

## Biological pest control

**Ankita Sunil Padale**

College of Agriculture (Baramati), MPK V, Rahuri, Maharashtra

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### **Introduction-**

Crop losses are a major threat to the wellbeing of rural families, to the economy of traders and governments, and to food security worldwide. Crop losses due to pests and diseases for major food and cash crops (rice, wheat, barley, maize, potatoes, soybeans, cotton, and coffee) were estimated between 20 and 40% at country.

The way to minimize this losses without causing much damage to environment is the biological pest control. Biological control is the use of living organisms to maintain pest populations below damaging levels. Biological control is defined broadly as the "use of natural or modified organisms, genes, or gene products" to reduce the effects of pests and diseases.

### **Need for Biological pest control in India**

1. The production of food grain should increase to 250 million tones by the year 2020 in order to meet the needs of the growing population.
2. .Beyond good agronomic and horticultural practices, growers often rely heavily on chemical fertilizers and pesticides. However, the environmental pollution caused by excessive use and misuse of agrochemicals, as well as fear mongering by some opponents of pesticides, has led to considerable changes in peoples attitudes towards the use of pesticides in agriculture.
3. In recent years after signing of the general agreement of trade and tariff of world trade organization more emphasis is given to the use of ecofriendly pesticide for crop production in view of their least toxic nature, low levels of disease resistance and low residue problems.

### **Merits of Bio control Agents in pest management-**

- Biological control is less costly and cheaper than any other methods.

- Bio control agents give protection to the crop throughout the crop period.
- They do not cause toxicity to the plant
- Application of bio control agents is safer to the environment and to the person who applies them.
- They multiply easily in the soil and leave no residual problem.
- Bio control agents not only control the disease but also enhance the root and plant growth by way of encouraging the beneficial soil micro flora. It increases the crop yield also
- Bio control agents are very easy to handle and apply to the target.
- Bio control agent can be combined with bio-fertilizer.
- They are easy to manufacture.
- It is harmless to human beings and animals (Environmentally safe).

### **Contribution of natural enemies in pest control-**

Insects are their own worst enemies. The predators and parasites (or parasitoids) of other insects include members of over 300 families in 10 insect orders. Insects also serve as prey for other arthropods (particularly spiders and mites), and several groups of vertebrates (e.g., fish, birds, frogs, toads, bats, mice, etc).The following list includes some of the more important groups of natural enemies.

#### **Predators**

**Arthropods:-**Spiders (order Aranea) All spiders (nearly 4000 species) are predators, and insects represent well over 99% of their diet. Despite their abundance, spiders play a relatively minor role in biological pest control because their diet is so non-selective.

**Dragonflies (order Odonata):-** Adults as well as immatures are predatory. Adult dragonflies can have a significant impact on populations of mosquitoes and other small flying insects.

**Lacewings (order Neuroptera):-**Immature lacewings are known as aphis-lions (Chrysopidae).A single aphis-lion may consume as many as 30 or 40 aphids per day.

**Beetles (order Coleoptera):-** The lady beetles are effective predators of aphids and scale insects.

**Flies (order Diptera):-** Syrphid fly larvae feed mostly on aphids, consuming as many as 50 or 60 prey in one hour True Bugs (order Hemiptera) —Damsel bugs (Nabidae), minute pirate bugs (Anthocoridae), and big-eyed bugs (Lygaeidae) are important predators of Lepidopteran eggs and larvae. The families Reduviidae (assassin bugs) and Phymatidae (ambush bugs) are more opportunistic predators.

**Ants and Wasps (order Hymenoptera):-**Hunting wasps in the families Pompilidae, Vespidae, and Sphecidae provision their nests with spiders, caterpillars, or other small insects.

**Thrips (order Thysanoptera) :-** Most thrips feed on plants, but a few species such as the black hunter (*Leptothrips mali*) and the banded thrips (*Aeolothrips fasciatus*) prey on small arthropods including mites, aphids, whiteflies.

#### **Vertebrates-**

**Fish (class Pisces):-** Aquatic insects serve as food for many kinds of fish. Several species of cyprinodont fish (e.g., *Gambusia* spp.) have been released as biocontrol agents of mosquito larvae.

**Frogs, Toads, and Salamanders (class Amphibia):-** Insects are a large part of the diet for many species of amphibians. The giant toad, *Bufo marinus*, has been used to control white grubs in Puerto Rican sugarcane fields.

**Lizards, Snakes, and Turtles (class Reptilia):-** Many reptiles are general predators of insects and other small invertebrates. In some parts of the world, geckoes are kept as house pets to help reduce cockroach populations.

**Birds (class Aves):-** Some birds, such as swifts, warblers, vireos, and flycatchers are almost exclusively insect predators

#### **Pathogens-**

**Fungal :-**Eg. *Verticillium lecani*, *Beauveria bassiana*, *Metarhizium anisopliae*

**Bacterial** Eg. *Bacillus thuringiensis*, *Bacillus papilliae*, *Pseudomonas aeruginosa*

**Viral** Eg. HaNPV, SLNPV

**Conclusion-** All pesticides have potential to be harmful to humans, animals and environment. Since there is wide need to use biological methods to control the attack of pests on crop. However the study from paper also found that there is ample scope to use natural enemies, microbial pathogens to reduce economic damage of farmer due to loss in production.

