

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END THEORY EXAMINATION

B.Sc. (Hons.) Agriculture

Semester	: IV (New)	Term	: II	Academic Year	: 2023-24
Course No.	: ENTO-243	Title	: Pests of Horticultural Crops and their		
Credits	: 2(1+1)		: Management		
Day & Date	:	Time (hrs.)	: 2 hrs.	Total Marks	: 40

- 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'		Marking scheme
Q.1	Give site of oviposition, site of pupation, nature of damage and management practices of citrus leaf miner.	
Ans:	<p>Site of oviposition-Singly on tender leaves.</p> <p>Site of pupation-On plant remain attached by silken threads.</p> <p>Nature Damage-Damaging Stage- Caterpillar</p> <p>Caterpillars feed voraciously on green tender leaves right upto the midrib and defoliate the plants in case of severe infestation.</p> <p>Management Practices-</p> <p>1) Hand picking of caterpillars in early stage of infestation and destroy.</p> <p>2) Spray 0.1% carbaryl or 0.01% fenvalerate or .05 % Quinolphos.</p>	<p>1</p> <p>3</p>
Q.2	Give nature of damage and management of mango hopper and mango stem borer.	
Ans:	<p>Mango hopper –</p> <p>Nature of Damage- Damaging Stage- Nymph & Adult</p> <p>Both nymph and adults suck the cell sap from the young leaves, tender shoots and flower (inflorescence) due to which flower buds wither and die off. The damage is more pronounced in flowering season. Premature dropping of flowers and fruits occur. Also, excrete honeydew, which encourages development of black sooty mould. As a result upper surface of leaves, flowers and shoots become black which affect the fruit setting.</p> <p>Management Practices: 1) Avoid close planting, as the incidence occurs very severe in overcrowded orchards. 2) Orchards must be kept clean by ploughing and removal of weeds. 3) First spray before flowering on bark of branch and two more sprays when buds begin to sprout with 0.04% dimethoate or 0.05% quinolphos. 4) Spray two rounds of acephate 75 SP@ 1g/lit or phosalone 35 EC@ 1.5 ml/lit. 5) Spray 3 per cent neem oil or neem seed kernel powder extract 5 per cent.</p> <p>Mango stem borer-</p> <p>Nature of Damage- Damaging Stage - Grub</p> <p>Grubs bore and tunnel into stem and feeds the vascular tissues, as a result, branches dry up and mass of refuge exude from the bored hole. Tree may die or wilt in case of severe infestation.</p> <p>Management Practices: 1) Remove and destroy dead and severely affected branches. 2) Remove alternate host, silk cotton and other hosts 3) Grow tolerant mango varieties viz., Neelam. 4) Inject borer solution (2 part CS2 + 1 part chloroform + 1 part creosote oil or CS2 or Ed/CT mixture or petrol in live bore</p>	<p>2</p> <p>2</p>



