

Insects as biocontrol agents

Insects play a crucial role as natural enemies of pests, helping to maintain ecological balance and reduce the need for chemical pesticides. Their role as biocontrol agents is an important part of Integrated Pest Management (IPM) and sustainable agriculture. They regulate pest populations by feeding on pests (predators) or by parasitizing pest stages (parasitoids).

Types of Biological Control

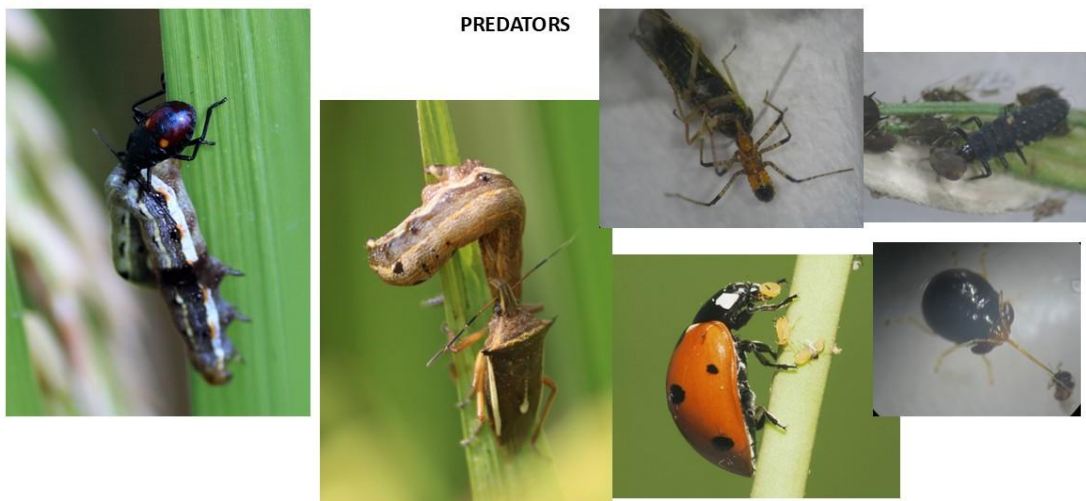
- Classical (Importation): Introducing natural enemies from the pest's native habitat.
- Augmentative: Mass-rearing and releasing beneficial insects.
 - Inoculative: Small, early-season releases.
 - Inundative: Large-scale releases for immediate impact.
- Conservation: Enhancing the survival of naturally occurring beneficial insects.

Predators

Predators consume multiple prey organisms in their lifetime.

Predator Insect	Target Pest(s)
<i>Coccinellidae</i> (ladybird beetles)	Aphids, mealybugs, whiteflies
<i>Chrysopidae</i> (green lacewings)	Aphids, mites, thrips
<i>Syrphidae</i> (hoverfly larvae)	Aphids, soft-bodied pests
<i>Anthocoridae</i> (minute pirate bugs)	Thrips, whiteflies
<i>Carabidae</i> (ground beetles)	Soil pests like cutworms

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Parasitoids

Family	Order	Host Type(s)	Example Parasitoid
Trichogrammatidae	Hymenoptera	Eggs of moths/butterflies	<i>Trichogramma chilonis</i>
Braconidae	Hymenoptera	Larvae of Lepidoptera, etc	<i>Cotesia glomerata</i>
Ichneumonidae	Hymenoptera	Larvae/pupae of insects	<i>Campoletis chlorideae</i>
Eulophidae	Hymenoptera	Leafminers, whiteflies	<i>Diglyphus isaea</i>
Encyrtidae	Hymenoptera	Scales, mealybugs	<i>Anagyrus lopezi</i>
Aphelinidae	Hymenoptera	Aphids, whiteflies	<i>Encarsia formosa</i>
Pteromalidae	Hymenoptera	Wide range of hosts	<i>Spalangia spp.</i>
Chalcididae	Hymenoptera	Pupae of insects	<i>Brachymeria spp.</i>
Tachinidae	Diptera	Larvae of insects	<i>Sturmiopsis inferens</i>

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PARASITOIDS

