

Lecture: 5

CONCEPT OF BALANCE OF LIFE OF INSECTS

The population of an insect or any organism may be defined as the number of individuals of particular species existing in a particular area at a time.

Balance of life

A constant interaction between two opposing forces in nature, the biotic potential tending to increase the population, and the environmental resistance tending to reduce the population.

Balance of Nature

Balance of Nature is defined as the natural tendency of plant and animal population to neither decline in numbers to extinction nor increase to indefinite density.

Factors contributing to increase the insect population:

Any organism will multiply enormously if the environment is optimum.

Fecundity (f): It is the average number of eggs laid by a female in its life.

If a pair of fruit borer adults is reared under most favourable conditions, after one month, 200 adults will come out (eg. 100 males + 100 females), and these can lay 20,000 eggs (200 eggs/female X 100 females).

Factors tending to reduce the insect populations:

In nature, powerful factors like abiotic and biotic working against the increase in insect populations

Environmental resistance (A biotic factors), any factor that inhibits the increase in number of the population. These factors include unfavourable climatic conditions; lack of space, light, or a suitable substrate; deficiencies of necessary chemical compounds or minerals; and

(Biotic factors), the inhibiting effects of predators, parasites, disease organisms.

Causes for Pest Outbreaks

1. Intensive and Extensive Agriculture without proper crop changes .
2. Intensive use of Nitrogen fertilizers .
3. Indiscriminate use of pesticides .
4. Use of high yielding varieties and introduction of new crops .
5. Destruction of forests and bringing forest area under cultivation .
6. Destruction of natural enemies .
7. Improved agronomic practices .
8. Introduction of new pests in new areas .
9. Accidental introduction of pests from foreign countries .
10. *Large scale storage of food grains.*

Factors that determine insect abundance

- 1- **Biotic potential** It is the innate ability of the population to reproduce and survive. It depends on the inherited properties of the insect i.e., reproduction and survival.
- 2- **Environmental resistance** is the physical and biological restraints that prevent a species from realizing its biotic potential.

BIORESOURCES IN ECOSYSTEM

Ecosystem comprises of biological communities and non-living environment. e.g. Agro ecosystem, pond ecosystem, etc.). Bioresources refers to the **biodiversity of various organisms living in that ecosystem.**

e.g. The different pests of cotton, its natural enemies, hyperparasitoids, microbes, etc. are referred to the bioresources in cotton ecosystem.

The ecosystem should have more bioresources.

Such ecosystem will be more stable. Insecticides will deplete the bioresources in ecosystem and make it less stable and prone to pest outbreak.

Natural control will be high when bioresources (e.g. Parasitoids and Predators) are more.