EXTENDED LECTURE OUTLINE

ENT6 311 Pest Management in Crops and Stored Grains (2+1)

Information on scientific name, family, order, distribution, host range, biology, nature and symptoms of damage of major insect pests of important field crops, horticulture crops and stored grains are provided. Integrated Pest Management strategies for major pests of crops and general management practices for minor pests are provided.

Lecture schedule	Topics to be covered
1	General description on nature and types of damage caused by arthropod pests - Different types of damages caused by insect pests on crops I. Direct damage 1. Types of damage caused by biting and chewing insect pests 2. Types of damage caused by piercing and sucking insect pests 3. Damage caused by subterraneous insect pests II. Indirect damage 1. Causing contamination and loss of quality of the product 2. Dissemination of plant diseases 3. Making the harvest difficult
	Insect pests of field crops and their management
2-3	Insect pests of paddy- Yellow stem borer, gall midge, leaf roller, case worm Sucking insects- Green leaf hoppers, brown plant hopper, white backed plant hopper, gundhi bug IPM practices for yellow stem borer, gall midge, brown plant hopper
4	Insect pests of sorghum – shoot fly, spotted stem borer, armyworm, aphids, shoot bug, earhead bug, earhead midge IPM practices for shoot fly, spotted stem borer
5	Insect pests of maize – fall armyworm, spotted stem borer, pink stem borer, armyworm aphids, cob worm IPM practices for fall armyworm
6-7	Insect pests of sugarcane - Seedling borer, Inter-node borer and top shoot borer, termites, root grubs, wooly aphid, scales & mealybugs IPM practices for seedling borer, wooly aphid and root grubs
8-9	Insect pests of cotton - Sucking pests viz., thrips, whiteflies, aphids, leaf hoppers;

	bollworms, cotton strainers- red cotton bug, dusky cotton bug IPM practices for sucking pests and bollworms
10	Insect pests of groundnut – Leaf miner, red headed hairy caterpillar, Tobacco caterpillar, white grubs, aphids and thrips IPM practices for leaf miner, red headed hair caterpillar
11	Insect pests of castor- Shoot and capsule borer, semilooper, castor butterfly, leaf hopper
12	Insect pests of sunflower – Head borer, semilooper, leafhoppers, thrips and parakeets IPM practices for head borer, parakeets
13	Insect pests of soybean – Stem fly, tobacco caterpillar, Pod borers, girdler, semilooper, aphids, whitefly IPM practices for stem fly, tobacco caterpillar
14-15	Insect pests of pulses - pod borers viz., gram pod borer, spotted pod borer, field bean pod borer, spiny pod borer, blue butterfly, plume moth, tur pod fly; pod sucking bugs, aphids, eriophyid mite IPM practices for pod borer complex
16-17	Factors affecting losses of stored grains – abiotic and biotic factors Insect pests of stored grains and their preventive and curative control measures
18	Mites, rodents, birds and micro-organisms associated with stored grains and their management
19	Storage structures and methods of grain storage
	Insect pests of horticulture crops and their management
	Insect pests of vegetable crops
20	Insect pests of brinjal -Shoot and fruit borer, hadda beetle, ash weevil, leaf hoppers, whiteflies, spider mites IPM practices for brinjal shoot and fruit borer
21	Insect pests of tomato – Serpentine leaf miner, South American pinworm, fruit borer, whiteflies, thrips, spider mites. IPM practices for South American pinworm, fruit borer, whiteflies
22	Insect pests of potato- Potato tuber moth, cutworms, tobacco caterpillar, aphids, yellow mite IPM practices for Potato tuber moth.
23	Pests of chilli – Chilli thrips, south Asian thrips (Black thrips), yellow mite, tobacco caterpillar, whiteflies, gall midge. IPM practices for thrips
24	Insect pests of cruciferous vegetables (Cabbage, Cauliflower, knolkhol, Radish)- Diamondback moth, leaf webber, tobacco caterpillar, cabbage butterfly, mustard

