

**MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION**

B.Sc. (Hons.) Agriculture

Semester	: V (New)	Term	: First	Academic year	: 2023 – 24
Course No.	: PATH 354	Title	: Diseases of Field and Horticultural Crops and their Management-I		
Credits	: 3 (2+1)				
Day & Date	:	Time	: 3 hrs.	Total Marks	: 80

- Note :**
1. Solve ANY EIGHT questions from SECTION 'A'
 2. All questions from SECTION 'B' are compulsory.
 3. All questions carry equal marks.
 4. Draw neat diagrams wherever necessary

SECTION "A"

Q.1	<p>Describe causal organism, perpetuation, symptoms and control measures for damping off diseases of tomato.</p> <p>Causal organism: <i>Pythium aphanidermatum</i>, <i>P. debaryanum</i>, (1 mark)</p> <p>Symptoms: (2 marks)</p> <p>The disease occurs in two stages i) Pre-emergence phase and ii) Post-emergence phase. In the pre-emergence phase of disease, the young seedlings are killed before they reach to the surface of the soil. The radicle and plumule undergo complete rotting. In the post-emergence phase of disease, infection usually occurs at or below the ground level and the infected tissue appear soft and water soaked. As the disease advances the stem becomes constricted at the base and plant collapses. Such symptoms are very common in seed beds.</p> <p>Perpetuation : (2 marks)</p> <p>The fungus survives in the form of oospores or mycelium in soil or seed. Primary infection takes place through seed and infected soil. Secondary infection by zoospores carried by irrigation water.</p> <p>Control measures : (3 marks)</p> <p>1) Avoid water-logged and low lying land. 2) Use seed from disease free area. 3) Seed treatment with fungicide thiram 75% WP @3gm/kg seed. 4) Seed treatment with <i>T. viride</i> @4g/kg seed. 5) Soil treatment with formaldehyde (Formalin 40%) diluted to 50 times with water or 1% Bordeaux mixture 15 to 20 days before sowing. 5) Sowing on raised seed beds and avoid over-crowding. OR other effective control measures.</p>
Q.2	<p>Write causal organism, symptoms and management of following diseases (ANY TWO).</p> <p>1) Bud rot of coconut 2) Black rot of crucifers 3) Wilt of guava</p> <p>1. Bud rot of coconut :</p> <p>Causal organism : <i>Phytophthora palmivora</i> (1 mark)</p> <p>Symptoms: (1.5 marks)</p> <p>Initially withering of spear leaf which, subsequently turns brown and bends. In due course of time, the younger leaves, closer to the spindle also show similar symptoms. Internal tissues develop discoloration assuming a pale pink colour with a brown border. Base of the spindle rots and can be detached with a gentle pull. It emits a foul smell.</p> <p>Disease management: (1.5 marks)</p> <p>1. 1. Field sanitation</p> <p>2. Regular spraying with copper fungicides like 1% B. M, COC @ 2.5% at 40 days intervals</p>

especially before and after monsoon as an effective preventive measure.
 3. In copper sensitive palms, keeping perforated sachets containing Dithane M-45 in the leaf axils during rainy season is useful.
 4. Spraying of Metalaxyl + Mancozeb @ 0.2% 2-3 sprays at 30 days interval.
 4. Injection of coconut stem with systemic fungicides like Aliette and Ridomil @ 3 g a.i./palm. Or any other effective control measures.

2) Black rot of crucifers :

Causal organism: *Xanthomonas campestris* pv. *campestris*

(1 mark)

Symptoms:

(1.5 marks)

In the seedling developed from infected seeds, the lesions first appear mostly on the cotyledons, which enlarge and coalesce. Cotyledons turn yellow to black, wilt and drop prematurely. Severely affected plants became stunted and the leaves defoliate prematurely. The diagnostic symptom in the field is 'V-shaped' yellowish spots on the veins and veinlets which turn black causing discolouration of the vascular bundles. The infection is systemic.

