## ROLE OF BENEFICIAL INSECTS IN AGRICULTURE

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## HOW ARE INSECTS CONSIDERED BENEFICIAL?

- Beneficial insects are the insects that play significant roles in reducing and controlling
  populations of both plants and insect pests by acting as both predators and parasites
  to these detrimental organisms.
- They pollinate plants, contribute to the decay of organic matter and the cycling of soil nutrients, and attack other insects and mites considered pests, completely preventing or greatly limiting pest problems.

# IMPORTANCE OF INSECTS:

#### 1. Use as Commercial Products

Honey and Beeswax - Honey is used extensively as a food and in the manufacture of many products. The industry uses beeswax extensively in making candles, sealing wax, polishes, certain types of ink, models or various kinds, dental impressions, cosmetics, and other products.

**Silk-** Silk, spun by larvae of the silkworm moth, was the "ultrasheer" fabric, used primarily for hose and a wide array of garment materials.

**Shellac** -Shellac is produced from the secretions of the lac insect, a type of scale insect occurring on fig and banyan.





#### 2. Use as a Pollination

Insects such as bees, butterflies, and beetles are integral in pollinating flowering plants and enhancing fruit and seed production. Insect-mediated pollination is an essential step in reproduction for most of the world's flowering plants, including numerous cultivated plant species. Approximately 75% of the world's flowering plants and about 35% of global food crops depend on animal pollination, making this group indispensable to agriculture. It has been estimated that roughly one-third of the World's agricultural production relies directly or indirectly on insect pollination.

#### 3. As Entomophagous insects

Entomophagous insects feed upon other insects, destroying our crops and stored

They constitute the greatest grains. single factor in preventing phytophagous gaining overwhelming insects from over animals. predominance other Entomophagous insects can be divided into two groups: predators and parasitoids. Predators: Many insects feed on pest species that threaten crops. Ladybugs, lacewings, and spiders are natural predators controlling populations of aphids, caterpillars, and other harmful insects.

**Parasitoids:** A parasitoid is an organism usually much smaller than its host and a single individual that may or may not kill the host. The majority of the parasitoids utilized in the biological control of insect pests belong to two orders, namely Hymenoptera

(Ichneumonidae,Braconidae, Eulophidae, Trichogrammatidae) and Diptera (Tachinidae).

Weed killers Insects can indeed play a significant role in weed management through a method known as biological weed control. Here are some examples of insects used as weed killers:

Cactus Moth: Targets prickly pear cactus Lantana Fly and Lace Bug: Control common lantana

Chrysomelid Beetle: Manages Congress grass

Water Hyacinth Beetles: Manage water hyacinth

Flea Beetles: Target alligator weed Beetles: Control water ferns

#### 4. Soil builders

Some beneficial insects, including certain beetles and ants, help aerate the soil, improving water infiltration and root growth. Soil is enriched by the addition of insect saliva and decomposition of exuviae and dead bodies of the insects.

#### 5. Scavangers

Many insects feed on dead and decaying animal and plant matter and thus accelerate the return of elements from the earth's surface to the dead and decaying bodies, which would otherwise be a health hazard; they are referred to as scavengers. There are two groups of insects (coleopteran and Diptera) that perform the major duties of scavengers. In addition, termites (Isoptera) feed upon dead wood, and ants live upon dead animals and decaying vegetable matter.

#### 6. Insects as food

Human ancestors were used to get nutrition from Insects. Even today, insects are used as food by people in many



countries. High in protein and low in fat, dried grasshoppers are sold in village markets in Mexico. Insects are mixed with flour to make tortillas and can be fried or ground into meals. Wood-boring beetle larvae can be boiled or roasted over a fire. E.g., Ants, bees, termites, water grubs, caterpillars, flies, crickets, katydids, beetle larvae, and nymphs of dragonflies are among them. In Thailand, the pupa of silkworms are used as food for human beings.

#### 7. Educational and Scientific value

Because of their simple food and other requirements, short duration time, and high fecundity, many insects can be reared cheaply and easily under laboratory conditions. Studies on insects have given us much basic animal and cell physiology knowledge, such as fruit flies (Drosophila melanogaster – in advanced genetic research).

#### 8. Medicinal value

Several insects and their products have found their use in medicine. The bee venom of honey bees has remedial value in treating arthritis and rheumatism. A specific medicine (Homeopathic), "Apis' is extracted from the honey bees by digesting the excited bees in alcohol and is used against certain diseases like urinary irritations, diphtheria, etc.

#### 9. Cantharidin

Cantharidin is a substance found in the blister beetle, *Lytta vesicatoria*, and is useful internally in treating certain urinary diseases and externally as a vesicant and counter-irritant. It is also probably the world's best-known and





most widely abused aphrodisiac.

Caterpillar fungus, prepared from caterpillars of Cordyceps sinensis, is used as a tonic by Chinese athletes to strengthen and rejuvenate the body, relieve stress, protect the lungs, and strengthen the immune system.

#### **10. Maggot therapy,**

Maggot therapy, i.e., using maggots of certain flies to clean wounds and promote healing, has been used for centuries in some societies. Allantoin is a substance isolated from the secretions of fly maggots that can heal deep wounds.

#### 11. Source of dyes:

The dead and dried bodies of certain insects and the galls produced by certain insects are a source of natural dyes. The beautiful carmine red dye "Cochineal" is obtained from the dried and powdered bodies of cactus scale insects ((also called the cochineal insects), Dactylopius coccus and tomentous, which thrive on Opuntia spp.

#### **12.** Aesthetic value

Insects have catered to the aesthetic needs of man for a long time. Some insects are extremely beautiful and rivel flowers and birds in this respect. Their shapes, wing color, and patterns have been models for artists, florists, textile designers, and interior decorators. Because of their beauty, certain groups, especially butterflies, moths, and beetles, are sometimes collected as a hobby. Some insects are embedded in clear materials from which jewelry, placemats, paper weights, etc., are made.

## HOW BENEFICIAL INSECTS ARE BOON ?

- 1. **Pest Control:** Utilizing beneficial insects for biological pest control can greatly reduce the reliance on chemical sprays. This not only lowers the cost of pest management for farmers but also mitigates the risks associated with pesticide exposure for humans and non-target organisms.
- **2. Increased Crop Yields:** Pollination services provided by beneficial insects can lead to higher yields. For instance, crops such as almonds, blueberries, and tomatoes show significant yield increases with proper pollinator activity.
- **3. Sustainable Practices:** Incorporating beneficial insects aligns with sustainable agriculture practices, which focus on ecological balance, conservation of biodiversity, and soil health. Farmers can create a more resilient agricultural system by fostering a habitat for these insects.
- **4. Environmental Health:** Reducing pesticide use benefits biodiversity and reduces the risk of chemical runoff into local waterways, thereby protecting aquatic ecosystems and improving water quality.
- **5. Cost-Effectiveness:** Investing in beneficial insects can lead to long-term savings. Biological control can provide a lasting solution to pest problems, reducing the need for costly pesticide programs and their associated application costs.



## **CONCLUSION**

The intricate relationship between agriculture and beneficial insects underscores the importance of fostering these invaluable allies. As the agricultural community pivots towards sustainable practices, harnessing the power of beneficial insects offers an effective means of pest control, improved crop yields, and enhanced environmental health. By recognizing the significance of these small creatures, farmers can take substantial steps toward building a sustainable and resilient agricultural future, ultimately benefiting not just their crops, but the broader ecosystem.

