



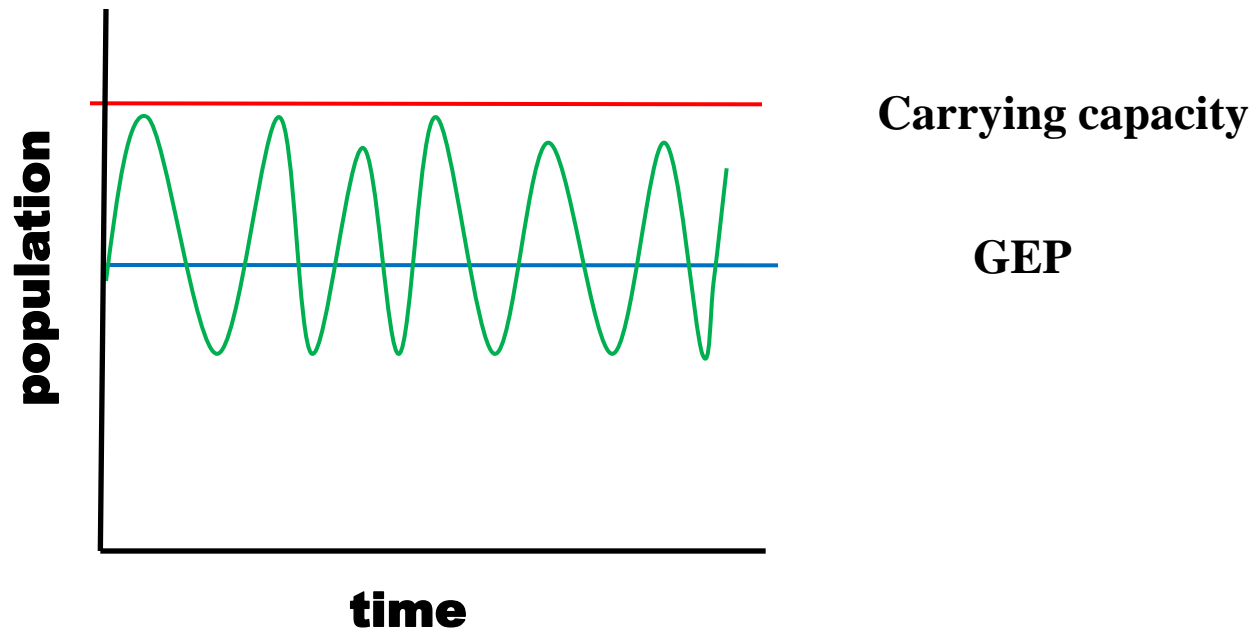
PEST, CAUSE FOR OUTBREAK AND CATEGORIES



Course teacher
Dr. A. Prabhuraj
Professor
Department of Agri. Entomology
UAS, Raichur

When an insect is called a pest ?

General equilibrium positions (GEP): It is the average of a population over a long period of time, around which the insect population tends to oscillate due to biotic and abiotic factors.



- Biotic factor: fecundity, food availability, natural enemies etc.
- Abiotic factors: Temperature, Rainfall, Humidity, wind etc.

- **Damage boundary (DB):** It is the lowest level of damage which can be measured.
- **Economic Injury level (EIL):** It is defined as the lowest population density of insect that will cause economic damage. **OR**
- The critical density of insect population where the loss caused by the pest equals the cost of control measures.



HOW TO CALCULATE ECONOMIC INJURY LEVEL?

EIL can be calculated by using the following formula

$$EIL = P' = \frac{C}{V \times I \times D \times K}$$

- ✓ P' = Economic Injury level in insects / Production or insects / ha
- ✓ C = cost of management activity per unit production (Rs/ha)
- ✓ V = Market value per unit yield (Rs/tonne)
- ✓ I = Crop injury per insect (percent defoliation or percent fruit damage)
- ✓ D = Damage or yield loss per unit injury (Tonne loss or % defoliation)
- ✓ K = proportional reduction in injury from pesticide use.

Worked Example:

Problem: Calculate EIL in terms of pest population/ha with the following figures.

C= management cost per unit area = Rs. 3000/ha

V= market value (in Rs/ unit product) =Rs 1000/tonne

I= crop injury / Pest density = 1% defoliation /100 insect

D= Loss caused by unit injury = 0.05 tonne loss/ 1%defoliation

K = Proportionate reduction in injury by pesticide application = 0.8(80% control)

$$EIL=C/VIDK$$

$$= 3000/1000 \times 0.01 \times 0.05 \times 0.8 = \mathbf{7500 \text{ insects/ ha.}}$$

Is EIL of a pest constant at all time?.....

NO.....

EIL is influenced by

- 1. Market value of the crop (Primary factor):** When crop value increases, EIL decreases and vice versa
- 2. Management of injury by insect (Primary factor):** When management cost increases, EIL also increases
- 3. Degree of injury per insect (Secondary factor):** Insect damaging leaves or reproductive parts will have different EILs
For instance, defoliators will have higher EIL
If insects are found on fruits – EIL low.
If insects are vectors of diseases EIL is very low.
- 4. Crop susceptibility to injury(Secondary factor):** If the crop can tolerate the injury and gives good yield, EIL can be fixed at higher volume. When the crop is older, it can withstand high population- EIL can be high.

Economic Threshold Level (ETL) or Action threshold : It is defined as the pest density at which control measures should be applied to prevent an increasing pest population from reaching EIL.

