SOS/MSCZO606/ Entomology (Systematic and Applied entomology M.Sc. Zoology 4th Sem.

Insect Systematic, Ecology and Applied entomology

Course I: Entomology (Systematic and Applied entomology) (MSCZO-610)

UNIT WISE CONTENTS

Block I: Insect origin and Systematics

Unit 1: Origin and evolution of insects

1.1 Objectives
1.2 Introduction
1.3 Origin of insects
1.4 Evolution
1.4.1 Evolutionary history
1.4.1.1 Devonian
1.4.1.2 Carboniferous
1.4.1.3 Permian
1.4.1.4 Triassic
1.4.1.5 Jurassic
1.4.1.6 Cretaceous
1.4.1.7 Paleogene
1.4.1.8 Neogene
1.5 Phylogeny
1.6 Summary
1.7 Terminal Questions and Answers

Unit 2: Insect classification

2.1 Objectives
2.2 Introduction
2.3 Historical basis of Insect classification
2.4 Phylogeny of Arthropoda and Hexapoda
2.5 Introduction to Primitive Insects
2.6 Construction of Dichotomous key for identification
2.7 Summary
2.8 Terminal Questions and Answers

Unit 3: Methods of Collection and Preservation

3.1 Objectives
3.2 Introduction
3.3 Collection of insects
3.3.1 Killing jars
3.3.2 Relaxing jars
3.3.3 Aerial Nets
3.3.4 Sweeping or Beating Nets
3.3.5 The Aspirator
3.3.6 Light traps
3.3.7 Pitfall traps
3.3.8 Pan traps
3.4 Preservation
3.4.1 Soft bodied Insects
3.4.2 Hard bodied Insects
3.5 Pinning, Mounting and Displaying of Insects
3.6 Summary
3.7 Terminal Questions and Answers

Unit 4: Parental Care

4.1 Objectives
4.2 Introduction
4.3 Care for Eggs
4.4 Brood care
4.5 Brood Parasitism
4.6 Summary
4.7 Terminal Questions and Answers

Insect Systematics

Unit 5: Generalized structure, habit and habitat of the following Orders with Families

5.1 Objectives
5.2 Introduction
5.3Thysanura (Machilidae, Lepismatidae)
5.4 Collembola
5.5 Isoptera
5.6 Phthiraptera (Anoplura and Mallophaga)
5.7 Orthoptera (Acrididae, Tettigonidae, Gryllidae)
5.8 Phase theory of Locust
5.9 Summary
5.10 Terminal Questions and Answers

Unit 6: Generalized structure habit and habitat of the following Orders with Families:

6.1 Objectives
6.2 Introduction
6.3 Heteroptera (Pentatomidae, Pyrrhocoridae, Coreidae, Reduviidae, Nepidae, and Belostomatidae)
6.4 Homoptera (Fulgoridae, Membracidae, Cicadidae, Aphidae, Coccidae)
6.5 Coleoptera (Hydrophilidae, Meloidae, Coccinellidae, Curculionidae, Scarabaeidae, Chrysomelidae, Cerambycidae)
6.6 Summary
6.7 Terminal questions and Answers

Unit 7: Generalized structure habit and habitat of the following Orders with Families:

7.1 Objectives
7.2 Introduction
7.3 Lepidoptera (Noctuidae, Sphingidae, Bombycidae, Nymphalidae, Pieridae, Papilionidae, Pyralididae and Saturniidae)
7.4 Hymenoptera (Ichneumonidae, Chalcididae, Braconidae, Vespidae, Apidae, Formicidae)
7.5 Diptera (Tipulidae, Chironomidae, Culicidae, Muscidae, Tabanidae, Tachinidae, Drosophilidae, and Bombyliidae)
7.6 Summary
7.7 Terminal Questions and Answers

Block II: Pest and their control

Unit 8: Insect pests (Agro Horticultural)

8.1 Objectives
8.2 Introduction
8.3 Origin of insect pests
8.4 Factors affecting the abundance of insect pests
8.5 Types of insect pest
8.6 Pests of stored grains: *Sitophilus, Trogoderma, Rhyzopertha, Tribolium, Bruchus*.
8.7 Pests of Sugarcane: *Pyrilla, Chilo, Emmalocera, Scirpophaga*
8.8 Pests of Cotton: *Dysdercus, Earias and Pectinophora,Sylepta*
8.9 Pests of Cereals: *Heliothis, Leptocorisa varicornis, Hieroglyph, Tryporyza*
8.10 Pests of Vegetables: *Epilachna, Aulacophora foveicollis, Pieris brassicae, Thrips tabaci*
8.11 Pests of Fruits: *Dacus cucurbitae, Papilio demoleus, Idiocerus atkinsoni, Anomala*

8.12 Polyphagous insect pest: locusts, termites, cutworms, gram pod borer, aphids
8.13 Summary
8.14 Terminal Questions and Answers

Unit 9: Household Pests: Classification, types, habit and habitat and damage of household items

9.1 Objectives
9.2 Introduction
9.3 Cockroaches
9.4 Ants
9.5 Wasps
9.6 Carpet beetles
9.7 Furniture beetles
9.8 Booklice
9.9 Summary
9.10 Terminal Questions and Answers

