MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMANINATION BOARD, PUNE
SEMESTER END EXAMINATION
B. Sc. (Hort.)

Semester: V | **Academic Year: 2016-17**
Course No. H/ENT - 353 | **Title: Insect Pest Management of Vegetable, Ornamentals and Spice crops**
Credits: 3(2+1)

MODEL ANSWER SET
SECTION "A"

Q.1 **Cucurbit fruit fly:** *Bactrocera cucurbitae* **(1 mark)**
Host plants: Gourds, melon, guava, mango etc **(1 mark)**
Nature of damage: Maggots feed on pulp of the fruits. Which cause fruit rotting. Deformation in fruits. Fruit become unfit for consumption **(1 marks)**
Management practices: **(1 mark)**

1. Clean cultivation
2. Deep Ploughing
3. Application of spray bait- 20ml malathion + 200 g jaggary + 20 lit. water
4. Sprying of 0.05% malathion or 0.2 carbaryl at flowering

Cardamom thrips : *Sciothrips cardamoni* **(1 mark)**
Host plants: Calocasia, Ginger, turmeric **(1mark)**
Nature of damage: Both nymph and adult scrap the leaves, inflorescence and capsules. Feeds on oozed sap. Shading of flowers and immature capsules. Feeding on tender capsules. Formation of scab like encrustation. Malformed and shriveled capsules. **(1marks)**
Management practices: **(1 mark)**

1. Monitoring by using blue sticky trap
2. Application of 5% NSKE

Q. 2 **Pest of tomato** **(2 marks)**

1. Fruit borer - *Helicoverpa armigera*
2. Leaf eating caterpillar- *Spodoptera litura*
3. White fly - *Bemisia tabaci*
4. Mealy bug - *Ferrisia virgata*
5. Aphid - *Aphis gossypii*
6. Leaf miner - *Liriomyza trifoli*

fruit borer
Nature damage: Young larvae feed on tender foliageLarvae bore inside developing fruit. Feeds on pulp and seed. Fruit attack by fungus and bacteria followed by rotting. Nibbling by larvae reduces fruit quality. Affected fruits drop down **(1 marks)**
Management practices: **(2 marks)**

1. Use of pheromone traps for monitoring
2. Collection and destruction of infested fruits along with larvae
3. Release of *Trichogramma chilonis*
4. Spraying of *Ha*NPV @ 1ml/lit
5. Spraying of 0.05% endosulfan or 0.005% cypermethrin

White fly
Nature of damage: Both nymph and adult suck the sap from leaves. **(1 marks)**

Leaves wither and turn yellow. Fruit setting affected. Development of black sooty mould which affect photosynthesis . Poor quality fruits (2 marks)

Management practices:

1. Preserve the predator, *Chrysoperla carnea*
2. Spraying of *Verticillium lecanii* @ 4g/l
3. Spraying of NSKE 5%
4. Spraying of 0.03% oxydematon methyl or 0.1% dimethoate or 0.05% fenpropathrin

Q. 3 **Potato tuber moth:** *Phthoromea operculiela* (1 mark)

Host plants: Brinjal, tobacco, tomato and potato (1 mark)

Nature of damage: In early phase of plant growth pest (1 marks)
Cause injury by mining leaves. Also borer petioles and terminal shoots. Damage to tuber in field and storage. Caterpillar borer tuber feeds internally. Rotting of infested potato

Management practices: (1 mark)

1. Timely earthing up
2. Spray with 0.1% carbaryl or 0.05% endosulfan 60 days after planting
3. Cover the harvested heaps of potato in field
4. Release of egg-larval parasitoid *Copidosoma koehleri* @ 20,000 mummies/ha at 7 days interval starting from 45 days after planting or release *Chelonus blackburni* @ 60,000 adults/ha in 4 releases at weekly interval

Diamond back moth: *Plutella xylostella* (1 mark)

Host plants: Cabbage, cauliflower, radish, knolkol, mustard (1mark)

Nature of damage: Young larvae feed on epidermis of leaves (1 marks)
Full grown larvae borer inside heads. Round transparent patches appear on leaves. Sever infestation skeletonized the plant. Head formation affected.

Management practices: (1 mark)

1. Planting of rows of mustard in main crop as a trap crop
2. Spraying of *Bacillus thuringiensis* @ 1-1.5 kg/ha
3. Spraying of 4% NSKE
4. Spraying of 0.05% malathion /quinalphos

Q.4 **Jasmin bud worm:** *Hendecasis duplifascialis* (1 mark)

Nature of damage: Caterpillar bore the developing buds and flower. (1 marks)
It causes webbing of buds. Feeds on petals and other reproductive parts of the flower. Destroy the flower completely.

