MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE

SEMESTER END EXAMINATION

B.Sc.(Hons.) Horticulture

Semester	**: III (New)**	**Term**	**: I Academic year : 2018-19**
Course No	**: H/ENTO-232**	**Title**	**: Insect Pests of Vegetable, Ornamental and Spice Crops.**
Credits	**: 3 (2+1)**		
Day and 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.

MODEL ANSWER PAPER

SECTION "A"

Q.1 Write the scientific name, nature of damage and management practices for diamond back moth and cabbage butterfly.

Ans: Diamond back moth : S.N.: ***Plutella xylostella*** 1 mark

Nature of damage : 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. 1 mark

Management practices: 1) Spraying with 0.05 % quinalphos or fenithrothion. 2) Spraying Bt. @ 1 to 1.5 kg/ha. 3) Spraying with 4 % NSKE with spreading agent viz., teepol/ sandovit @ 1 ml/lit. 4) Trap cropping with mustard crop attracts 80 – 90 % moths for colonization. 5) Tomato, when intercropped with cabbage reduces egg laying by diamond back moth. 2 marks

Cabbage butterfly : S.N : ***Pieris brassicae,*** 1 mark

Nature of damage : Young larvae scrap the leaf surface in masses. But later ones eat away the leaves at the margins inwards leaving intact the major vein alone. Sometimes caterpillar bores the heads of cabbage and cauliflower. 1 mark

Management practices : 1) Hand picking and destruction of caterpillar in early stage. 2) Spraying with 0.2% carbaryl or 0.05% dichlorvos or 0.1% malathion. 3) Spraying with *Bacillus thuringiensis* @ 1 kg/ha. 2 marks

Q.2 Describe the nature of damage of the following pests. 2 marks each

Ans :1) Curry leaf butterfly :The caterpillar is damaging stage. Larva feed on tender leaves upto midrib. Completely defoliate the plant. Severe in nurseries.Affects growth of plant. Feeding on new flush affects yield.

2) Okra shoot and fruit borer : Caterpillar bore into the tender shoot, flower buds and fruits. As a result, the shoots dry, flower buds and fruits drop prematurely. Fruits remaining on the plants get deformed and often show exist holes of the larvae.

3) Mustard sawfly : Larvae feed on leaves from margin inward, mostly during morning and evening. They cut small holes into the leaves and skeletonized the plant. Frequently large number of larvae can be found on each leaf.

4) Sweet potato weevil : The grub infests vines (stems) and cause tunneling inside. The grubs as well as adults bore into tubers both in field and godowns, feed on inner content and spoil them. Dark black patches are noticed on the

tubers and stems.

Q.3 Describe the marks of identification of the following pests. 2 marks each

1) Epilachna beetle : Adult beetle spherical, pale brown in colour and mottled with black spots. *E. dodecastigma* has 6 spots on each elytra, while *E. vigintioctopunctata* has 14 spots on each elytra. Grubs are yellow in colour with hairs on body.

2) Cardamom shoot and capsule borer : The full grown caterpillar 25 to 30 mm in length, reddish brown with black blotches all over the body and pale stripes on the lateral sides. The moths are orange yellow with black marking on both wings.

3) Almond moth : Moths are about 13mm in wing expanse ,Wings are dirty white to grayish in colour with indistinct black bands. Larvae are grayish white, hairy with dark brown head with two dark areas on the first segment behind the head.

4) Pulse beetle : Adult beetle oval dark brown, 3-4 mm in length, 2 ivory coloured spots in the middle of dorsal side of the body. Grubs white , cylindrical, fleshy with brownish mouth parts, always found inside the grains.

Q.4 Describe the nature of damage and management practices of potato tuber moth and cutworm along with their scientific names.

Ans : 1) Potato tuber moth : S.N. ***Phthorimaea operculella*** 1 mark

Nature of damage : in early stage of the crop growth the pest is injurious to plant as leaf miner also bores into petioles and terminal shoots. The caterpillar bore the tubers and feed on the pulp in field as well as storage. The presence of black excreta near the eye buds help to detect its presence in the tuber. 1 mark

Management practices : 1) Timely earthing up of the crop to cover the exposed tubers helps in reducing the intensity of infestation. 2) Spray with 0.05% quinalphos or 0.1% carbaryl at 60 days after planting. 3) Heaps of harvested potatoes should not be kept exposed in the field but covered with straw and the infested tubers should be rejected before storage. 4) The potatoes should be stored in well ventilated and dry places with temp not exceeding 21 c . 5) Fumigate the tuber with CS2 @1kg/27cu.m for 3 hrs. before storage. 2 marks

2) Cutworm : S.N. ***Agrotis ipsilon*** 1 mark

Nature of Damage : The caterpillars hide during the day in cracks and crevices 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. 1 mark

Management practices : 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. 2) Clean cultivation and mechanical destruction of caterpillars. 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 2% @ 125 kg/ha before planting. 2 marks

Q.5 Write the nature of damage, order and control measures for chrysanthemum aphid and rose thrips.