Control measures:

(1.5 marks)

1. Field sanitation and crop rotation.
2. Use disease free seed.
3. Seed treatment with 0.1 per cent Mercuric chloride solution for 30 minutes to eradicate surface borne bacteria.
4. Hot water seed treatment at 50° C for 30 minutes effectively killed both internally and externally seed borne pathogen.
5. Spray the crop with copper fungicides (0.25%), give first spray when the crop is 5-6 weeks old and subsequent sprays at an interval of 15 days.

3) wilt of guava : Causal organism : *Fusarium oxysporum* f. sp. *psidii*

(1 mark)

Symptoms:

(1.5 marks)

Yellowing and browning of leaves, discolouration of the stem and death of the branches along one side. Sometimes the infection girdles the stem and the whole plant may wilt. Leaves die and the twig barks split.

Management :

(1.5 marks)

Dry branches should be cut off and wilted plants uprooted. The soil of the pits should be treated with 37 to 40 per cent formaldehyde (45 ml of formaldehyde plus 270 ml of water plus 35 kg of soil). This treatment has to be covered with a polythene sheet for at least 15 to 20 days. When the traces of formalin disappears, the pits are filled with this soil after planting the tree. Or any other effective control measures.

Q.3

Give important symptoms of following diseases (ANY FOUR).

- | | | |
|----------------------------------|---------------------------|-------------------------|
| 1. Downy mildew of bajra | 2. Wilt of pigeon pea | 3. Head smut of sorghum |
| 4. Bacterial leaf blight of rice | 5. Early blight of tomato | |

1. Downy mildew of bajra :

(2 marks)

1) Chlorosis and downy phase

- i) Appearance of chlorosis in seedling stage
- ii) Corresponding lower surface bears white downy growth of the fungus.
- iii) The downy growth consists of sporangiophores and sporangia. Infected leaves and inflorescences produce sporangia over a considerable period of time under humid conditions.

2) Dwarfing and excessive tillering

- i) Dwarfing of the seedlings due to shortening of internodes.
- ii) Induction of excessive tillering in early infections.

3) Green ear or Witches broom stage

- i) The inflorescence of infected plants gets completely or partially transformed into leafy

- structures, giving the typical symptom of green ear or witches broom,
- ii) Transformation may be of following three types:
 - a) Normal length of ear head with complete transformation of ear head.
 - b) Normal length of ear head with partial transformation of lower half into leafy structures
 - c) Reduced length of inflorescence with complete transformation into leafy structures without bearing any grains.
 - iii) Infection converts the various floral parts viz. glumes, palea, stamens and pistils into green, linear leafy structures of variable lengths.
 - 4) Necrosis : Death of infected tissue occurs. The dry necrotic tissues contain masses of oospores.

2. Wilt of pigeon pea :

(2 marks)

The main symptom of the disease is wilting of seedlings and adult plants as if they have suffered from water shortage even though there may be plenty of moisture in the field. Wilting is characterized by gradual, sometimes sudden, yellowing, drooping and drying of leaves followed by drying of the entire plant or sometimes of its branches. Examination of roots of infected plants show discoloration of vascular tissues when split open longitudinally and dark streaks are observed under the bark of roots. Sometimes dark brown bands may be seen on the main stem.

3. Head smut of sorghum :

(2 marks)

The head is mostly completely or some times partially replaced by a large sorus. The sorus is first covered by a whitish grey membrane of fungal tissue, which ruptures often before the head emerges from boot leaf of the host, to expose the mass of brown, black powder, among which are embedded long, thin, dark coloured filaments which are the vascular bundles of the infected head. These filaments resemble like hairs and therefore it is locally called as *Zipari* or *Kesal Kanhi*. The spores are blown away, exposing the dark filaments. In this smut, usually entire ear is transformed where as in other three smuts, individual florets are infected.