Management practices:

1. Collection and destruction of webbings along with larvae
2. Spraying of 0.05% endosulfan or quinalphos
3. Spraying of.005% cypermethrin (2 marks)

Rose mite: *Tetranychus urticae* or *T. cinnabarinus* (1 mark)

Nature of damage: Both nymph and adults are damaging stages. (1 marks)
They suck the cell from ventral surface of leaves along the midrib. Bronzy patches produced on dorsal surface on leaves. They form silken webbing around buds and flower. Drying of leaves and petals. Affect quality production.

Management practices: 3

1. Collection and destruction heavily infested flower and branches . **(2 marks)**
2. Spraying of 0.25% sulphur 70 WP or 0.02% fenpropathrin
3. Spraying of dicofol @ 1ml/l or abamectin 0.25ml/l

Q. 5 Pest of okra

1. Shoot and Fruit borer - *Earias vitella* **(2 marks)**
2. Leaf roller- *Sylepta derogata*
3. White fly - *Bemisia tabaci*
4. Jassids - *Amrasca biguttula biguttula*
5. Aphid - *Aphis gossypii*
6. Mites - *Tetranychus* sp.

Shoot and fruit borer

Nature damage: Caterpillar bore into the tender shoot, flower buds & fruits **(1 mark)**
Shoots dry up. Pre-mature flower bud a & fruit drop. Fruit remain on plant are deformed marked with exit hole

Management practices: **(2 marks)**

5. Use of pheromone traps for monitoring
6. Collection and destruction of infested fruits along with larvae
7. Release of *Trichogramma chilonis*
8. Spraying of *Ha*NPV @ 1ml/lit
5. Spraying of 0.05% endosulfan or 0.005% cypermethrin

Jassids

Nature of damage: Both nymph and adult suck the sap from leaves. **(1 marks)**
Leaves wither and margins turn yellow. They curled upword and reddish brown scorchy appearance of leaves- Hopper burn symptoms . Growth of plant and fruit setting affected. Development of black sooty mould which affect photosynthesis . Poor quality fruits

Management practices: **(2 marks)**

1.Preserve the predator *Chrysoperla carnea*
2. Spraying of *Verticillium lecanii* @ 4g/l
3. Spraying of NSKE 5%
4. Spraying of 0.1%methyl dematon /dimethoate or 0.05% fenpropathrin

Q. 6 **Cinnamon butterfly:** *Chilasa clytie* **(1 mark)**
Site of oviposition : leaves **(1 mark)**
Nature of damage: Caterpillar feed voraciously on tender **(1 marks)**
leaves causing defoliation of plant that adversely affect growth of the plant. Only mid rib with some veins remains. Affect the plant growth

Management practices: **(1 mark)**

1. Collection and destruction of caterpillars
2. Deep ploughing
3. Use egg parasite *Telenomus romus*
4. Spraying of o.o5 % endosulfn/quinalphos

Pollu beetle: *Longitarsus nigripennis* **(1 mark)**
Site of oviposition: On berries **(1 mark)**
Nature of damage: Both grub and adult are harmful. **(1 marks)**

Grub bore through tender spike, berries and damage them by feeding on internal content. Infested berries turn yellow and black. These berries remain hollow and easily pressed. It act as vector for 'pollu' disease. Adult feed on tender shoot, leaves, spikes by scrapping **(1 mark)**

Management practices:

1. Use of resistant varieties –Kulluvally-2, Ultrapatta1&2, Simoga
2. Racking of soil and application of 4% endosulfan dust or 2 % methyl parathion dust @ 20-25 kg/ha
3. Spraying of 0.1% dimethoate /quinalphos or 0.05%
4. Spray 0.05% dimethoate/quinalphos or carbosulfan

(4 marks)

Q.7 **1. Curry leaf butterfly,** ***Papilio demoleus***

Family- Papilionidae Order: Lepidoptera

Serious pest of nursery. Plants from family Rutaceae are attacked. Dark green larvae with osmaterium. It lay the eggs on tender leaves and pupates on plant in silken caccon Caterpillar feeds on tender leaves upto midrib. Defoliation of plant. Affect growth of the plant. Feeding on new flush affects yield.

Management practices:

1. Use of pheromone trap for monitoring
2. Hand picking and destruction of caterpillar at early infestation
3. Use of egg parasite *Trichogramma evanescense*
4. Spraying with *B.t* @ 1 kg/ha
5. Spraying of 0.05 % endosulfan or 0.1 carbaryl

(4 marks)

2. Rose bud borer, ***Helicoverpa armigera***

Family- Noctuidae Order- Lepidoptera

Polyphagous pest infesting many vegetables & flower crops.

Female lay the eggs singly on floral parts and tender leaves Larvae green colour feeds on flower bud by inserting anterior half portion inside the bud/flower. Initially feeds on tender leaves then to floral parts. Completely eat away petal other reproductive parts. Injured bud infected with fungus and bacteria.

