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SEMESTER END THEORY EXAMINATION
B.Sc.(Hons.) Horticulture

Semester	: III (New)	Term	: I Academic year : 2020-21
Course No	: H/ENTO-232	Title	: Insect Pests of Vegetable, Ornamental and Spice Crops.
Credits	: 3 (2+1)		
Day and Date	: Monday, 25.01.2021	Time	: 12.00 - 14.00 Total Marks : 80

Note : 1. Solve ANY EIGHT questions from SECTION-A
2. Solve ANY TWELVE questions from SECTION-B
3. All questions from SECTION-C are compulsory
4. Send the PDF file of answer sheet to the email id of respective course teacher

	MODEL ANSWER PAPER SECTION "A".	32
Q.1	Write in brief about nature of damage and management practices for turmeric rhizome fly. **Ans : Nature of damage:** Maggots bore into the shoots and finally feed developing rhizomes and rotting takes place. In severe cases entire rhizome found with tunnels of maggots. Infested rhizomes attacked by fungi and nematodes. **Management practices:** 1) Use of healthy planting material. 2) Destroy residues of previous crops. 3) Cover the exposed rihizomes with soil by earthing up operation in the month of July to Sept. 4) spraying with 0.05% Quinalphos 25 EC as soon as the infestation is noticed. 5) destruction of stray plants in off season. 6) Deep ploughing after harvesting.	2 mark 2 mark
Q.2	Write in brief about integrated management practices for tomato fruit borer. **Ans :** 1. Ploughing the field after harvest of the crop would expose the pupae to the birds. 2. In early stage of attack, handpicking of caterpillars & their destruction help in reducing the intensity of infestation. 3. Installation of sex pheromone trap, *Helilure*. 4. Apply HaNPV @ 250 to 500 LE/ha. 5. Spraying the crop with any contact or stomach insecticide e.g. quinalphos, profenophos,fenitrothion.	4 mark
Q.3	Write the scientific name, site of oviposition and management practices for diamond back moth. **Ans : S.N.** Diamond back moth : *Plutella xylostella* **Site of oviposition:** Singly along the veins on lower surface of leaves **Management Practices:** 1. Spraying with 0.05% malathion or quinalphos or fenitrothion control the pest effectively. 2. Spraying with Bt (*Bacillus thuriengiensis*) @ 1 to 1.5 kg / ha. 3. Spraying with 4% NSKE. It is necessary to add wetting spredding agent viz ; teepol / sandovit @ 1 ml / lit. 4. Trap cropping with mustard crop attracts 80-90% moths for colonization. 5. Tomato intercropped with cabbage reduces egg laying by diamond back moth.	1 mark 1 mark 2 mark
Q.4	Write in brief about the management practices for chilli thrips and potato cutworm. **Ans :1) Chilli thrips:**	2 mark

	1) Inter crop with Shevari *Sesbania grandiflora*, to provide barrier which regulate the thrips population. 2) Don't follow chilli and onion mixed crop. 3)Sprinkle water over the seedlings to check the multiplication of thrips. 4) Seed treatment with Imidacloprid 70 WS @ 10 g or Thiamethoxam 70 WS @ 3 g/Kg seed. 5) Spraying with Imidacloprid 17.8SL@100ml or Thiacloprid 21.7SC@225ml or Spinosad 45SC@ 160ml or Fipronil 5SC@ 1000ml or Fenpropathrin 30EC@ 170 ml. **2) Potato cutworm:** 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).	2 mark
Q.5	Write the scientific name, site of oviposition and nature of damage for rose mites. **Ans :** **Red spider mite:** SN : *Tetranychus telarius* Linnaeus, *T. urticae* Koch **Site of oviposition:** On the leaves **Nature of damage :** Both nymphs and adult suck the cell sap from leaves and twigs. Infested leaves turn yellowish with whitish, spots along with leaf veins, later on brownish burnt patch develop on the leaves, which wither & finally dry.	1 mark 1 mark 2 mark
Q.6	Write the scientific name, site of oviposition and nature of damage for brinjal shoot and fruit borer. **Ans : S.N. :** *Leucinodes orbonalis* **Site of oviposition:** laid singly on ventral side of leaves, shoots, flower buds or sometimes on fruits. **Nature of damage:** Infestation starts few weeks after transplanting, the caterpillars bore into the growing shoots, midribs & 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 makes 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.	1 mark 1 mark 2 mark
Q.7	Give the scientific name, nature of damage and site of pupation for pollu beetle. **Ans : S.N. :** *Longitarsus nigripennis* **Nature of Damage :** Adult causes damage by feeding on leaves growing shoot tips as on tender spike. The feeding on spikes lead to their partial damage. The grub damage by boring into growing tips spikes and into the berries. The shoot tips and also the spike tied up together, about 53% fall of spike have been reported. The attacked beries appeared dark and hallow inside and crumble when pressed, locally known as pollu berries. **Site of pupation :** In an earthen cell in soil at a depth to 5 to 7.5 cm deep	1 mark 2 mark 1 mark
Q.8	Write the nature of damage and management practices for melon fruit fly and red pumpkin beetle **Ans :** **Melon fruit fly:** **Nature of damage:** Maggots feeds on pulp of fruits. Infested fruits start rotting, gets malformed and fall down.	1 mark

