BENEFICIAL INSECTS

WHAT ARE BENEFICIAL INSECTS?

Beneficial insects are species that provide valuable services in ecosystems, especially in agriculture and gardening. These insects help control pests, pollinate plants, and contribute to nutrient cycling. They are often used as natural pest control methods to reduce the need for chemical pesticides.

INSECT CATEGORIES

- Predators
- Parasitoid
- Pollinators

PREDATORS

These insects help control populations of harmful pests by feeding on them. Examples include ***ladybugs, lacewing, praying mantis, hoverflies.***

Ladybugs (also known as ladybirds or lady beetles)

They are recognized for their distinctive appearance, typically with red or orange wings covered in black spots, though some species can be yellow, black, or even striped.

They are considered beneficial insects because they are natural predators of many garden pests, especially aphids, which are harmful to plants. A single ladybug can

consume hundreds of aphids in a day, making them valuable for natural pest control. In addition to aphids, ladybugs may also feed on other small insects like mealybugs, scale insects, and mites.

Beyond pest control, ladybugs play a role in biodiversity, and their bright colors serve as a warning to potential predators, signaling that they are not tasty (as they excrete a foul-tasting substance if threatened).

4A

4B

Ladybug eggs

Lacewing

Lacewings are a type of insect belonging to the family Chrysopidae, known for their delicate, transparent wings that have a net-like or lace-like pattern, which gives them their name. These insects are often green, but some species can also be gold or brown.

Lacewings are highly beneficial, especially in gardens and agriculture, because their larvae are voracious predators of pest insects. Lacewing larvae feed on a wide variety of soft-bodied pests, including aphids, mealybugs, whiteflies, scale insects, and even the eggs of other harmful insects. They are particularly effective at controlling aphid populations, which makes them valuable for natural pest management.

Adult lacewings are also important because they pollinate certain plants as they feed on nectar. However, it is the predatory larvae that make lacewings one of the most sought-after natural pest control agents.

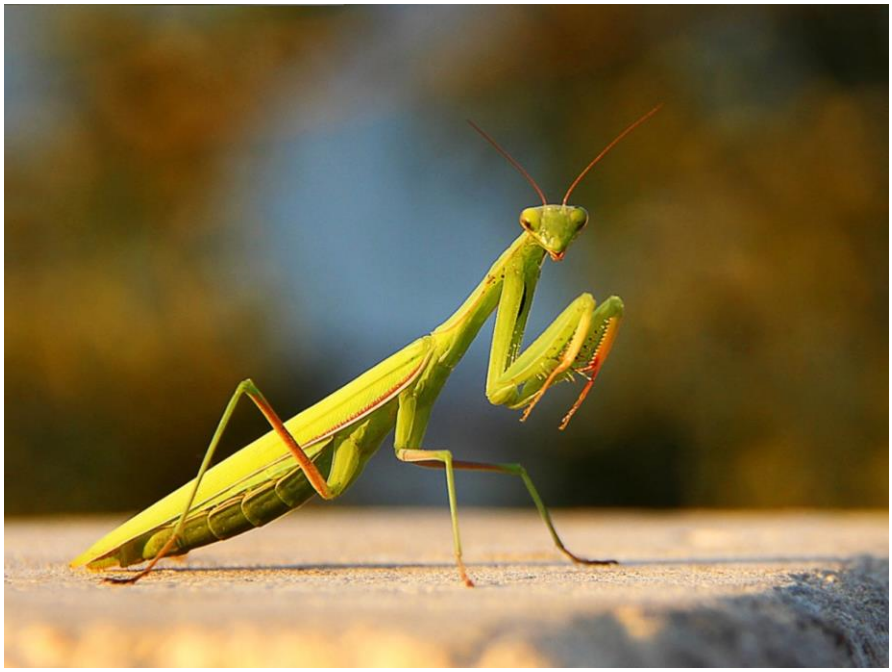
4C. EGGS **4D. LARVAE** **4E. ADULT**

Praying Mantis

A praying mantis is a predatory insect known for its distinctive “praying” posture, where it holds its forelegs in a folded, upright position, as if in prayer. Most mantises are green or brown, which helps them blend into plants, making them effective ambush predators.

They are considered beneficial insects because they are carnivorous and eat a variety of pests. They hunt patiently waiting for prey to come near, then striking with incredible speed and accuracy. They primarily feed on other insects, such as flies, moths, beetles, grasshoppers, and even other garden pests like aphids and caterpillars. Some larger species have been known to catch small vertebrates like hummingbirds or lizards.

Unlike herbivorous pests like aphids or caterpillars that feed on plant leaves and stems, mantises do not damage plants. This makes them a “win-win” insect for farmers—they control pests while leaving your plants untouched. Because they are efficient predators of harmful insects, mantises help reduce competition for resources among other beneficial insects like ladybugs or lacewings. Fewer pests mean these other beneficial insects can thrive and continue their important work, such as pollination or further pest control.



4F

Hoverflies

Hoverflies are a type of beneficial insect that are important for pollination. They get their name from their ability to hover in mid-air, like hummingbirds.

They resemble small bees or wasps, but they are flies. They typically have black and yellow or black and orange markings on their bodies, which can help them mimic the appearance of more dangerous insects like bees, deterring potential predators. Hoverflies are known for their impressive hovering ability. They can stay perfectly still in the air, which is quite unique for insects. They undergo complete metamorphosis, and the larvae of the hoverflies are particularly beneficial because they often feed on aphids and other small pests.