	holes with syringe & seal with mud. 5) Kill grub by pouring a stiff wire inside burrow.																																		
Q.3	Enlist pests of brinjal with scientific name. Give nature of damage of brinjal shoot and fruit borer.	2																																	
Ans:	<p>Pests of brinjal with scientific name-</p> <table border="1"> <thead> <tr> <th>SN</th><th>Common Name</th><th>Scientific Name</th></tr> </thead> <tbody> <tr> <td>1</td><td>Brinjal shoot & fruit borer</td><td><i>Leucinodes orbonalis</i></td></tr> <tr> <td>2</td><td>Brinjal leaf roller</td><td><i>Antoba olivacea</i></td></tr> <tr> <td>3</td><td>Brinjal lace wing bug</td><td><i>Urentius echinus</i></td></tr> <tr> <td>4</td><td>Jassids</td><td><i>Amrasca biguttula biguttula</i> <i>Empoasca devastans</i></td></tr> <tr> <td>5</td><td>Aphid</td><td><i>Aphis gossypii</i></td></tr> <tr> <td>6</td><td>Brinjal stem borer</td><td><i>Euzophera peritella</i></td></tr> <tr> <td>7</td><td>Epilachna beetle</td><td><i>Hemisepilachna veginitioctopuncta</i></td></tr> <tr> <td>8</td><td>Thrips</td><td><i>Scelenothrips indicus</i> <i>Scirtothrips dorsalis</i></td></tr> <tr> <td>9</td><td>Mites</td><td><i>Tetranychus urticae</i></td></tr> <tr> <td>10</td><td>White fly</td><td><i>Bemisia tabaci</i>, <i>Aleurodicus dispersus</i></td></tr> </tbody> </table> <p>Nature of Damage - Larvae Infestation starts few weeks after transplanting the caterpillars bore into the growing shoots, midrib & petioles of large leaves & feed on internal tissues. As a result, of damage, affected shoots wither & dry up & plants exhibit the symptoms of drooping. After fruit formation, larvae make their entry under the calyx, when they are young. The holes, later plugged with excreta leaving no visible sign of infestation. Large circular holes seen on the fruits are the exit holes. Such fruits loose market value & are unfit for human consumption.</p>	SN	Common Name	Scientific Name	1	Brinjal shoot & fruit borer	<i>Leucinodes orbonalis</i>	2	Brinjal leaf roller	<i>Antoba olivacea</i>	3	Brinjal lace wing bug	<i>Urentius echinus</i>	4	Jassids	<i>Amrasca biguttula biguttula</i> <i>Empoasca devastans</i>	5	Aphid	<i>Aphis gossypii</i>	6	Brinjal stem borer	<i>Euzophera peritella</i>	7	Epilachna beetle	<i>Hemisepilachna veginitioctopuncta</i>	8	Thrips	<i>Scelenothrips indicus</i> <i>Scirtothrips dorsalis</i>	9	Mites	<i>Tetranychus urticae</i>	10	White fly	<i>Bemisia tabaci</i> , <i>Aleurodicus dispersus</i>	2
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Q.4	Enlist pest of tomato. Give nature of damage and management practices of tomato fruit borer.	1																																	
Ans:	<p>Pest of tomato-</p> <p>Fruit borer, Leaf miner, Aphids, Thirps, White fly, Mites.</p> <p>Nature of Damage : Damaging Stage- Caterpillar On hatching, young larvae feed on tender foliage. Full-grown larvae attack the fruits. They bore circular holes & thrust only a part of their body inside the fruits & eat the inner contents. If the fruit is bigger in size, it is only partly damaged by the caterpillar but latter it is invariably invaded by fungi & bacteria and spoiled completely. The larvae move from one fruits to another & a single caterpillar may damage & destroy 2 to 8 fruits.</p> <p>Management Practices:</p> <ol style="list-style-type: none"> 1) Collect and destroy the infested fruits and grown up larvae. 2) Grow simultaneously 40 days old African tall marigold and 25 days old tomato seedling at 1:10 rows to attract <i>Helicoverpa</i> adults for egg laying. 3) Set up pheromone trap with Helilure at 15/ha and change the lure once in 15 days. 4) Release <i>T. chilonis</i> 6 times@ 50,000/ha per week coinciding with flowering time. 5) Release <i>Chrysoperla carnea</i> at weekly interval at 50,000 eggs or grubs / ha 	3																																	