Ans : Chrysanthemum aphid : Order : Hemiptera — 1 mark

Nature of damage : It is dark chocolate brown insect, found always in clusters on tender terminal shoots and on under side of leaves, nymphs and adults suck cell sap from leaves and tender shoots. Due to continuous sucking of sap, shoots are distorted, leaves are teared and malformation of flowers takes place. They are also the carrier of aspermy virus disease of chrysanthemum. — 2 marks

Control measures : Aphids can be controlled by spraying 0.02 % methyl demeton or 0.05 % malathion or 0.03 % dimethoate. — 1 mark

Rose thrips: Order : Thysanoptera. — 1 mark

Nature of Damage : Nymphs and adults with rasping mouth parts scrape the tissue from leaf surface as well as petals and suck the cell sap oozing out from wound. The attacked leaves show brown patches, get distorted, finally wither and drop down. This adversely affect the flowering capacity by shedding of flower buds. Brown patches on petals affects the beauty of flowers. — 2 marks

Control measures : 1) Spraying with 0.05% monocrotophos or 0.1% lindane or dusting with 2% methyl parathion dust. 2) Soil application of 10% phorate granules given sufficient protection. — 1 mark

Q.6 Describe the nature of damage, site of pupation and management practices for pollu beetle and cinnamon butterfly.

Ans: Pollu beetle Nature of damage : — 1 mark

Both grubs and adults are harmful. Grubs 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. They act as a vector of pollu disease. Adults feed on tender shoots, leaves, spikes by scrapping the tissues.

Site of pupation : In earthen cell in soil. — 1 mark

Management practices : 1)Use of resistance varieties –Kulluvalley –2, Uthirankotta 1 & 2, TMBV, Shimoga. 2) Racking of soil. 3) Soil application – Methyl Parathioin 2% @20–25 kg/ha.4) Dimethoate 0.1 %, Quinolphos 0.1 %. — 2 marks

Cinnamon butterfly : Nature of damage:

After hatching the first instar larva starts feeding on the lamina of the freshly emerged leaves. The later instars feed voraciously on the tender leaves. Leaving only the mid ribs with portion of veins. In case of severe infestation, the growth of the plant is adversely affected. — 1 mark

Site of pupation : In rough silken padding on stem. — 1 mark

Management practices :1) Follow cultural practices and maintain hyagine in the field. 2) Collect larvae and pupae and destry them. 3) Pest can be kept under check by collecting the butterflies with the help of net.4) Destroy the alternate host. 5) Spray Quinalphos 25 EC @ 0.05% if the infestation is severe. — 2 marks

Q.7 Write the management strategies for the following pests. — 2 marks each

Ans :1) Brinjal shoot and fruit borer : 1) Remove and destroy all the affected shoots and fruits along with larvae. 2) Avoid continuous cropping of brinjal crop. 3) As soon as the attack starts, spray the crop with Quinalphos 0.05 % or Fenvalerate 0.01 % or Cypermethrin 0.0125 %, 3 to 4 sprays should be given at an interval of 15 days. 4) Spray NSKE 5 % at flowering.

2) Turmeric rhizome fly: 1) Use of healthy planting material. 2)Destroy residues of previous crops. 3)Destruction of stray plants along with rhizomes from field. 4)Deep ploughing after harvesting. 5)Phorate 10 G @ 20 kg /ha. 6)Trichoderma plus 10 kg/ha.

3) Tomato fruit borer: 1) In early stage of attack, handpicking of caterpillars and their destruction help in reducing the intensity of infestation. 2) Ploughing the field after harvest of the crop would expose the pupae which would be destroyed by birds. 3) Spraying the crop with 0.05% quinalphos or fenitrothion. 4) Use pheromones traps for monitoring the pest population.

4) Tobacco leaf eating caterpillar : 1) Fields should be properly ploughed to expose and kill the pupae in the soil. 2) Collection and destruction of egg masses and leaves with young larvae. 3) Sparing with 0.05% dichlorvos or dusting with carbaryl 10% dust. 4) Flood irrigation to drown the hibernating caterpillars.

Q.8 Give the scientific name, nature of damage and control measures for jasmine budworm and carnation red spider mite.

Ans : Jasmine budworm : S.N. :*Hendecasis duplifascialis* — 1 mark

Nature of damage : The larva bores into immature buds and feeds on the internal contents. The larva feeds voraciously on the corolla tube in the mature buds. Larva attacks 2 – 3 buds, buds webbed together by silken thread. — 2 marks

Control measures : 1)Spray dimethoate 30EC @ 2 ml /lit or cypermethrin 25 EC @ 1 ml /lit. 2) Neem cake extract 5 % or NSKE 5 % are also effective. — 1 mark

Red spider mite : S.N.: *Tetranychus urticae* — 1 mark

Nature of damage : mite feed on underside of the leaves suck the cell sap and as a result the leaves turn pale yellow and dusty coating and fine webs. In severe infestation plants become stunted and the flowers also invaded. Plant growth, crop quality, yield and vase life of carnation flowers decreased with increasing mite population. — 2 marks

Control measures :1) Proper ventilation, clean cultivation and frequent watering/ misting to bring down greenhouse temperature helps to keep the mite population build up under check. 2) Cutting and burning of heavily infested shoots should be done. 3) Predatory mite feeds exclusively on red spider mites. 4) Dicofol 0.05 % @ 3 ml/ 10 lit. of water effectively control the mites population. — 1 mark

Q.9 Describe the nature of damage of the following pests with their scientific names.

