

Types of parasitoids and parasitism

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Classification of parasitoid

- Based on stages of attack
- Based on number per host
- Based on feeding type
- Based on trophic level (or) Food web relationship
- Based on host range
- Based on parasitism
- Based on other categories

Based on stages of attack

Egg parasitoid

- ✓ Begins and completes the life cycle in the eggs of the host
- ✓ Eg- Mymaridae, Platygasteridae and Trichogrammatidae
- ✓ *Trichogramma chilonis* on eggs of cotton bollworm, sugarcane borers and rice leaf folder



Larval parasitoid

- ✓ Begins and completes the life cycle in the larva of the host
- ✓ Eg- Braconidae, Bethyridae and Ichneumonidae
- ✓ *Bracon brevicornis* on coconut BHC



Pupal parasitoid

- ✓ Begins and completes life cycle in the pupae of the host
- ✓ Eg- *Trichospilus pupivora* (Eulophidae) and *Brachymeria nephantidis* (Chalcididae) on pupa of coconut BHC



Egg-larval parasitoid

- ✓ Begins the life cycle in the egg stage of the host and completes in larval stage
- ✓ Eg- *Chelonus blackburnii* (Braconidae) on cotton bollworm



Larval-pupal parasitoid

- ✓ Begins the life cycle in the larval stage of the host and completes in the pupal stage
- ✓ Eg- *Isotima javensis* (Ichneumonidae) on sugarcane top borer



Nymphal- adult parasitoid

- ✓ Begins the life cycle in the nymphal stage and completes in the adult stage of the host
- ✓ Eg- *Encarsia formosa* (Aphelinidae) on cotton whitefly, *Epiricania melanoleuca* (Epipyrophidae) on sugarcane leaf hopper and *Aphelinus mali* (Aphelinidae) on aphids

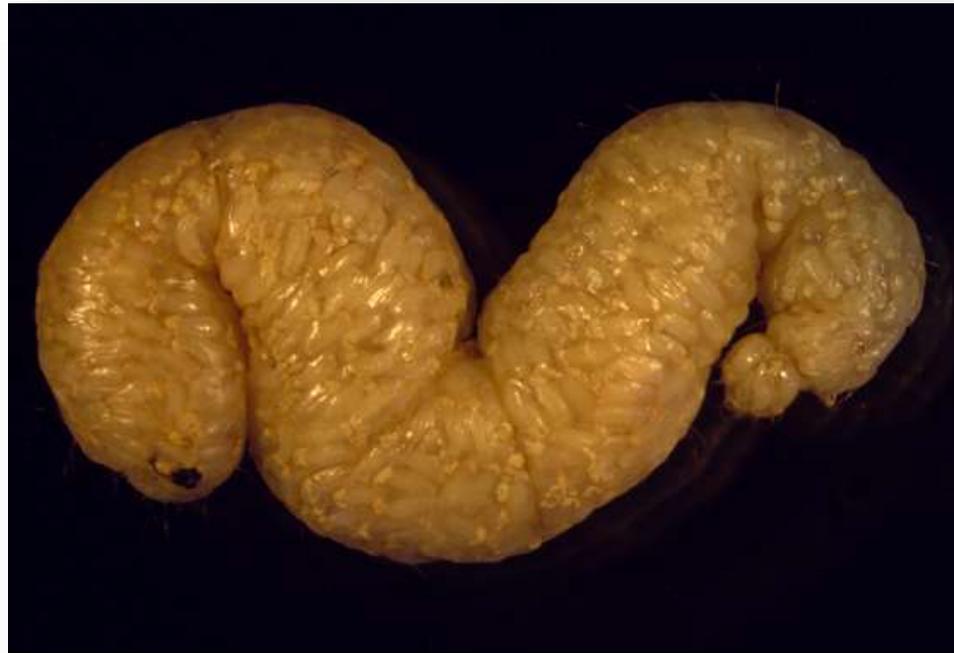


Based on numbers per host

- Solitary parasitoid - Single parasite develops in the single host. Eg- Ichneumonidae
- Gregarious parasitoid – Many larvae develops and matured in the single host. Eg- Braconidae



- **Poly-embryonic parasitoid** – 1000's per host. It is the extended version of gregarious parasitoids. Important polyembryonic parasitoid families are Platygasteridae, Encyrtidae and Dryinidae.



Based on feeding type

- **Ecto parasitoid**- An insect parasite which feed externally on the host body and complete their development externally on its host. Eg- *Epiricania melanoleuca* on sugarcane *Pyrilla*.



- **Endo parasitoid**- An insect parasite which complete their development within or inside the host body.
- Eg- *Aphelinus mali* on Apple woolly aphid.



Based on host range

- **Monophagous-** Attacks single host species- *G. nephantidis* on coconut BHC.
- **Polyphagous-** Attacks widely differing species. Example is *Trichogramma* spp.
- **Oligophagous-** Attacks closely related species- Braconidae, Ichneumonidae.

Parasitism ???????

- Relationship between host insects and parasitoid
- One is going to be beneficial at the cost of host
- This is a kind of symbiosis in which parasitoid lives at the expense of the host and killing the host in the process of development
- Parasitization is an act of attack and ovipositioning the eggs with the help of ovipositor by the parasitoid on the host

Based on parasitism

- **Simple parasitism-** One parasitoid species attack one host. *G. nephantidis* on coconut BHC.
- **Super parasitism-** Attack a single host by many individuals belonging to same species, that can mature in the host. *Trichospilus pupivora* on pupae of coconut BHC.
- **Multiple parasitism-** Attack a single host by many individuals belonging to different species. *Eriborus trochanteratus* (Ichneumonidae) and *G. nephantidis* on the larvae of coconut BHC.

- **Auto parasitism-** Otherwise called as adelphoparasitism. Female develops as a primary parasitoid but the male is a secondary parasitoid through female of its own species. This is also called as heteronomous hyperparasitoids. Example is *Encarsia formosa* attacking scale insects and whiteflies.
- **Cleptoparasitism-** A parasitoid attacking a host, already parasitized by another species of parasitoid. Pine shoot moth attacked by either *Eurytoma pini* (Eurytomidae) or *Rhyacionia buoliana*.

- **Hyperparasitism-** A parasitoid attacking another parasitoid.
Pleurotropis sp hyperparasitoid on *Bracon brevicornis* a primary parasitoid.

Based on other categories

Idiobionts

- ❖ The parasitoids are those which prevent any further development of the host after initial parasitization
- ❖ No development is possible in the host
- ❖ Venom keeping fresh
- ❖ Select fully developed insects

Koinobionts

- ❖ The venom injection is temporary
- ❖ Allows the host to continue its development
- ❖ Select younger instars
- ❖ The host becomes an adult
- ❖ There are two types of koinobionts parasitoids
- ❖ Ecto and endo parasitoids

THANK YOU.....

