



**FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES**

## ENT -321 Management of Beneficial Insects 2 (1+1)

### Lecture-15 Insects used in Biological Control of Pests:

**1. Predators:** Predators are free living and require several preys to complete the life cycle. They tend to feed on preys smaller than themselves. Ex: Coccinellid beetles, ground beetles, anthocorid bugs, syrphid flies, and predatory mites. Coccinellid beetles are commonly called as ladybirds. These are hemispherical in shape and brightly coloured bearing distinct spots and stripes. These feed on aphids, scale insects, mealybugs and mites. Both grubs and adults are voracious feeders. *Vadalia* beetle, *Rodolia cardinalis* is used for the control of cottony cushion scale on citrus. Australian lady bird beetle, *Cryptolaemus montrouzieri* is commonly used for the management of mealybugs and scale insects. Coccinellids, *Pharoscymnus horni* and *Chilocorus nigrita* and *Stichlotis madagassa* are used in sugarcane for the control of scale insect, *Melanaspis glomerata*. Lady bird beetle, *Curinus coerulens* is used for the control of psyllid, *Heteropsylla cubana* on subabul plantations. *Chrysoperla carnea* and *Mallada boninensis* are used in cotton and citrus ecosystem for protection from aphids and other soft bodied insects. *C. carnea* feed on aphids, red mites, thrips, white and black flies, eggs of leaf hoppers, moths, leaf miners and small caterpillars. Anthocorid bugs are used in sunflower

**2. Parasitoids:** Each parasitoid requires only one host, which it kills for its development into a free-living adult. Parasitoids are of the same size as the hosts, or sometimes even smaller. The adult food of parasitoids is different from that of larvae. Many adult parasitoids feed on nectar or pollen. Parasitoids may be specific or polyphagous. The host specific parasitoids are generally preferred for classical biological control for the management of introduced pests.

#### Type of Parasitoids:

1. Egg parasitoids/ egg larval parasitoids
2. Larval parasitoids/ larval pupal parasitoid
3. Pupal parasitoids
4. Adult parasitoids

- a) **Egg parasitoids:** Trichogramma egg parasitoids are used for the management of tissue borers in sugarcane, stem borer in rice, boll worms in cotton and pests of several crops. *Trichogramma chilonis* is used for the control of bollworms in cotton, internodal borer in sugarcane and rice leaf folder. *Trichogramma japonicum* is used for the control of rice stem borer. *Telenomus remus* is used for the control of tobacco caterpillar.
- b) **Egg larval parasitoids:** *Chelonus balckburni* is used for the control of spotted boll worm.
- c) **Larval parasitoids:** *Campolestis chloridae* is used for the control of *Helicoverpa armigera*, *Bracon hebetor* and *Bracon brevicornis* for the control of coconut black headed caterpillar. *Platygaster oryzae* is used for the control of rice gall midge.
- d) **Larval pupal parasitoids:** *Isotima javensis* is used for the control of top shoot borer of sugarcane.
- e) **Pupal parasitoids:** *Trichospilus pupivora*, and *Brachymeria nephantidis* are used for the control of coconut black headed caterpillar.
- f) **Nymphal and adult parasitoids:** *Aphelinus mali* is used for the control of apple wooly aphid. *Encarsia formosa* for the control of whitefly.