

# BENEFICIAL INSECTS

## BENEFICIAL INSECTS TO FARMERS

### POLLINATORS



BUTTER FLIES



MOTHS



WASPS



BEETLES & WEEVILS



MANTIDS



COCCINELLID BEETLES



### PREDATORS



APHID LION



ANT LION



TIGER BEETLES



ANTS

### WEED KILLERS



LANTANA - *Ophiomyia lantanae* (SEED FLY)



WATER HYACINTH - *Neochlamis bebbianae*



OPUNTIA - *Dactylopus tamentosa*



TERMITES



FLIES



BEETLES

### SCAVENGERS

In the higher plants, sexual reproduction is through pollination

These plants may be self-fertile or self-infertile, which require **cross pollination**

Example for Insect **pollination- aganotid fig wasp, Blastophaga psenes transfers pollen to Smyrna fig from Capri fig**

The process of fertilizing figs with fig wasps is called **caprification**

out of all insect pollinators, important one being **honey bees**

The practice of rearing bee colonies for pollination service started in **USA by about 1910**

General recommendation is five colonies for **two hectares of crop**

Management of honey bees for pollination

- Place bee hives very **near to the field** to save bee's energy
- Place bee hives in field at **10% flowering** of crop
- Place **2- 3 colonies per ha**
- The colonies should have **full strength of bees**
- Allow **sufficient space** for pollen and honey storage
- Provide **artificial sugar syrup and water** if required

## Pollination Syndromes

Suites of **flower traits** evolved **in response to natural selection** imposed by **different pollen vectors**, which can be abiotic (wind and water) or biotic, such as birds, bees, flies etc

Include flower shape, size, colour, odour, reward type and amount, nectar composition, timing of flowering, etc.

**Tubular red flowers with copious nectar often attract birds**

**Foul smelling flowers attract carrion flies or beetles, etc.**

Two basic types of pollination exist: abiotic pollination and biotic pollination

Pollination syndromes are

### 1. Abiotic pollination syndromes

**Anemophily:** The process of pollination by **wind**

**Hydrophily:** The process of pollination by **water**

### 2. Biotic pollination syndromes:

Entomophily is a mode of pollination or transfer of pollen through the agency of insects

The flowers which are insect pollinated are called **entomophilous**

The most common insect pollinators are **bees, moths, flies, butterflies, wasps, beetles, etc**



Cross pollination aided by

- Bees (Honeybees, bumble bees, Orchid bees, etc) - **Melittophily**
- Hawk moths - **Sphingophily**
- Small moths - **Phalaenophily**
- Flies (Syrphid flies) - **Myophily**
- Butterflies - **Psychophily**
- Beetles - **Cantharophily**
- Ants – **Myrmecophily**

## Insect weed killers:

As they damage the noxious and menacing weeds, they are considered to be beneficial to man and called as weed killers

A successful weed killer

- a) Should **not itself be a pest of cultivated plants** or later turn into a pest of cultivated crops
- b) Should be **effective** in damaging and controlling the weed
- c) Should preferably be a **borer or internal feeder** of the weed and
- d) Should be able to **multiply in good numbers** without being affected by parasitoids and predators

## Suppression of Water Fern, *Salvinia molesta*, the weevil, *Cyrtobagous salviniae*,

- imported from Australia in 1982
- on water fern, *S. molesta* in a lily pond in Bangalore in 1983-84
- Within 11 months in the lily pond the salvinia plants collapsed



## Biological Control of Water Hyacinth, *Eichhornia crassipes*

- by three exotic natural enemies were introduced in India
- hydrophilic weevils – *Neochetina bruchi* and *N. eichhorniae* ( Argentina)
- galumnid mite *Orthogalumna terebrantis* (South America)
- in 1982 for the biological suppression of water hyacinth



## **Scavengers**

feed upon the dead and decaying plant and animal matter

Insects help to remove from the earth surface the dead and decomposing bodies are referred to as scavengers

Converts complex molecules into simpler ones, where they become easily available as food for growing plants

In this respect termite, maggots of many flies and larvae and adults of beetles

The following are the important groups of insects that serve as scavengers in nature:

### **Coleoptera**

Rove beetles; Chafer beetles; Ptilinid beetles; Darkling beetles; Skin beetles; Nitidulids; The carrion beetles; Jewel beetles; Water scavenger beetles; Powder post beetles and bostrychids

### **Diptera**

Dady-long legs; Sand flies or moth flies; Midges or gnats; Fungus gnats; Hover flies; Root maggot flies; Muscids

### **Isoptera**

(whiteants) and Hymenoptera (ants) also live and feed upon dead wood, dead animal or decaying vegetable matte