4. Bacterial leaf blight of rice :

(2 marks)

1) Kresak phase

- i) Results from early systemic infection
- ii) Leaf rolling, drooping, yellowing and withering of tillers
- iii) Death of the affected tiller is common in tropics
- iv) Confusion with stem borer affected tillers which are easily pulled out while that of "kresak" not.

2) Leaf blight

- i) Water soaked translucent spots on margin and along with Midrib.
- ii) Elongated streaks with wavy margin becoming white yellow or straw coloured.
- iii) Streaks coalesce, filling vascular bundles with bacteria.
- iv) Milky or opaque bacterial exudations from leaf leaving white encrustations.
- v) Grain discoloration with water soaked spot.

5. Early blight of tomato :

(2 marks)

On the leaves, spots of varying size appear. The spots are small isolated pale brown to dark spots, circular to angular in shape, mostly up to 3 to 4 mm in diameter, and with concentric lines inside the spots. Often several spots coalesce to form large patches resulting in the leaf blight. As a rule the lower leaves are affected first and the disease progresses upwards. In severe cases of infection the leaves dry up, shrivel and drop off. Fruits are infected in the green and ripe stage, the disease appears on fruits as dark brown, usually

	sunken spots, which may enlarge to the extent that they involve most of the fruits.
Q.4	<p>Write perpetuation for following diseases (ANY FOUR).</p> <div style="display: flex; justify-content: space-between;"> a) Blast of finger millet b) Panama wilt of banana </div> <div style="display: flex; justify-content: space-between;"> c) <i>Phomopsis</i> blight of brinjal d) <i>Phytophthora</i> blight of colocasia </div> <p>e) <i>Alternaria</i> leaf spot of crucifers</p> <p>a) Blast of finger millet : (2 marks) The fungus is seed-borne and the primary infection takes place through the seed-borne conidia and also the other crops serve as source of inoculum. The secondary spread is through air- borne conidia.</p> <p>b) Panama wilt of banana : (2 marks) The pathogen is soil-borne. It survives in the form of chlamydospores in soil for longer periods. The primary spread of the disease is through infected suckers and secondary spread is through irrigation water.</p> <p>c) <i>Phomopsis</i> blight of brinjal : (2 marks) The fungus survives in the infected plant debris in the soil. It is seed borne. The spores are spread by rain splashes. The fungus spreads through implements and insects. The fungus requires wet weather and high temperature ($30\text{--}32^{\circ}\text{C}$) for disease development.</p> <p>d) <i>Phytophthora</i> blight of colocasia : (2 marks) The fungus over winters in the form oospores in plant debris and soil. Other colocasia plants like Elephants ear and Dasheen are additional mean. Oospores germinates to produce sporangiophore bearing lemon shaped sporangia which infect colocasia leaves directly via germ tube or indirectly by producing zoospores that spreads through irrigation water.</p> <p>e) <i>Alternaria</i> leaf spot of crucifers : (2 marks) <i>A. brassicicola</i> and <i>A. brassicae</i> cause black leaf spot and <i>A. raphani</i> cause radish leaf spot. All these pathogens are seed borne under the seed coat and thus can be transported with seed to new fields and countries. The fungi subsist as mycelium in the infected plant refuse. They also survive in susceptible weeds or perennial crops.</p>
Q.5	<p>Comment on yellow vein mosaic of okra and banana bunchy top diseases on following points.</p> <div style="display: flex; justify-content: space-around;"> 1) Causal agent 2) Symptoms 3) Transmission 4) Control measures </div> <p>Yellow vein mosaic of okra.</p> <p>Causal organism- Yellow vein mosaic virus (YVMV) DNA virus (1 mark)</p> <p>Symptoms: (1 mark) The infected plants are stunted. The leaves are reduced and often curled. All veins and veinlets turn yellow while entire lamina remains green. Most of the affected leaves show thickening of veins on the lower side of the leaves. The fruits produced on diseased plants are small in size, pale in colour and often deformed. The inter node distance get reduced, leaf size, petiole length and fruit length is also reduced. Fruits on diseased plants are short, somewhat thick and are brittle and poor in quality.</p> <p>Transmission : The virus causing yellow vein mosaic is not transmitted through sap but it spreads in nature by white flies, <i>Bemisia tabaci</i>. (1 mark)</p> <p>Management : (1 mark)</p> <ol style="list-style-type: none"> Eradication of infected plants. Rouging of plants during early stage of growth. Spraying the crop every 10 days with Dimethoate 0.05 per cent or Endosulfan 0.06 per cent. Destruction of weed host and other malvaceous hosts whenever possible should also be given importance viz. <i>Hibiscus ablesmoschus</i>, <i>H. tetraphyllus</i>, <i>Althaea rosea</i>.