Management practices:

1. Monitoring with pheromone trap
2. Release of egg parasite *Trichogramma chilonis*
3. Collection and destruction of affected buds and larvae
4. Application of HaNPV @ 1ml/l
5. Spaying of 0.06% endosulfan or 0.005 % cypermethrin or 0.1% carbaryl

(4 marks)

3. Rat / Rodent

Different species of rat

a. Filed rat : *Bandicota bengalensis*
b. House rat: *Rattus rattus*
c. Large rat: *Bandicota indica*

Rat causing damage to coconut , grape etc. Rat directly feeds on fruits. Dropping of immature fruits. Damage is more than actual feeding.

Management:

1. Hunting- Using trained dogs and cats
2. Trapping
3. Poisoning
   Quick poison – Zinc phosphide baiting. Pre -bating essential
   Slow poison – Warffarin –Causing haemorrhage
4. Fumigation – By Alluminium phophide
   Fixing of galvanized iron sheet band on tree trunk

Q. 8. Sweet potato weevil: **(1 mark)**

Host Plant: Sweet potato only. **(2 marks)**

Nature of Damage: The grubs infest vines (stems) and cause tunneling inside. Grubs as well as adults bore into tubers, both in field and godown, feed on inner content and spoil them. Dark black patches are noticed on the tubers and stems.

Management practices: 1) Healthy cutting should be selected for planting. **(1 mark)**
2) After harvest of the crop, vines should be collected and destroyed
3) Follow proper crop rotation. 4) Spray with 0.1 per cent carbaryl.
5) Apply phorate 10 G in the soil at the time of planting @ 10 kg/ha.
6) Use pheromone traps for attracting the adults.

Ped **Stem fly or Coller borer :**

Host Plants : Polyphagous : Beans, peas, grams, cowpea and sweet pea. **(1 mark)**

Nature of Damage: The maggot cause tunneling inside stem. Usually enters through leaf axils. The leaves become plale and droop down. The braches wither and drying of the branches due to rooting inside stem. **(2 marks)**

Management practices: 1. Destruction of infested plant parts **(1 mark)**
2. Apply 0.1% neem oil
3. Spraying with 0.05 % quinalphos as soon as infestation is noticed.

Q. 9 Gerbera leaf miner, ***Liriomyza trifoli*** **(1 mark)**

Nature damage: Maggots feeding between two layers of leaf on mesophyle, making narrow serpentine mine that appears whitish when seen from upper surface ultimately causing blotches and holes. Such leaves become yellow which affect photosynthesis to some extent. Plant growth affected. **(2 marks)**

Management practices: 1. Monitoring by using yellow sticky trap **(1 mark)**
2. Destruction of infested plant parts
3. Apply 0.1% neem oil
4. Spraying with 0.05% quinalphos or trizophos or Monocrotphos

Cut worm: ***Agrotis ipsilon*** **(1 mark)**

Nature of Damage: The caterpillars hide during the day in cracks and crevice in soil or in debris around the plants and feed on tender leaves during night by cutting seedlings near ground level. The destruction is much more than actual feeding. **(2 marks)**

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Control measures: 1) Heaps of green grasses may be kept at suitable interval in infested field during evening and collected next day early in the morning along with caterpillars and destroy. **(1 mark)**

2) Clean cultivation and mechanical destruction of caterpillars also help in reducing pest infestation.

3) 5% carbaryl poison bait @ 25-60 kg/ha controls the pest effectively. (1 kg carbaryl 50 WP + 10 kg wheat bran + 1 kg jaggery and sufficient water)

4) Apply lindane dust @ 125 kg/ha before planting of potato crop.

Q. 10. Write nature of damage of following pests

1. Rhizome fly:

Maggot feeds on rhizome. Infested rhizome attack by soil micro-organism. Soft brown patches are developed on rhizome. Yellowing f followed by drying of plant. Reduction in yield.

2. Fruit fly:

Maggot after hatching feeds on pulp. Soft dark patches are developed on fruits. Rotting of fruit followed by drooping. Heavy loss in marketable produce.

3. Clove stem borer:

Grub bore the bark initially and enters inside the stem. Tunneling inside the stem results into drying of branches.

4. Red pumpkin beetle:

Beetles are mainly responsible for above ground damage to leaves, stem, fruits. They feeds initially on leaves and then on stem and fruits. Grub attacked below ground parts of stem and roots.

SECTION "B"

Q. 11 a. Answer the following **(4 marks)**

1. Leaf curl
2. 1 kg carbaryl + 10 kg wheat bran + 1 kg jaggary
3. *Spodoptera litura* Nuclear Polyhydrosis Virus
4. *Xylostrichus quadripes*

b Give the site of oviposition of the following pests. **(4 marks)**

1. Ventral surface of leaf
2. Ventral surface of leaf
3. Soil
4. Soil

Q. 12 Do as directed **(8 marks)**

1.True 2. Knots on roots or swelling of roots 3. Katte
4. Drooping of shoots 5. Mites 6. False
7. *Coppidosoma koehleri* or *Chilouns blackburni*
8.True