	sawfly, Aphids IPM practices for Diamondback moth
25	Insect pests of cucurbitaceous vegetables (Melons and gourds) – Melon fruit fly, pumpkin beetles, pumpkin caterpillar, serpentine leaf miner, snake gourd semilooper, aphids, thrips, whiteflies, spider mites. IPM practices for melon fruit fly
	Insect pests of fruit crops
26-27	Insect pests of mango - Leaf hoppers, fruit fly, mango nut weevil, stem borer, leaf webber, scales & mealy bugs IPM practices for leaf hoppers and fruit fly
28	Insect pests of citrus – Citrus leaf miner, citrus butterfly, stem borers, Fruit sucking moths, mealybugs, psyllids, aphids, mites IPM practices for fruit sucking moth
29	Insect pests of guava - Tea mosquito bug, fruit fly, bark eating caterpillar, fruit borer, scales & mealy bugs, spiralling whitefly IPM practices for fruit fly
30	Insect pests of banana- Rhizome weevil, pseudostem weevil, tobacco caterpillar, banana skipper, aphids and thrips IPM practices for rhizome weevil and pseudostem weevil
31	Insect pests of Grapes - Flea beetle, stem borer, shot hole borer, mealy bugs, thrips IPM practices for mealy bugs
32	Insect pests of pomegranate – Anar butterfly, fruit sucking moths, thrips and aphids IPM practices for anar butterfly and fruit sucking moths
	Insect pests of plantation crops
33-34	Insect pests of coconut- Black headed caterpillar, rhinocerous beetle, red palm weevil, rugose spiralling whitefly, coconut perianth mite IPM practices for black headed caterpillar, rhinocerous beetle, red palm weevil, rugose spiralling whitefly, coconut perianth mite
35	Insect pests of areca nut - Root grubs, spindle bug, inflorescence caterpillar, mites
36	Insect pests of cashew – Tea mosquito bug, stem & root borer, leaf miner, Apple & nut borer, aphids.
37	Insect pests of coffee- White stem borer, shot hole borer, coffee berry borer, coffee green scale IPM practices for white stem borer and coffee berry borer

	Insect pests of spices and condiments
38	Insect pests of cardamom - Shoot and capsule borer, thrips, aphids IPM practices for thrips Insect pests of black pepper – Marginal gall thrips, pollu beetle, scales, mealy bugs
39	Insect pests of ginger and turmeric - Shoot borer, ginger fly, rhizome scale, skipper
	Insect pests of ornamental crops
40-41	Insect pests of rose - Thrips, mites, bud worm, aphids, scales
	Insect pests of jasmine- Budworm, bud borer, leaf webber, eriophyid mite
	Insect pests of chrysanthemum- Aphids, thrips, whiteflies, bud borers
	Insect pests of gerbera- Serpentine, leaf miner, aphids, thrips, whiteflies, bud borers
42	Household insect pests & their management – Cockroaches, housefly, mosquito, bed bug, ants, house cricket.
	Non-insect pests & their management- mites, snails and slugs
43-44	Definition of IPM, concepts of IPM with suitable examples
45	Biorational approaches in pest management –Insect attractant, Insect repellents, botanicals, microbes.
46	Use of drones and artificial intelligence in pest management

Practical:

1. Types of damages caused by different insect pests
2. Identification of insect pests of paddy and their damage symptoms
3. Identification of insect pests of sorghum, maize and their damage symptoms
4. Identification of insect pests of sugarcane, cotton and their damage symptoms
5. Identification of insect pests of ground nut, castor and sun flower and their damage symptoms
6. Identification of insect pests of pulses and their damage symptoms
7. Field visits – To study of damage symptoms of insect pests of field crops
8. Identification of insect pests of stored grains and their damage symptoms
9. Identification of insect pests of brinjal, tomato, chilli, potato and their damage symptoms
10. Identification of insect pests of cruciferous & cucurbitaceous vegetables and damage symptoms
11. Identification of insect pests of mango, citrus and their damage symptoms
12. Identification of insect pests of guava, banana, grapes, pomegranate and their damage symptoms
13. Identification of insect pests of coconut, areca nut, cashew and their damage symptoms
14. Identification of insect pests of coffee, cardamom, turmeric, ginger their damage symptoms
15. Identification of insect pests of rose, jasmine, chrysanthemum and their damage symptoms
16. Field visits – To study of Insect pests of horticulture crops
17. Study of household insect pests and non-insect pests

18. Spraying techniques for field and horticulture crops

References:

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4. Hill, D.S. 1985, Agricultural insect pests of tropics and their control.
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6. T.V.R. Ayyar, 1984, Hand book of Economic entomology for South India
7. Srivatava, P. M. and Ashok kumar, 1989, Text book of Agricultural entomology