5. Use of resistant varieties like Versha upahar, Arka Anamika, Arka Abhay, Varsha Upahar and tolerant variety like Parbhani Kranti.

Banana bunchy top disease :

Causal agent: *Banana Bunchy top virus* (BBTV) or *Banana virus 1* or *Musa virus 1*

(1 mark)

Symptoms:

(1 mark)

The affected leaf shows streaks on the secondary veins on the underside of lamina and on the midrib and petiole. The streaks are about 0.75 mm wide and vary in length upto 2.5 cm. The powdery bloom covers the midrib and petiole. If this is rubbed off the dark green streaks can be clearly seen. The streaks form a series of dark green dots at a continuous dark green line with a ragged edge. The subsequent leaves, show the same symptoms and are progressively dwarfed. They also show marginal chlorosis and curling. The leaves are brittle in texture and petioles are incompletely elongated. Pale, whitish streaks may be seen along the length of lamina. In subsequent leaves unfurling process is premature but slow so that several leaves are unrolling at the same time. The leaves become smaller and eventually the crown of the plant becomes composed of stunted leaves, the rosette or bunchy top. The opening bunches are constricted or 'choked' by the pseudostem and may split instead of emerging in the normal fashion. Bunches are itself reduced in size and the fruit loses its market value.

Transmission :

(1 mark)

BBTV is not transmitted mechanically. The major vector is the banana aphid, *Pentalonia nigronervosa*. It is transmitted in persistant manner.

Management:

(1 mark)

1. Selection of healthy suckers for planting.
2. Removal of affected trees and suckers at periodical intervals.
3. Control of aphid vector by suitable chemical methods.

Or other effective measures

Q.6 Write symptoms of following diseases (ANY FOUR)

- | | | |
|----------------------|-------------------------|--------------------------|
| 1. Coffee rust | 2. Soft rot of ginger | 3. Downy mildew of maize |
| 4. Mosaic of tobacco | 5. Anthracnose of beans | |

1. Coffee rust : *Hemileia vastatrix*

(2 Marks)

The disease is restricted to the leaves but sometimes be seen on the berries and on tender leaves. Plants in all stages of growth are attacked but young leaves are more susceptible to infection than mature ones, whose tissues apparently acquire resistance to invasion by fungus. Rust lesion with orange yellow uredosori develop on the underside of the leaves. Each sorus emerge through a seprate stroma. Infection becomes visible initially as a pale chlorotic spot. Lesions increase in size and may coalesce to involve the whole leaf with the older centre becoming necrotic. Diseased leaves shed prematurely and this is the main cause of damage to the tree. Vegetative growth is reduced on diseased trees because of the defoliation so that less nodes are produced to carry the next seasons' crop. The effect on the tree is progressive decline in the vigour and yield over a number of years.

2. Soft rot of ginger : *Pythium aphanidermatum*

(2 Marks)

Soft rot appears in the seedling stage itself if rhizomes are infected and causes damping off. Plants become pale, leaf tips turn yellow and the infection gradually spreads down the leaf blade and leaf sheath along the margin. Often the middle portion of the lamina remains green while margins turn yellow Yellowing spreads from bottom upwards; leaves droop, plants wither and dry. Infected plant can be easily pulled out from the soil as the collar

region becomes soft, rotten and show pale, translucent, water soaked patches; Rhizomes get discoloured; soft and from a putrefying mass.

