Lecture 13: PEST MANAGEMENT - DEFINITION - NEED - OBJECTIVES - REQUIREMENTS FOR SUCCESSFUL PEST MANAGEMENT PROGRAMME - COMPONENTS OF PEST MANAGEMENT

Pest Management (or) Integrated Pest Management –

Definition IPM definition by FAO (1967)

Integrated Pest Management (IPM) is a system that, in the context of associated environment and population dynamics of the pest species, utilizes all suitable techniques and methods in as compatible a manner as possible and maintains pest populations at levels below those causing economic injury.

IPM definition by Luckmann and Metcalf (1994)

IPM is defined as the intelligent selection and use of pest control tactics that will ensure favourable economical, ecological and sociological consequences.

Need for Pest Management (or) Why Pest Management

1. Development of resistance in insects against insecticides e.g. OP and synthetic pyrethroid resistance in *Helicoverpa armigera*.
2. Out break of secondary pests e.g. Whiteflies emerged as major pest when spraying insecticide against *H. armigera*.
3. Resurgence of target pests e.g. BPH of rice increased when some OP chemicals are applied.
4. When number of application increases, profit decreases.
5. Environmental contamination and reduction in its quality.
6. Killing of non-target animals and natural enemies.
7. Human and animal health hazards.

Stages in crop protection leading to IPM

1.	Subsistence phase	:	Only natural control, no insecticide use
2.	Exploitation phase	:	Applying more pesticides, growing HY varieties and get more yield and returns
3.	Crisis phase	:	Due over use pesticides, problem of resurgence, resistance, secondary pest out break, increase in production cost
4.	Disaster phase	:	Due to increased pesticide use - No profit, high residue in soil - Collapse of control system
5.	Integrated Management Phase	:	IPM integrates ecofriendly methods to optimize control rather than maximise it.

Objectives of pest management

1. To reduce pest status below economic injury level. Complete elimination of pest is not the objective.
2. To manage insects by not only killing them but by preventing feeding, multiplication and dispersal.
3. To use ecofriendly methods, which will maintain quality of environment (air, water, wild life and plant life)
4. To make maximum use of natural mortality factors, apply control measures only when needed.
5. To use component in sustainable crop production.

Requirements for successful pest management programme

1. Correct identification of insect pests
2. Life history and behaviour of the pest
3. Natural enemies and weather factors affecting pest population
4. Pest surveillance will provide above data
5. Pest forecasting and predicting pest outbreak
6. Finding out ETL for each pest in a crop
7. Need and timing of control measure - Decision
8. Selection of suitable methods of control
9. Analysis of cost/benefit and benefit/risk of each control measure
10. Farmer's awareness and participation
11. Government support
12. Consumer awareness on use of pesticides free products

TOOLS OR COMPONENTS OF INTEGRATED PEST MANAGEMENT (Arranged in increasing order of complexity)

i. Cultural method or use of agronomic practices

1. Crop rotation
2. Crop refuse destruction
3. Tillage of soil
4. Variation in time of planting or harvesting
5. Pruning or thinning
6. Fertilizer management
7. Water management
8. Intercropping
9. Trap crop

ii. Host plant resistance - Antixenosis, antibiosis, tolerance

iii. Mechanical methods of pest control

1. Hand destruction
2. Exclusion by screens, barriers
3. Trapping, suction devices, collecting machine
4. Crushing and grinding

iv. Physical methods

1. Heat
2. Cold
3. Energy - light trap, irradiation, light regulation
4. Sound

v. Biological methods

1. Protection and encouragement of NE
2. Introduction, artificial increase and colonizing specific parasitoids and predators
3. Pathogens on insects like virus, bacteria, fungi and protozoa
4. Use of botanicals like neem, pongam, etc.

vi. Chemical methods

1. Attractants
2. Repellents
3. Insecticides - OC, OP, carbamates, pyrethroids, etc.
4. Insect growth inhibitors
5. Chemosterilants

vii.Behavioural methods

1. Pheromones
2. Allelochemics

viii. Genetic/biotechnology method

- Release of genetically incompatible/sterile pests
- Transgenic plant

ix. Regulatory/legal method

- Plant/animal quarantine
- Eradication and suppression programme