Sclerotinia</i> stem rot and <i>Alternaria</i> blight; <b>Castor:</b> Phytophthora blight;	
11.	<b>Mustard:</b> <i>Alternaria</i> blight, white rust, downy mildew and <i>Sclerotinia</i> stem rot;	
12.	<b>Gram:</b> wilt, grey mould and <i>Ascochyta</i> blight; <b>Lentil:</b> rust and wilt; <b>Pea:</b> downy mildew, powdery mildew and rust	
	<b>DISEASES OF HORTICULTURAL CROPS</b>	
13.	<b>Mango:</b> anthracnose, malformation, bacterial blight and powdery mildew	
14.	<b>Citrus:</b> canker and gummosis; Greening other diseases	
15.	<b>Grape vine:</b> downy mildew, Powdery mildew and anthracnose;	
16.	<b>Apple:</b> scab, powdery mildew, fire blight and crown gall; <b>Peach:</b> leaf curl <b>Strawberry:</b> leaf spot	
17.	<b>Potato:</b> early and late blight, black scurf, leaf roll, and mosaic	
18.	<b>Cucurbits:</b> downy mildew, powdery mildew, wilt;	
19.	<b>Onion and garlic:</b> purple blotch, and <i>Stemphylium</i> blight; <b>Chillies:</b> anthracnose and fruit rot, wilt and leaf curl;	
20.	<b>Turmeric:</b> leaf spot <b>Coriander:</b> stem gall	

21.	<b>Marigold:</b> Botrytis blight; <b>Rose:</b> dieback, powdery mildew and black leaf spot.	
22.	<b>Guava:</b> wilt and anthracnose; <b>Pomegranate:</b> bacterial blight	
23.	<b>Coconut:</b> wilt and bud rot	
24.	<b>Banana:</b> Panama wilt, bacterial wilt, Sigatoka and bunchy top;	
25.	<b>Papaya:</b> foot rot, leaf curl and mosaic,	
26.	<b>Cruciferous vegetables:</b> Alternaria leaf spot and black rot;	
27.	<b>Brinjal:</b> Phomopsis blight and fruit rot and Sclerotinia blight; <b>Okra:</b> Yellow Vein Mosaic; <b>Ginger:</b> soft rot;	
28.	<b>Tomato:</b> damping off, wilt, early and late blight, buck eye rot and leaf curl and mosaic;	
29.	<b>Beans:</b> anthracnose and bacterial blight; <b>Colocasia:</b> Phytophthora blight;	
30.	<b>Tea:</b> blister blight; <b>Coffee:</b> rust	