3. Downy mildew of maize :

(2 Marks)

In the brown stripe downy mildew of maize, narrow chlorotic spots with well defined margins which extend in parallel fashions between the veins appear on the leaf blades. The stripe later turns reddish to purple. If the chlorotic stripe occur prior to flowering, the seeds fail to develop and the plant dies prematurely.

4. Mosaic of tobacco :

(2 Marks)

The leaves are distinctly blotched mottled. The young leaves are sometimes distorted. Sometimes the mottling consisting of bright green yellow white patches and blistering of the lamina is also seen. The first symptom is yellowing of the veins in young leaves. In severe cases, the development of the leaf is entirely suppressed so that the leaf is little more than twisted midrib. Some times a very irregular, twisted narrow blade is produced. The leaves become unfit for curing and both quality and quantity of cured leaves get deteriorated.

5. Anthracnose of beans :

(2 Marks)

The disease appears as angular spots on the lower side of the leaves. They ultimately become visible on the opposite side. Similar lesions are also found on seed, petiole and stem. Black cankers may appear on the cotyledon. Deep cankers on the coleoptile result in plant collapse. On immature pods, small brown spots develop into lesions, which look light brown at border and brown to black at centre.

Q.7 Write on following (ANY TWO).

a) Causal organism, transmission and control measures of tungro disease of rice.

Causal virus :

(1 Mark)

1) Rice Tungro Bacilliform Virus: RTBV and 2) Rice tungro Spherical Virus: RTSV.

Transmission :

(1 Mark)

a) Non-persistently by leafhopper vectors viz. *Nephotettix virescence*, *N. nigropictus*, *N. parvus*, *N. malayanous* and *Recilia dorsalis*

b) No latent period in vector

c) Retention of infectivity for 6 days after acquisition

Management :

(2 Marks)

1) Growing tolerant varieties viz., IR50 and CO 45.

2) Destruction of weed hosts of virus and vector.

3) Vector i.e. leaf hopper control by spraying suitable insecticide twice after transplanting at 15 and 30 days of transplanting. Suitable insecticides are a) Phosphomidon OR

b) Fenthion c) Monocrotophos d) Neem oil (3%) at recommended concentration.

b) Causal organism, symptoms and perpetuation of ergot of bajra.

Causal organism: *Claviceps fusiformis*

(1 mark)

Old synonym: *Claviceps microcephala*

Symptoms :

(2 marks)

The disease occurs only at the time of flowering. Small droplets of pinkish or light honey coloured dew-like substance exudes from infected spikelets known as "Honey dew" stage. Later, these droplets become darker, coalesce and cover larger areas of the inflorescence. In advanced stages, small, dark brown sclerotia can be seen projecting from between the glumes. These sclerotia replace the ovary or grain and are hard and woody. These sclerotia contain several alkaloids responsible for ergot poisoning in animals known as "Ergotoxin" or "Ergotin".

