

PTH214:FUNDAMENTALS OF NEMATOLOGY

L:1 T:0 P:2 Credits:2

Course Outcomes: Through this course students should be able to

CO1 :: gain knowledge on the morphology, biology and classification of plant parasitic nematodes

CO2 :: identify plant parasitic nematodes and understand their interaction with other pathogens

CO3 :: utilize knowledge of critical developmental stages of plant parasitic nematodes for designing effective management plans

CO4 :: apply suitable management strategies targeting the vulnerable stages of plant parasitic nematodes

CO5 :: analyze the interaction between management strategies, plant health and yield outcomes

Unit I

Introduction to Plant Nematology : history of phytonematology, habitat and diversity, evolution of nematode research in India and globally, economic importance of nematodes, impact on crop yield, quality and international trade

Unit II

General characteristics of nematodes : terminologies, general characteristics, general morphology and biology, major genera of plant-parasitic nematodes and their host range, difference between free-living and plant-parasitic nematodes, role of nematodes in soil ecosystem and plant health

Unit III

Classification of nematodes : classification of nematodes up to family level with emphasis on groups containing economically important genera, important orders of plant-parasitic nematode, classification of nematodes on the basis of feeding/parasitic habit

Unit IV

Symptomatology and disease interaction : symptomatology, role of nematodes in disease development, interaction between plant parasitic nematodes and disease-causing fungi, bacteria, viruses

Unit V

Nematode pests of crops : nematode pests of rice, wheat, vegetables, pulses, oilseed crops, fiber crops, citrus, banana, tea, coffee, coconut and their distribution

Unit VI

Nematode management : cultural methods, physical methods, biological methods, chemical methods of nematode management, plant quarantine, plant resistance and immunity

List of Practicals / Experiments:

Nematode sampling and extraction techniques

- To study sampling and collection of soil and plant samples
- To extract of nematodes from soil using Cobb's sieving and decanting technique
- To extract of nematodes from plant tissues using the Baermann funnel technique

Nematode handling and enumeration

- To pick and count plant parasitic nematodes

Identification of key plant parasitic nematodes

- To identify the Meloidogyne spp. using taxonomic keys
- To identify the Pratylenchus spp. using taxonomic keys
- To identify the Heterodera and Tylenchulus spp. using taxonomic keys
- To identify the Xiphinema and Helicotylenchus spp using taxonomic keys

Symptomatology and host-nematode interaction

- To study of symptoms caused by nematode pests in cereal crops

- To study of symptoms caused by nematode pests in vegetable and pulse crops
- To study of symptoms caused by nematode pests in plantation crops

Nematode management strategies

- To study the methods of application of nematicides and organic amendments

Text Books:

1. TEXTBOOK ON INTRODUCTORY PLANT NEMATOLOGY by R. K. WALIA & H. K. BAJAJ, ICAR
2. PLANT NEMATOLOGY by N. G. RAVICHANDRA, I. K. INTERNATIONAL PUBLISHING HOUSE

References:

1. ECONOMIC NEMATOLOGY by JOHN M. WEBSTER, ACADEMIC PRESS
2. PLANT PARASITIC NEMATODES: MORPHOLOGY, ANATOMY, TAXONOMY, AND ECOLOGY by BERT MERTON ZUCKERMAN, W. F. MAI, RICHARD A. ROHDE, ACADEMIC PRESS