RAMA UNIVERSITY

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FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

Lecture-1 Categories of insect pests and diseases

CATEGORIES OF PESTS

Based on occurrence following are pest categories

Regular pest: Frequently occurs on crop - Close association e.g. Rice stem borer, Brinjal fruit borer

Occasional pest: Infrequently occurs, no close association e.g. Caseworm on rice, Mango stem borer

Seasonal pest: Occurs during a particular season every year e.g. Red hairy caterpillar on groundnut, Mango hoppers

Persistent pests: Occurs on the crop throughout the year and is difficult to control e.g. Chilli thrips, mealy bug on guava

Sporadic pests: Pest occurs in isolated localities during some period. e.g. Coconut slug caterpillar

Based on level of infestation

Pest epidemic: Sudden outbreak of a pest in a severe form in a region at a particular time e.g. BPH in Tanjore, RHC in Madurai, Pollachi

Endemic pest: Occurrence of the pest in a low level in few pockets, regularly and confined to particular area e.g. Rice gall midge in Madurai, Mango hoppers in Periyakulam

Parameters of insect population levels

General equilibrium position (GEP) The average density of a population over a long period of time, around which the pest population over a long period of time, around which the pest population tends to fluctuate due to biotic and abiotic factors and in the absence of permanent environmental changes.

Economic threshold level (ETL) Population density at which control measure should be implemented to prevent an increasing pest population from reaching the ETL.

Economic injury level (EIL) The lowest population density that will cause economic damage

Damage boundary (DB) The lowest level of damage which can be measured. ETL is always less than EIL. Provides sufficient time for control measures.

PEST CATEGORIES ACCORDING TO EIL, GEP AND DB

(i) Key pest

- ✓ Most severe and damaging pests
- ✓ GEP lies above EIL always
- ✓ Spray temporarily bring population below EIL
- ✓ These are persistent pests
- ✓ The environment must be changed to bring GEP below EIL e.g. Cotton bollworm, Diamond back moth

(ii) Major pest

- ✓ GEP lies very close to EIL or coincides with EIL
- ✓ Economic damage can be prevented by timely and repeated sprays e.g. Cotton jassid, Rice stem borer

(iii) Minor pest/Occasional pest

- ✓ GEP is below the EIL usually
- ✓ Rarely they cross EIL
- ✓ Can be controlled by spraying e.g. Cotton stainers, Rice hispa, Ash weevils

(iv) Sporadic pests

- ✓ GEP generally below EIL
- ✓ Sometimes it crosses EIL and cause severe loss in some places/periods e.g. Sugarcane pyrilla, White grub, Hairy caterpillar

(v) Potential pests

- ✓ They are not pests at present
- ✓ GEP always less than EIL
- ✓ If environment changed may cause economic loss e.g. *S. litura* is potential pest in North India

CLASSIFICATION OF PLANT DISEASES

Based on Infection Process

- **Infectious**
  - ✓ A disease caused by a pathogen that can spread from infected plant to healthy plant.
  - ✓ Disease is caused by living organisms
  - ✓ Also known as parasitic or biotic diseases
  - ✓ E.g. Fungi, bacteria, virus, phytoplasma, nematode

- **Non-infectious**
  - ✓ Non-infectious diseases can not be transmitted to a healthy plant.
  - ✓ Also referred as non-parasitic disorders or simply physiological disorders, and are incited by abiotic or inanimate causes like nutrient deficiency or excess or unfavorable weather conditions of soil and air or injurious mechanical influences.

Classification Relation to Their Occurrence

- **Endemic diseases** -which are more or less constantly present from year to year in a moderate to severe form in a particular geographical region, i.e. country, district or location. E.g. Wart disease of potato in Darjeeling.

- **Epidemic or epiphytotic diseases** - which occur widely but periodically particularly in a severe form. They might be occurring in the locality every year but assume severe form only on occasions due to the favorable environmental conditions occurring in some years. E.g. Rust, Late blight

- **Sporadic diseases** occur at irregular intervals and locations and in relatively few instances. E.g. Leaf blight, Wilt

- **Pandemic diseases:** A disease may be endemic in one region and epidemic in another. When epiphytotics become prevalent throughout a country, continent or the world, the disease may be termed as pandemic. E.g. Late blight of potato

Based on plant part affected

- **Localized**, if they affect only specific organs or parts of the plants.
- **Systemic**, if entire plant is affected. or

They can be classified as root diseases, stem diseases, foliage/foliar diseases, etc.

Based on perpetuation and spread

- **Soil borne** -when the pathogen perpetuates through the agency of soil.

- **Seed borne** -when the pathogen perpetuates through seed (or any propagation material).
- **Air borne** -when they are disseminated by wind e.g. rusts and powdery mildews.

Based on the signs and symptoms produced by the pathogens

- Diseases are classified as rusts, smuts, powdery mildews, downy mildews, root rots, wilts, blights, cankers, fruit rots, leaf spots, etc. In all these examples, the disease is named after the most conspicuous symptom of the disease appearing on the host surface.

Based on pathogen generation

- **Simple interest/Monocyclic disease:** Those diseases which have only one generation in one cropping season **OR** Those diseases the increase of which is analogous of increase in money due to the simple interest. E.g. Powdery mildew of wheat.
- **Compound interest/Polycyclic disease:** Those diseases which have more than one generation in one cropping season. E.g. Late blight of potato