Ans :1) Cigarette beetle : S.N. : *Lasioderma serricorne* — 1 mark

Nature of damage: Grubs are damaging. Make small cylindrical galleries. Adults feed very little. The larvae are very active and move and bore into the commodity. It feeds on seeds and dried plant products specially used as drugs, black and red pepper. — 1 mark

2) Drug store beetle : S.N. : *Stegobium paniceum* — 1 mark

Nature of damage: Grubs damage by making small cylindrical galleries through the commodities. Adults fed very little. Larvae are quite active and move around or bore into the commodity. — 1 mark

3) Gladiolus thrips : S.N. : *Taeniothrips simplex* — 1 mark

Nature of damage: The nymphs and adults damage leaves and spikes by rasping tissues and sucking the sap (ozzing). Affected leaves and spikes develop silver streaks, turn brown, get deformed and dry. When attack on bud, flowers, the bud do not open regularly and leaves show unnatural whitish grey glistering. Corms in storage are also attacked by thrips. Infested corms are sticky, get shriveled and produce weak plants. 1 mark

4) Onion fly : S.N. : *Delia antiqua* 1 mark

Nature of damage: The maggots bore into the bulbs causing the plants to become flabby and yellowish. They mine thought the small bulbs completely, leaving only the outer sheath. Larger bulbs are attacked by many maggots at a time. Partially attacked bulbs get rottened. Attack in storage also.

Q.10 Write short notes on. 4 marks each

Ans :1) Economic importance of insects in vegetable, ornamental and spice crops : All insects are not harmful, those harmful are not harmful unless their population density crosses certain limit (ETL). Economic importance of insects lies more in their harmful effects than beneficial effects. Higher the status of an insect as pest, more important that insect is.

Beneficial effects: a) Pollination b) Entomophagous insects : Predators, Parasitoids

Harmful effects : Greater importance of insects lies in their harmful effects than their beneficial effects. Only a few species are harmful and attain the status of pest. Crop losses by the insect pests vary from 10-40 per cent depending upon the crop and environment.

a) Destruction and spoilage of food (Both fresh and in storage): Cutworms (reduce the no of plants in the field), Fruit borer, fruit flies and other direct pests, Leaf eaters, Sap suckers, Stem borers, Chlorophyll eaters, Root feeders, Gall formers.

b) Vectors for impossible to control viral diseases in plants e.g. some aphids, whiteflies, thrips etc.

2) Maximum Residue Limits : It is the maximum concentration (in ppm) of pesticide residue that is permitted in or on food at a specified stage of harvesting, transport, marketing or preparation of food up to the final point of consumption.

MRLs are not the maximum toxicological limits. However, care is taken to ensure that maximum levels do not give rise to toxicological concerns. The determination of MRL is, thus a multi-step process. First, the residue levels are set by supervised field trials for various crops a pesticide has been registered for. Then, TMDI is calculated by estimating the total intake of pesticide from all possible sources taking into account the MRLs that have been set.ADI is determined from the available toxicological data and usually involves finding the maximum dose that would produce no adverse effects in a lifetime. It is also important that the MRLs set take care of the all age groups and both the sexes.

SECTION "B"

Q.11 Answer in one sentence.

Ans :

1) Which pest is responsible for splitting of stem in amaranthus : **Amaranthus stem weevil**

2) Spell out the abbreviation *Ha*NPV : ***Helicoverpa armigera* Nuclear Polyhedrosis Virus**

3) Which viral disease is transmitted by cardamom aphids : **Katte**

4) Give the scientific name of pea stem fly : ***Ophiomyia phaseoli***

5) Yellow vein mosaic in okra is transmitted by which pest : **Whitefly**

6) State the contents of poison bait used for control of melon fruit fly : **20 ml malathion + 200 g jaggary + 20 lit. water**

7) Which viral disease is transmitted by chilli thrips : **Leaf curl**

8) State oviposition site of red pumpkin beetle : **In soil**

Q.12 State the damaging stage(s) of the following pests.

Ans :

1) Fruit fly : **Maggot**

2) Mealy bug : **Nymph and adult**

3) Banana aphid: **Nymph and adult**

4) Tomato leaf miner : **Maggot**

5) Tingid bug : **Nymph and adult**

6) Yam beetle : **Grub and adult**

7) Sweet potato leaf eating caterpillar : **Caterpillar**

8) Whitefly : **Nymph and adult**