	Management practices: 1)Removal and destruction of fallen and infested fruits. 2) Deep ploughing 3) Use of attractant traps. 4) Spray 0.05% malathion . **Red pumpkin beetle:** **Nature of damage:** Beetle damage above ground parts like leaves, flowers and fruits making irregular holes and causing death or retardation of growth. Grubs feeds on roots and underground stem, resulting in rotting of roots and stem. **Management practices:** 1) Buring of old creepers, ploughing and harrowing after harvest of crop. 2) Collection and destruction of beetles in early stage. 3) Spray 0.05 % malathion or dusting with 5 % malathion dust @ 10 kg/ha.	1 mark 1 mark 1 mark
Q.9	Give the scientific name and nature of damage for mustard sawfly and rose thrips. **Ans : Mustard Sawfly:** S.N. *Athalia lugens proxima* **Nature of damage:** 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. **Rose thrips: S.N.** *Rhipiphorothrips cruentatus*, *Thrips coloratus* **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 affects the flowering capacity by shedding of flower buds. Presence of brown patches on petals affects the beauty of flowers.	1 mark 1 mark 1 mark 1 mark
Q.10	Write short notes on. **(Any one)** **Ans : a) Integrated pest management practices under protected conditions :** The IPM programme for protected cultivation can be described as a pyramid constructed having three key components namely, Avoidance of problem; Sampling and early detection; and curative measures. **1. AVOIDANCE : a) Use of Physical Barriers :** Use of Insect-proof screens, Provision of double door and Ultra-violet radiation absorbing sheets. **b) Sanitation and Cultural Practices :** Pre-season cleanup, Inspection upon arrival, Balanced use of fertilizer, Pinching and Pruning and Trap crop/Indicator plants **2. EARLY DETECTION: a) Scouting** :Scouting procedures for most greenhouse-grown crops are based on visual observations. **b)Monitoring:** the pest population is estimated with the help of attractant traps. **3. CURATIVE MEASURES:** a) Biological Control b) Chemical Control **Rat control:** a) Preventive : Rat proffing, cleaning and sanitation. b) Mechanical : Traps, sound repellants, rat hunting etc. c) Cultural method : It includes deep ploughing, reconstruction of bunds, flooding etc. d) Most physible and effective, it includes rat poisons. i) Single dose poison : Zinc phosphide (acute poison) Bait composition for acute poison. For 100 gm, Zinc phosphide 2 gms + Food material 50 gms. + sweet oil 2 gm + Jaggery 6 gm. ii) Multiple dose/Chronic poison : Warfarin, bromedioloe – poison 5 gm + flour 450 gm + Jaggery 15 gm + sweet oil 10 ml. e) Fumigants : HCN, EDB are mostly use fumigants 3 gm tab/burrow 2-3 times prebaiting is needed.	4 marks 4 marks