Unit 10: Pest of Farm Animals and their control

10.1 Objectives
10.2 Introduction
10.3 Blood-sucking flies: Systematic position
10.3.1.1 Causes/Mode of parasitism
10.3.2 Disease/Effected host
10.3.3 Control measures
10.4 Myiasis flies: Systematic position
10.4.1 Cause / Mode of parasitism
10.4.2 Disease/ loss
10.4.3 Control measures
10.5 Lice: systematic position
10.5.1 Causes/Mode of parasitism
10.5.2 Disease /Effected host
10.5.3 Control measures
10.6 Fleas: systematic position
10.6.1 Causes/ mode of parasitism
10.6.2 Disease/ Effected host
10.6.3 Control measures
10.7 Ticks: Systematic position
10.7.1 Causes/Mode of parasitism
10.7.2 Disease/ Effected host
10.7.3 Control measures
10.8 Mites: Systematic position
10.8.1 Causes/Mode of parasitism
10.8.2 Disease/ Effected host
10.8.3 Control measures
10.9 Summary
10.10 Terminal Questions and Answers

Unit 11: Medical entomology

11.1 Objectives
11.2 Introduction
11.3 Pests of public importance and their control:
11.3.1 Mosquitoes
11.3.2 House flies
11.3.3 Bedbugs
11.4 Insect borne diseases
11.4.1 Typhus
11.4.2 Yellow fever
11.4.3 Dengue fever
11.4.4 Sleeping sickness
11.4.5 Encephalitis

11.4.6 Leishmaniasis
11.5 Venoms and allergens
11.6 Blister and urtica-inducing insects
11.7 Arthropods of forensic importance
11.8 Insects succession on corpse and its relationship in determining time of death
11.9 Summary
11.10 Terminal Questions and Answers

Unit 12: Insect Pest Control: Natural Control

12.1 Objectives
12.2 Introduction
12.3 Applied control
12.4 Cultural control: Agronomic practices
12.4.1 Crop rotation
12.4.2 Tillage practice
12.4.3 Planting/harvesting date manipulation
12.4.4 Sowing/plant density
12.4.5 Inter cropping
12.4.6 Trap cropping and irrigation
12.5 Summary
12.6 Terminal Question and Answers

Unit 13: Chemical control

13.1 Objectives
13.2 Introduction
13.3 Formulations and Insecticide Toxicity
13.4 Botanical Pesticide
13.4.1Pyrethrins
13.4.2 Rotenone
13.4.3 Sabadilla
13.4.4 Nicotine
13.4.5 Neem
13.5 Synthetic Organic Insecticides and their Mode of Action
13.5.1 Organochlorines
13.5.2 Organophosphates
13.5.3 Carbonates
13.5.4 Pyrethroids
13.5.5 Neonicotinoids
13.6 Insect Growth Regulators (IGR)
13.6.1 Juvenoids
13.6.2 Ecdysoids
13.6.3 Anti hormones
13.6.4 Chitin inhibitors
13.7 Summary
13.8 Terminal Questions and Answers

Unit 14: Biological control

14.1 Objectives
14.2 Introduction
14.3 Parasites
14.4 Parasitoids
14.5 Predators
14.6 Methods for using biocontrol agents
14.6.1 Classical biological control
14.6.2 Augmentation and inoculation techniques
14.6.3 Conservation biological control
14.6.4 Microbial control (virus, bacteria and fungi)
14.7 Behavioral control
14.7.1 Types of pheromones
14.7.2 Uses of pheromones in pest management (monitoring, mass trapping and matting disruption)

14.8 Genetic and biotechnological control
14.9 Insect attractants, repellents and antifeedants
14.10 Summary
14.11 Terminal Question and Answers

Block III: Applied & Sustainable Entomology

Unit 15: Mulberry and non mulberry sericulture

15.1 Objectives
15.2 Introduction
15.3 Cultivation of Food Plants
15.4 Rearing of Silkworms
15.5 Harvesting and Processing of Cocoons
15.6 Genetic improvement of Silkworms
15.7 Diseases of Silkworm
15.8 Economic importance and Sustainable livelihood through Sericulture
15.9 Summary
15.10 Terminal Questions and Answers

Unit 16: Apiculture

16.1 Objectives
16.2 Introduction
16.3 Conservation of important Bee Flora for Forage
16.4 Types of honeybees
16.5 Organization of bee Colony
16.6 Life history and behavior of Bees
16.7 Diseases of Honeybees
16.8 Beekeeping Methods
16.8.1 Equipment and tools
16.8.2 Apiary Management
16.8.3 Controlling Swarming
16.8.4 Handling of Bees
16.8.5 Extraction of Honey and Wax and other Bee Products
16.9 Role of honey Bee in Crop Pollination
16.10 Summary
16.11 Terminal Questions and Answers

Unit 17: Lac culture

17.1 Objectives
17.2 Introduction
17.3 Lac Insect and its Life History
17.4 Host Plant Management
17.5 Strains of Lac Insects
17.6 Propagation of Lac Insects
17.7 Lac Crop Management
17.8 Natural Enemies of Lac Insects and their Management
17.9 Lac extraction
17.10 Summary
17.11 Terminal Questions and Answers

Suggested Readings:

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14. Patton. W.S. and Cragg F.W.1981. A Text Book of Medical Entomology. International Books and Periodicals Supply Service, New Delhi.
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