	<p>Perpetuation : (1 mark)</p> <p>Primary infection by ascospores, produced by germination of sclerotia in the soil. Secondary infection is by means of conidia carried by wind and by insects attracted due to honey dew secretions.</p> <p>c) Symptoms, causal organism and management of grain smut of jowar.</p> <p>Grain smut of Sorghum</p> <p>Causal organism : (1 mark)</p> <p><i>Sporisorium sorghi</i> (<i>Sphacelotheca sorghi</i>)</p> <p>Symptoms : (1.5 marks)</p> <p>This smut is also called as covered, kernel, short or grain smut. The individual grains are replaced by smut sori which can be localized at a particular part of the head or can occur over the entire inflorescence. The individual sori are oval to conical and are covered with a tough, white or creamy to light brown skin (peridium) which often persist unbroken up to threshing. The sori vary in size from those small enough to hidden by the glumes to those as long as 1.2 cm.</p> <p>Control : (1.5 marks)</p> <ol style="list-style-type: none"> 1) Seed treatment with Sulphur @ 4 g/kg or Thiram @ 3 g/kg of seed. 2) Use of resistant varieties viz., PJ 7K, PJ23 K and Nandyal. 3) A few varieties coming under the broad group of sorghum viz. Milo, Hegari, Feterita and Shantung have been found to carry genes for resistance.
Q.8	<p>Enlist important diseases of rice along with causal organism. Write symptoms and management of blast disease.</p> <p>List of rice diseases namely blast, brown spot, bacterial leaf blight, sheath blight, sheath rot, false smut, khaira and tungro along with their cause. (For 2 marks)</p> <p>Symptoms : Symptoms of blast disease explaining typical blast symptoms on leaf, node, neck and glumes is expected. (For 3 marks)</p> <p>Management: Integrated management of blast of rice with physical, biological and chemical methods including use of resistance sources is essential. (For 3 marks)</p>
Q.9	<p>Write in brief integrated management strategies for following diseases (ANY FOUR).</p> <p>1) Early blight of tomato 2) Sigatoka leaf spot of banana 3) Downy mildew of Bajra 4) Tikka disease of groundnut 5) <i>Rhizoctonia</i> blight of soybean (For 2 marks each)</p> <p>1) Early blight of tomato :</p> <ol style="list-style-type: none"> 1. Plant debris from the previous crop should be collected and burnt to avoid primary inoculum. 2. Grow resistant/tolerant varieties 3. Nursery spraying two weeks after sowing with copper oxychloride 50 WP (0.25 %) or Zineb (0.2%) or Mancozeb (0.2%). 4. Field application- first spraying 2-3 weeks after transplanting followed by second, third and fourth spraying at an interval of 2 weeks. 5. Spray Copper oxychloride 0.3 per cent or Zineb 0.2 per cent or Mancozeb 0.25 per cent or tebuconazole + trifloxystrobin 0.05% or propiconazole 0.1% 2-3 sprays at 15 days interval.

