VIP



* Insect Ecology & IPM :- ENTO-232 (1+1)

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* Insect Ecology :-

The term Ecology is derived from Greek word "oikos" meaning 'house' and "logy" meaning "the science of" or "the study of".

Ecology is a multidisciplinary subject & derives support from other science.

OR

Ecology can be defind as the science of plants & animals in relation to their enviornment.

OR

"the study of organism at home" by Eugene P. odum.

Importance :-

1) Indiscriminate uses of pesticides lead to a regular resurgence of pests due to the fact that the natural enemies get killed.
2) Increase in pest population is also due to the interference of man by monoculture, using high yielding & susceptible varieties etc
3) The importance of ecology was then felt & integrated approches in pest management are now made to avoid the violent fluctuation in pest populations.
4) Ecological studies assist pest control programmes by explaining pest problems & suggesting alternate ways of combating insects.
5) The outbreaks or attack of pest can also be predicted.
6) The key mortality factors in a nature population ~~mechanism of natural~~ help to integrate the various methods of controls.

Q.2 Define ecosystem & Describes Biotic & Abiotic factors (2)

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Ecosystem :-

Ecosystem is the aseroblage of elements, communities & physical environment.

OR

Ecosystem is the ultimate unit for study in ecology as they are composed of living organisms & the non-living environment.

Biotic & Abiotic factors :-

1] Biotic factors

a) Competition (interspecific & intraspecific)
b) Natural enemics (predators, parasites & Pathogens)

2] Abiotic factors

a) Temperature
b) Light
c) Moisture & water
d) Substratum & Medium


Biotic factors :-

a] Competition for at least part of lifetime the members of an insect species are likely to be competing with one another or with members of another species for limited resources like food mates, suitable site for pupation.

(1) Intraspecific :- (same species) competition of resource of same species.

(2) Interspecific :- (two or more species)

Abiotic factors :- (50)-(51)

b) Natural enemics :-

① Predators :- Predators are free living organism that feed on other animals, their prey, devouring them completely & rapidly.

② Parasites :- An organism that is depended for some essential metabolic factor on another throughout its all life stages

- A paraiste weaken or kill the host while feeding
- Many parasites on single host

③ Pasitoid :- An insect parasite of an arthropod this is parasitic in its immature stage killing the host in the process of developements & adults are free.

# Effect of Abiotic factors on Insect Population :-

(4)

a) Temperature :-

This is most important physical factor which determines the duration of the various stages in the Insect life cycle.

1) By acting directly on the survival & developement which determine the abundance of pest
2) Indirectly through food & other environmental factor such as moisture, rainfall, wind etc.

b) Moisture :-

1) Insect body consists of 80-90% water.
2) Aquatic larvae contain about 98%.
3) Insects which feed on dry food like Tribolium sp, etc constitute about 50%.
4) Water is generally lost through spiracles & integument.
5) Insects cannot afford to lose more water than they take.

c) Rainfall :-

1) Relative humidity is dependent on rainfall
2) The total ammount of rainfall distribution in time influences the abundance of insects in an area.
3) If there are less than 10 wet days will be an increase of outbooms in following year.
4) If there are more than 10 wet days there will be a decrease.
5) Rainfall also play an important role in movement of swarms of desert locuse.

eg. Ants, termites, root grub beetles etc.

d) Light :-

Q.3 Define IPM. Enlist tools of IPM & describe cultural method of IPM.

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IPM :- (Integrated pest Management)

By FAO (1967). IPM is a system that, in the context associated environment & population dynamics of pest species, utilizes all suitable techniques & methods so as compatible a manner as possible & maintains pest population at below those causing economic injury.

Tools of IPM :-

1] Cultural method :-

1) Crop rotation
2) Crop refuse destruction
3) Tillage of soil
4) Variation in time of planting or harvesting
5) Pruning or thinning
6) fertilizer management
7) Water management
8) Intercropping
9) Trap crop

Q.4 Define ETL (Economic Threshold Level) & write causes of outbreak · pest in agroecosystem.

⇒ ETL :- (Economic Threshold Level)

ETL is defind as the pest density at which control measure should be applied to prevent an increasing pest population from reaching ETL.

Causes of pest outbreak or ~~Attack~~ :-

1) Deforestration or bringing under cultivation
2) Destruction of natural enemics
3) Intensive & Extensive cultivation
4) Introduction of new varieties & crops
5) Improved agronomic practices
6) Introduction of new pest in new environment
7) Accidental introduction of pest from foreign countries
8) Large scale storage of food ~~grains~~ grains.

Q.5 Write the stages in crop protection leading to IPM & objectives of pest Management :-

⇒

Stages of crop protection :-

1) subsistence phase :-
only natural control, no insecticides are use

2) Exploitation phase :-
Applying more pesticides, growing HY varieties & get more yield & returns.

3) Crisis phase :-
Due over use pesticides, problem of resurgence, resistance, secondary pest outbreak, increase in production cost

4) Disaster phase :-
Due to increased pesticide use
- No profit, high residue in soil-
Collapse of control system

5) Integrated management phase :-
IPM integrates ecofreindly methods to optimize control rather than maximize it.

## Objective of IPM :-

1) To assessment of pest surveliance
2) To assessment of exotic breed & local breed.
3) For assessment of pest population
4) To study the influence of weather & influence on pest
5) To assess natural enemies
6) To detect developement of insecticides is important
7) To studies the effect of New ~~variety~~ cropping system patter & varieties on pest
8) Monitoring help to detect the & intercrop movement of target pests

## Q.6 Defination :-

1) Economic Injury level (EIL)
The lowest population density that will cause economic damage is called EIL.

OR

Also defind as a critical density where loss caused by pest equals the cost of control measures.

Calculation,

$$EIL = \frac{C}{VXIXDXk} \text{ OR } \frac{C}{VIDk}.$$