	from 30 days after planting. 6) Spray <i>Bacillus thuringiensis</i> 2g/lit or any one of the following insecticide. Indoxacarb 14.5 SC @ 8ml or Flubendiamide 20 WG @ 5 gm or Novaluron 10 EC @ 7.5 ml or Quinalphos 25 EC @ 1 ml / 10 lit water.	
Q.5	Enlist pest of grape. Give nature of damage and management practices of udadya beetle.	
Ans:	Pest of grape- Udadya beetle, Thrips, Stem girdler, Mealy bug, Mite. Udadya beetle- Nature of Damage: Damaging Stage- Grub & Adult Beetle Adult feed voraciously on sprouting buds & tender shoots soon after pruning. Buds dry up and do not develop. Beetle also feed on mature leaves giving shot hole appearance. Grubs feed on roots but do not cause severe damage. Management Practices: 1) Remove the loose bark at the time of pruning to prevent egg laying. 2) Shake vines to dislodge adult beetles Collect into trays containing kerosenated water and destroy them. 3) Spray with 0.05% malathion or 0.02% phosphamidon or 0.03% dimethoate. 4) First spraying immediately after pruning and second spraying 10 days after sprouting.	1 3
Q.6	Give scientific name and family, nature of damage and management practices of onion thrips.	
Ans:	Scientific name of Onion thrips : <i>Thrips tabaci</i> Family: Thripidae Nature of Damage : Damaging Stage- Nymphs & Adult Nymphs & adults found between leaf sheaths & stems lacerating the epidermis of leaves & suck the exuding sap. The affected leaves show silvery white blotches which later become brownish & get distorted from tips downwards, wilt & ultimately dry away. Heavy infestation at seedling stage results in retardation of growth & severe scarring of leaves which ultimately kills the seedling outright. In case of heavy infestation at later stage, the bulbs, remain undersized & get distorted in shape. Management Practices : 1) Use neem coated urea to reduce the infestation of the pest. 2) Install sky blue colour sticky traps@ 25/ha 3) Conserve predators like <i>Scymnus nubilis</i> , <i>Orius albidipenis</i> , <i>Chrysopa</i> sp. and predatory thrips viz., <i>Aelothrips collaris</i> 4) Spray with 0.05% monocrotophos / dimethoate or 0.2% carbaryl.	1 3
Q.7	Give nature of damage and management practices of rhinoceros beetle and rat of coconut.	
Ans:	Rhinoceros beetle – Nature of Damage: Only beetles are harmful. They damage unopened central leaflet (tender fronds) & feed voraciously on softer tissues of growing points, with the result the growth of the tree is arrested which ultimately wither and dies. Injury can be recognized by clipping of leaves (fan like appearance) and not capable of longer flight. Management practices: 1) Treating manure pits with 0.1% carbaryl once in three months reduce the intensity of infestation. 2) Extracting beetles with iron hooks. 3) Filling bored holes as well as leaf axils with 2% methyl parathion dust + sand (1:1) to avoid re-infestation. 4) Removal & destruction of decaying organic matter laying near about orchards. Rat – Nature of Damage : Rats remain in the crowns of coconut palm and feed on nuts	2 2

	<p>of all stages. They make hole through the husk and drinks the sweet liquid. Spoiled nuts fall down in large number.</p> <p>Management practices: 1) Use of zinc phosphide or warfarin poison bait is found to be effective. 2) Use of mechanical barrier : the galvanized iron bands (40 cm wide X 0.15 cm thick) are fitted around the trunk, 2 meters from the ground level prevent rats to climb. 3) Trapping with the help of preferred food.</p>	
Q.8	<p>Enlist pests of guava. Give nature of damage and control measures of spiraling white fly.</p> <p>Ans: Pests of Guava: Fruit fly, Spiraling white fly, Bark eating caterpillar and fruit borer.</p> <p>Nature of Damage: Both nymph & adult suck the cell sap from ventral side of leaves. As a result leaf margins turn yellow, curl & becomes reddish brown producing typical "hopper burn" symptoms. Fruiting capacity is adversely affected.</p> <p>Control Measures: Spray with 0.1% carbaryl or 0.02% phosphamidon or 0.03% dimethoate. First spray should be given in the first week of October when new flush appears & subsequent sprays as & when infestation noticed.</p>	1 3
Q.9	<p>Enlist pests of cabbage. Give nature of damage and management practices of diamond back moth.</p> <p>Ans: Pests of cabbage: Diamond back moth, aphids, painted bug, cabbage butterfly, leaf eating caterpillar.</p> <p>Diamond back moth:</p> <p>Nature of Damage : Damaging Stage- Larva Young larvae feed on epidermis of leaves while full-grown larvae bore inside the heads. Round transparent patches appear on leaves due to feeding. In case of severe infestation the plants may be completely skeletonized.</p> <p>Management Practices: 1) Grow mustard as trap crop. Raise 2 rows of mustard for every 25 rows of cabbage. 2) Install pheromone trap to monitor DBM adults @ 5 /ha and 25/ha for mass trapping. 3) Apply <i>Bacillus thuringiensis</i> formulation @ 1 g/L or NSKE 4% spray. 4) Tomato, when intercropped with cabbage reduces egg laying by diamond back moth. 5) Conserve larval parasitoids viz., <i>Cotesia plutellae</i>. 6) Depending upon the pest intensity, spray any of the following insecticide: Chlorantraniprole 18.5 SC 01 ml/10 lit. or Spinosad 2.5 % SC @ 12ml/10 lit. or Quinalphos 25 EC @ 10 ml /10 lit</p>	1 3
Q.10	<p>Write short note (any two):</p> <p>Ans: 1) Fruit sucking moth:</p> <p><i>Eudocima (Othreis) fullonica</i> C.</p> <p><i>Eudocima (Othreis) materna</i> L.</p> <p><i>Achoea janata</i> L.</p> <p>Noctuidae : Lepidoptera.</p> <p>Marks of Identification: Moth:</p> <p>Large sized. Forewings grey or brown. Hind wings orange or yellows with black spot in the center & marginal dark bands. Kidney shape black spots in <i>E. fullonica</i> & round black spots in <i>E. materna</i>. Host Plant: Larva feeds on leaves of gulvel (<i>Tinospora cardifolia</i>) and vasanvel (<i>Cocculus pendulus</i>) & moth feeds on fruits of citrus, mango, pomegranate, grape, cashew nut etc.</p> <p>Site of oviposition: Eggs: 300 on leaves of Gulvel & Vasanvel, I.P.: 3-4 days.</p> <p>Pupa: Pupation in soil. P.P.: 9 days.</p> <p>Nature of Damage: Damaging Stage- Adult (Moth)</p> <p>Moths are nocturnal & seen flying on orchards after dusk. Moth punctures the</p>	2

