



FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

Lecture- 5 Calculation and Dynamics of Economic Injury Level and Importance of Economic Threshold Level.

Pest managers cannot afford to take a pest management action without knowing if it is economically sound. Treating a pest needlessly is not conducive to making a profit. Other values such as aesthetics of the management situation (pertinent to landscapes, indoor settings), and environmental and social costs (e.g., cleanup of water sources, pesticide disposal, medical costs for workers, etc.) can play major roles in pest management decision-making.

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 fluctuate due to biotic and abiotic factors.

Economic Impurity level (EIL): It is defined as the lowest population density that will cause economic damage or the critical density where the loss caused by the pest equals the cost of control measures.

Economic-injury Level (EIL) (Stern et al., 1959) – “The lowest population density of a pest that will cause economic damage; or the amount of pest injury which will justify the cost of control”

EIL can be calculated by using the following formula:

$$EIL = C / V \times I \times D \times K \text{ or } C / VIDK$$

EIL = Economic Injury level in insects / Production or insects / ha

C= cost of management activity per unit production (Rs/ha)

V= Market volume per unit yield (Rs/tonne)

I = Crop injury per insect (percent defoliation or percent fruit change)

D= Damage or yield loss per unit injury (Tonne loss or % defoliation)

K= proportional reduction in injury from pesticide use.

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.

EIL is influenced by the

- 1) Market value of the crop (Primary factor)
- 2) Management costs (Primary factor)
- 3) Degree of injury per insects (Secondary factor)
- 4) Crop susceptibility to injury (Secondary factor)

a) Market volume of the crop: When crop volume increases, EIL decreases and vice versa

b) Management of injury per insect: When management cost increases, EIL also increases

c) Degree of injury per insect:

- 1) Insect damaging leaves or reproductive pest have different EIL (Lower EIL for pest damages).
- 2) If insects are vectors of diseases EIL is very low (1 or 2).
- 3) If insects are found on fruits – EIL low.

d) Crop susceptibility to injury:

- 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 with stand high population- EIL can be high.

Damage boundary (DB): It is the lowest level of damage which can be measured.

Concepts of ETL and EIL

Economic Injury Level (EIL): It is the minimum pest population which causes economic injury. The pest population level at which expenditure on control measure is just balanced by value of increased yield resulting from control of pest.

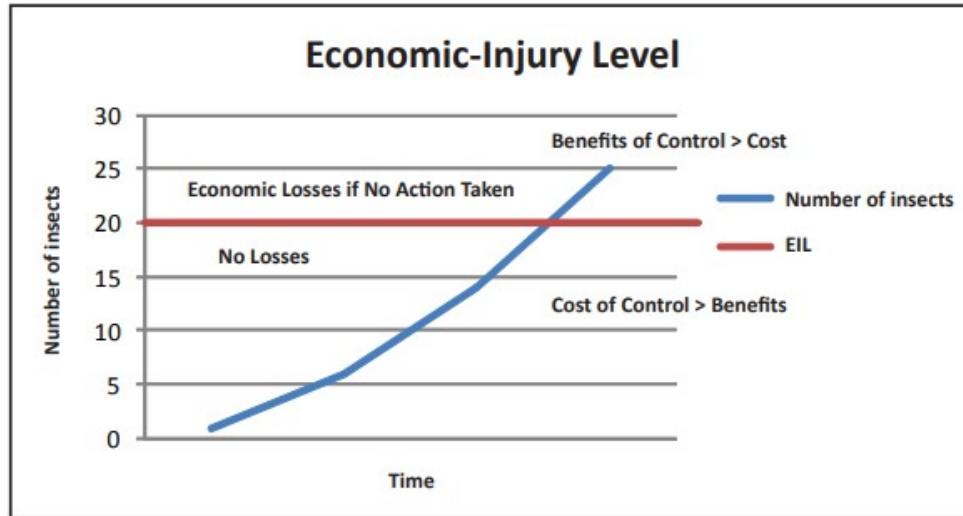


Figure Graphic representation of the Economic-injury Level (EIL) and its relationship to economic loss, benefits, and costs.

Economic threshold level (ETL): The pest population at which control measures should be initiated to prevent population rising above economic injury level also called as action threshold level.

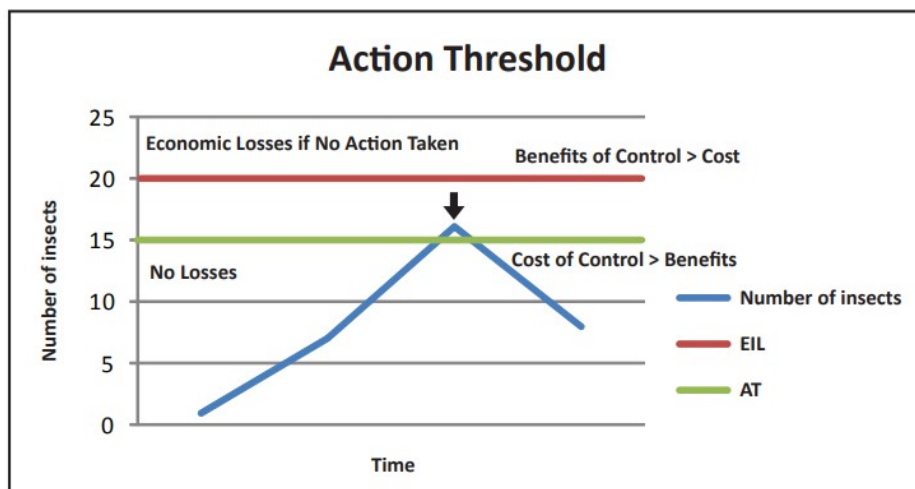


Figure Graph showing the relationship between the Action Threshold (AT) and Economic-injury Level (EIL). The arrow indicates when a pest control action is taken.

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.