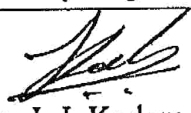
	<p>2) Sigatoka leaf spot of banana :</p> <ol style="list-style-type: none"> 1. Removal and destruction of affected leaves followed by spraying with Bordeaux mixture 1.0 per cent + linseed oil 2.0 per cent is effective. 2. Carbendazim 0.1 per cent or thiophanate methyl 0.1 per cent or prochloraz 0.1 per cent or Mancozeb 0.2 per cent is also recommended. 3. Spraying of Strobilurin fungicide (CGA 279202) @ 70-90 g a.i/ha is found out standing. <p>3) Downy mildew of Bajra :</p> <ol style="list-style-type: none"> 1) Seed treatment with Metalaxyl (Apron 35SD) @ 6g / kg seed . 2) Spray Metalaxyl (0.08%) +Mancozeb 0.2%on 20th day after sowing in the field. 3) Adopting crop rotation 4) Growing resistant/ tolerant varieties viz. PDKV Raja (BBH-3), Shraddha, Saburi and ABPC 4-3. <p>4) Tikka disease of groundnut :</p> <ol style="list-style-type: none"> 1) Collection and destruction of plant debris. 2) Seed treatment with Thiram 5 g / kg of seed. 3) Foliar spray with Mancozeb 0.25 % or Hexaconazole 0.1 % or Propiconazole 0.1 % or tebuconazole 0.1%. Two to three sprays at 20 days interval, beginning 6 weeks after sowing. <p>5) Rhizoctonia blight of soybean : Management : Avoid dense planting. Remove and destroy infected plants. Seed treatment with benlate @2g/kg seed or thiram + carbendazim (2:1) @ 3g/kg of seed.</p> <p style="text-align: center;">Or other suitable control measures</p>
<p>Q.10</p>	<p>Write causal organism, symptoms and management of bacterial blight of pomegranate and bacterial wilt of tomato.</p> <p>1. Bacterial blight of pomegranate</p> <p>Causal organisms : <i>Xanthomonas axonopodis</i> pv. <i>punicae</i>. (1 mark)</p> <p>Symptoms: (1.5 marks)</p> <p>Small irregular, water- soaked spots appears on the leaves. Spots vary from two to five mm in diameter with necrotic centre of pin-head size. These spots are translucent, which later turn light brown to dark brown, and are surrounded by prominent water-soaked margins. Spots coalesce to form large patches. Severely infected leaves fall off. The bacterium attacks stems, branches and fruits also. On the stem, the disease starts as brown to black spots around the nodes. It leads to girdling and cracking of nodes. Finally the branches break down. Brown to black spots appear on the pericarp with L or Y shaped cracks. The spots on fruits are raised and oily in appearance.</p> <p>Management : (1.5 marks)</p> <p>Clean cultivation and strict sanitation in the orchard help to reduce the disease incidence. Spraying with Bordeaux mixture 1.0 per cent controls the disease. Or any other suitable control measure is expected.</p> <p>2. Bacterial wilt of tomato</p> <p>Causal organism : <i>Ralstonia solanacearum</i> (<i>Pseudomonas solanacearum</i>) (For 1 mark)</p> <p>Symptoms: (1.5 marks)</p> <p>The disease is observed at any stage of crop growth after transplanting. However, symptoms and severity of the disease is more at the flowering stage. A characteristic symptom is the loss of turgidity of leaves followed by dropping of entire plant. Such plants wilt within 2-3 days. When wilted plants cut opened longitudinally, there is brown discolouration of the vascular tissue. Bacterial ooze is clearly visible from stem/root cut end, when immersed in water.</p>

	Management : (1.5 marks) 1. Field sanitation. 2. Long crop rotation with non-host crops viz. Cereals and legumes. 3. Seedlings should be raised in the disease free seed. 4. Use of disease resistant varieties. Or any other effective control measure
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SECTION "B"

Q.11	Answer in one sentence (1 mark each)
1.	Write the causal agent of blister blight of tea Ans. <i>Exobasidium vexans</i>
2.	Name the toxin produced by ergot causing fungus. Ans. Ergotin or Ergotoxin
3.	What do you mean by heteroecious rust? Ans. Rust fungus which requires more than one host to complete its life cycle.
4.	Name the vector responsible for transmission of pigeon pea sterility mosaic virus. Ans. Eriophyid mite, <i>Aceria cajani</i>.
5.	What is the cause of khaira disease of rice? Ans. Zinc deficiency
6.	Which papaya disease is reduced by weekly spraying with 1.0% groundnut oil? Ans. Mosaic
7.	State one fungal and one bacterial bioagents used for control of soil borne diseases Ans. Fungal – <i>Trichoderma spp</i>, <i>Aspergillus niger</i>, Bacterial – <i>Pseudomonas fluorescens</i>, <i>Bacillus subtilis</i> etc.
8.	In which disease of crucifers 'V-shaped' yellowish spots on the veins and veinlets are induced? Ans. Black rot

Q. 12	State True or False
	1. Papaya ring spot virus is transmitted by <i>Myzus persicae</i> . – True
	2. Perfect stage of anthracnose of black gram is <i>Glomerella lindemuthianum</i> . - True
	3. 'Kresak' phase in rice occurs due to blast disease. – False
	4. Bunchy top of banana is transmitted by leaf hoppers. – False
	5. Moko wilt of banana is caused by <i>Ralstonia solanacearum</i> . – True
	6. Root wilt disease of coconut is caused by phytoplasma. – True
	7. The fungus <i>Puccinia vastatrix</i> causes coffee rust disease. – False
	8. Tomato early blight disease is caused by <i>Phytophthora infestans</i> . – False


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