	<p>ripening fruits & sucks the juice, Bacterial infection to the infested fruit causes rotting and shading fruits.</p> <p>Control Measures: 1) Eradication of host plants viz. gulvel & vasanvel. 2) Poison baiting (20 ml malathion 50EC + 200gm jaggary + 2 lit. water) 3) Bagging of fruits with polythene paper or cloth bags. 4) Quick removal and disposal of fallen fruits. 5) Smoking below the trees during dusk period. 6) Use light trap or food lure to attract moths 7) Trap crop – growing tomato crop in orchards to attract the adult moth</p> <p>2) Anar butterfly: <i>Deudoxia isocrates</i> (Fab). Or (<i>Virachola Isocrates</i> F.) Lycaenidae : Lepidoptera</p> <p>Economic Importance: Serious pest, regular in occurrence causing 40 – 90% fruit damage.</p> <p>Life History: Eggs: On calyx of flowers or small fruits I. P: 7 -10 days Pupa: Pupation inside the fruit stalk P. P: 7 – 34 days Life cycle: 1-2 months No. of generation: 4 / year S.O: pest is active throughout the year.</p> <p>Nature of Damage: Caterpillars bore the fruit, feed on pulp & seeds. Damaged fruits subsequently get infected by bacteria resulting in rotting of fruits. Such rotten fruits give offensive smell & fall down. The excreta of the larva around the entry hole is seen.</p> <p>Control Measures: 1. spraying with 0.2% carbaryl or 0.03% phosphamidon as soon as appearance of flower buds. 2) Bagging of fruit if no. of fruit trees are limited. 3) Remove & destroy affected fruits.</p> <p>3) Lemon butterfly: Lemon Butterfly: - <i>Papilio demoleus</i> Linn. Papilionidae : Lepidoptera</p> <p>Economic Importance: It causes severe damage to citrus particularly in nurseries.</p> <p>Marks of Identification: Adult: Have yellow and black markings on wings.</p> <p>Larva: Early stage larva resembles birds dropping. Green colour and measures 38 mm. When disturbed they protrude two fleshy horns from the neck.</p> <p>Host Plant : All citrus species and other plants like bael, ber, kadhi limb, bawachi etc.</p> <p>Life History : Eggs : 70-180, laid singly on tender leaves I.P.: 3-7 days. Larva: L.P. 2 weeks Pupa : Pupation on plant, remain attached by silken threads. P.P.: 10-15 days, may extend upto 2-3 months in winter.</p> <p>No. of generations: 4 /year S.O.: Pest is active in monsoon season.</p> <p>Nature Damage: Damaging Stage- Caterpillar</p> <p>Caterpillars feed voraciously on green tender leaves right upto the midrib and defoliate the plants in case of severe infestation.</p> <p>Control Measures: 1) Hand picking of caterpillars in early stage of infestation and destroy. 2) Spray 0.1% carbaryl or 0.01% fenvalerate or .05 % Quinolphos.</p>	<p>2</p> <p>2</p>
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SECTION 'B'

Q.11	Give site of pupation of following: Ans: 1) Mango stone weevil - Stone 2) Aphid - No pupation 3) Tomato leaf miner - Soil 4) Thrips - Soil	4
Q.12	Do as directed: Ans: 1) Order of mustard saw fly - Hymenoptera 2) Vector of bunchy top of banana- Aphid 3) Vector of greening melody of citrus - Citrus psylla 4) Site of oviposition of ber fruit borer - In depression near the stalk of fruit	4
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