Q.11	SECTION "B"	
a.	**Ans.** Scientific name: *Macrosiphoniella sanborni* Damaging stages: Nymph and adult	2 mark
b.	**Ans.** Extended form: *Helicoverpa armigera* Nuclear Polyhedrosis Virus Pest name against which it use: *Helicoverpa armigera*	2 mark
c.	**Ans.** Scientific name: *Lasioderma serricorne* Site of Oviposition: Eggs laid closely on the commodity	2 mark
d.	**Ans.** Scientific name: *Hypolixus truncatulus* Site of pupation: In stem	2 mark
e.	**Ans.** Scientific name: *Papilio demoleus* Damaging stages: Caterpillar	2 mark
f.	**Ans.** Scientific name: *Prionoryctes caniculus* Damaging stages: Larva and adult	2 mark
g.	**Ans.** Site of pupation: In soil in earthen cocoons Order: Hymenoptera	2 mark
h.	**Ans.** Site of pupation: On leaves Order: Coleoptera	2 mark
i.	**Ans.** MRL: Maximum Residue Limits ADI: Acceptable Daily Intake	2 mark
j.	**Ans.** Family: Termitidae Order: Isoptera	2 mark
k.	**Ans.** Scientific name: *Stegobium paniceum* Family: Anobiidae	2 mark
l.	**Ans.** Site of Oviposition: Just under the skin (epidermis) of the fruits Order: Diptera	2 mark
m.	**Ans.** Site of oviposition: Singly in small incisions in the leaf with ovipositor Order: Diptera	2 mark
n.	**Ans.** Authors: A.S. Atwal and G.S. Dhaliwal	2 mark

Q.12	SECTION "C"	
1	Tortoise beetles are pests of **Ans.** d) Sweet potato	1 mark
2	Which pest of potato attacks the tuber both in field and storage ? **Ans.** b) Potato tuber moth	1 mark
3	Cinnamon butterfly *Chilasia clytia* belongs to order **Ans.** c) Lepidoptera	1 mark
4	Scientific name of brinjal stem borer is **Ans.** b) *Euzophera perticella*	1 mark
5	Pest acts as a vector for transmitting yellow vein mosaic virus disease in okra is **Ans.** b) *Bemisia tabaci*	1 mark
6	The damaging caste of termites, *Termes spp.* is **Ans.** b) Workers	1 mark
7	*Epilachna vigintioctopunctata* is a serious pest of **Ans.** b) Brinjal	1 mark
8	Monophagous pest of sweet potato crop is **Ans.** c) Sweet potato weevil	1 mark
9	The lethal dose at which 50% of the population if killed in a given period of time is referred as	1 mark

	Ans. c) LD50	
10	Mining and skeltanization of cabbage leaves is caused by **Ans.** d) Diamond back moth	1 mark
11	Site of pupation for tomato leaf miner, *Liriomyza trifoli* is **Ans.** d) In soil	1 mark
12	Murda or Bokadya symptoms in chilli crop is due to attack of **Ans.** a) Thrips	1 mark
13	Which one of the following is serious pest of rose crop? **Ans.** a) Thrips	1 mark
14	Use of resistant varieties in the IPM is an example of **Ans.** c) Cultural control	1 mark
15	Yellow sticky traps are recommended for the management of **Ans.** a) Gerbera whiteflies	1 mark
16	Irregular holes on cucurbit leaves is damage symptom of **Ans.** c) Red pumpkin beetle	1 mark
17	Use of egg parasitoid, *Trichogramma chilonis* is recommended for management of **Ans.** a) Bean pod borer	1 mark
18	Scientific name of cabbage head borer is **Ans.** b) *Hellula undalis*	1 mark
19	Jasmine budworm, *Hendecasis duplifascialis* belongs to family **Ans.** a) Pyraustidae	1 mark
20	*Tetranychus urticae*, a serious pest of carnation crop belongs to order **Ans.** b) Acarina	1 mark
21	Selection of healthy rhizome for planting is recommended for the management of **Ans.** a) Turmeric rhizome fly	1 mark
22	The major pest of Cardamom crop is **Ans.** a) Cardamom thrips	1 mark
23	SINPV is recommended for the management of **Ans.** b) *Spodoptera litura*	1 mark
24	The pest having both beneficial and harmful stages in its life cycle is **Ans.** c) Blister beetles	1 mark