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CATEGORIES OF INSECT PESTS

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IPM: INTRODUCTION, HISTORY, IMPORTANCE, CONCEPTS, PRINCIPLES AND TOOLS OF IPM

Pest

Any species, strain or biotype of plant, animal, or pathogenic agent injurious to plant or plant products.

CATEGORIES OF PESTS

- a. Key pests:** An important major pest species in the complex of pests attacking a crop e.g. American bollworm.
- b. Regular pests:** Pests that occur more frequently on a crop having close association with particular crop. e.g. Rice stem borer, Mustard aphid.
- c. Occasional pests:** Pests that occur rather infrequently and have close association with a particular crop. e.g. Rice horn caterpillar, Rice case worm
- d. Seasonal pests:** Pests that occur on a crop during a particular season of the year. e.g. Red hairy caterpillar in groundnut in Saurashtra and maize in Dahod in June - July.
- e. Persistent pests:** Pests, which occur persistently on a crop almost throughout the year. e.g. Thrips on chillies
- f. Sporadic pests:** Pests, which occur in a few isolated localities during some period. Occasionally causing serious damage. e.g. Rice ear head bug, Mango shoot borer

- g. Epidemic pests:** Pests, which occur in severe form in a region or locality at a particular season. e.g. RHC in maize in Dahod in monsoon.
- h. Endemic pests:** Pests, which occur regularly and confined to a particular area of locality. e.g. Mustard aphids in North Gujarat, Rice Gall midge in Madurai district
- i.**

Economic Injury Level (EIL): The lowest pest population density that will cause economic damage.

Economic Threshold Level (ETL): The Pest density at which control measure should be applied to prevent an increasing pest population from reaching the economic injury level (EIL) . It is also called action threshold.

WHAT IS INTEGRATED PEST MANAGEMENT (IPM)?

What is IPM?

‘**Integration**’ means the harmonious use of multiple methods to control single pests as well as the impacts of multiple pests.

‘**Pests**’ are any organism detrimental to humans, including invertebrate and vertebrate animals, pathogens and weeds.

‘**Management**’ refers to a set of decision rules based on ecological principles and economic and social considerations. The backbone for the management of pests in an agricultural system is the concept of economic injury level (EIL).

According to FAO (1967), Integrated pest management (IPM) is a system that, in the context of associated environment and population dynamics in pest species, utilizes all suitable techniques and methods in as compatible manner as possible and maintains the pest population at levels below those cause economic injury".

History of IPM

- Stern et al. (1959) systematized the integration of chemical and biological control methods. He coined the term IPM for the first time.
- Geier and Clarke (1961): The term pest management was advocated by them.
- 1976: The concept of IPM came of at the XV International Congress of Entomology.
- Metcalf (1994): He advocated judicious use of insecticides as an essential component of IPM systems based on their convenience, simplicity, effectiveness, flexibility and economy.

Concepts of IPM

- 1. Understanding the agricultural ecosystem:** An agro ecosystem is intensively manipulated by man. Agro ecosystem is a complex of food chains and food webs that interact together to produce a stable unit.
- 2. Planning of agricultural ecosystem:** In IPM programme the agricultural system can be planned in terms of anticipating pest problem and also the ways to reduce them.
- 3. Cost/ Benefit and Benefit/ Risk :** Based on the possibility of pest damage by predicting the pest problem and by defining ETL, emphasis should be given to cost benefit ratio.
- 4. Tolerance of pest damage:** The pest free crop is neither necessary in most cases for high yields nor appropriate for insect pest management. Exceptions occur in case of plant disease transmission by vectors. The relationship between density of pest population and profitability of control measures is expressed through threshold values.
- 5. Leaving a pest residue:** It is an important concept of pest management, to leave a permanent pest residue below economic threshold level, so that natural enemies will survive.

Timing of treatments: Treatment in terms of pesticide spray should be need based, with minimum number of sprays, timely scheduled, combined with improved techniques of pest monitoring and crop development.

6. Public understanding and acceptance: In order to deal with various pest problems special effort should be made for effective communication to the people for better understanding and acceptance of pest management practices. The IPM practices followed should be economical and sustainable.

Principles of IPM

1. Subsistence phase
2. Exploitation phase
3. Crisis phase
4. Disaster phase
5. Integrated management phase

Different components or tools of IPM

1. Cultural methods
2. Mechanical methods
3. Physical methods
4. Biological methods (Use of parasites, predators & host plant resistance)
5. Legal control
6. Chemical methods
7. Behavioural methods
8. Genetic / Biotechnology methods

Why Integrated Pest Management?

1. Development of resistance in insects against insecticides e.g. OP and synthetic pyrethroid resistance in *Helicoverpa armigera*.
2. Outbreak 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 (parasites, predators & pollinators).
7. Residue in food and feed.
8. Human and animal health hazards.

Basic Requirements for successful pest management programme

Knowledge on following points is required for successful management of pests.

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

References – A Text Book of Entomology by Dr. Mathur and Dr. Upadhyay

Applied Entomology by D. S. Reddy

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