Adult hoverflies are excellent pollinators for many flowers and plants. They visit a variety of flowers to feed on nectar, helping with the transfer of pollen as they move from one bloom to another.

The larvae of the hoverflies are voracious predators of aphids and other harmful pests. This makes them a natural way to control pest populations without relying on chemical pesticides.

4G

PARASITOIDS

Parasitoids are a type of beneficial insect that play a vital role in controlling pest populations. Unlike predators, which typically kill and consume their prey immediately, parasitoids lay their eggs on or inside other insects (called the host). The parasitoid larvae then feed on and eventually kill the most insect.

Parasitoids help control populations of agricultural pests, such as aphids, caterpillars, and flies, which can damage crops. By keeping these populations in check, parasitoids reduce the need for chemical pesticides. They contribute to maintaining a healthy balance of ecosystems. They help regulate the populations of herbivorous insects that could otherwise overwhelm plant communities, promoting biodiversity. Parasitoids themselves are part of diverse food webs, providing food for other predators like birds or larger insects. Their presence helps sustain overall biodiversity in ecosystems.

Tachinid Flies

Tachinid flies are a family of parasitic flies, Tachinidae, known for their role in controlling pest insect populations. They are considered beneficial insects due to their natural pest control abilities.

- Appearance: They are typically medium to large, with a robust, bristly appearance. They often have a distinct, “hairy” look with a rounded abdomen and wide, prominent eyes.
- Life Cycle: Tachinid flies are parasitoids, meaning they lay their eggs on or outside their host insects. The larvae that hatch from the eggs feed on the host, eventually killing it. The parasitic nature of these flies helps keep populations of harmful pests in check.

Benefits of Tachinid Flies

- Natural Pest Control: Tachinid flies help control populations of agricultural pests, such as caterpillars, beetles, and aphids. This reduces the need for chemical pesticides.

- Specificity: Tachinid flies are often specific in the types of pests they target, which helps minimize the risk of harming beneficial insects, such as pollinators.
- Ecological Balance: By parasitizing harmful insects, tachinid flies help maintain balanced populations within ecosystems, preventing any one species from becoming too dominant.

4H

4I

Parasitic Wasps

These wasps lay their eggs on or inside other insects (usually pests), and their larvae feed on the host, eventually killing it. Parasitic wasps are extremely useful for controlling pest populations without harming other beneficial organisms, including humans and pollinators.

Key Roles of Parasitic Wasps

- **Natural Pest Control**
    - They are highly effective at controlling pest populations. They parasitize a wide range of harmful insects, including caterpillars, aphids, weevils, flies, and beetles. By keeping these populations in check, parasitic wasps help prevent crop damage and reduce the need for chemical pesticides.
- **Sustainability**

- By relying on parasitic wasps for pet control, farmers and gardeners can use a more sustainable, eco-friendly approach to managing pests. This can help reduce the environmental impact of farming and gardening practices, maintain diversity, and encourage a healthier ecosystem overall.

- **Biodiversity support**
  - Parasitic wasps play a role in maintaining ecological balance by controlling herbivorous insect populations. Without these wasps, pests could overwhelm plant populations, leading to less biodiversity. By keeping pest populations in check, these wasps help ensure that other species can thrive.

4J

Nematodes

Microscopic parasitic worms that reside in soil, between 2-5 mm (about 0.2 in). Colorless and translucent. Some are harmful and feed on plants, but some are beneficial.

They enter the insect body and release a bacterium that kill the host within 48 hours (about 4 days). The juvenile nematodes stay inside the body of the dead host to feed on it, develop and reproduce. Several generations may live and reproduce inside the dead host.

Life Cycle: Nematodes develop and reproduce according to the number of pests present. As the number of pests decreases, so will the nematode population, so seasonal releases are recommended.

Insect Pests Attacked: Ants, grubs, weevils, Japanese beetle, fungus gnats, cutworms.

4K

POLLINATORS

Pollinators, such as bees, butterflies, moths, and even some birds, are incredibly beneficial insects that play a vital role in our ecosystems. They facilitate the reproduction of many plants by transferring pollen between flowers, enabling the plants to produce fruits, seeds, and other forms of plant reproduction. Without these pollinators, many crops and wild plants would not be able to grow or produce food.

Why are pollinators important?

- **Food Production**
    - Pollinators are essential for producing many foods we rely on, including fruits, vegetables, nuts, and seeds. Around 75% of flowering plants depend on pollinators, including key crops like apples, almonds, and berries.

- **Biodiversity**
    - Pollinators help maintain biodiversity by supporting the reproduction of plants, which are a crucial part of ecosystems. A diverse range of plants supports healthy habitats for various animals and insects.

- **Environmental Health**
    - The presence of healthy pollinator populations often indicates a healthy environment. Pollinators thrive in well-balanced ecosystems, so their decline can signal broader environmental problems.

- **Soil Health**
    - Many plants that rely on pollinators also help maintain soil health by preventing erosion, improving water retention, and cycling nutrients back into the soil.

Examples of pollinators include bees, wasps, moths, butterflies, flies, and other insects that visit flowers for pollen and nectar.

4L

4M

Bees

Bees are some of the most efficient pollinators, helping plants reproduce by transferring pollen from one flower to another. This process is essential for producing many fruits, vegetables, and nuts. By pollinating a wide variety of plants, bees help maintain biodiversity. These plants provide food and shelter for many other species, and without bees, many plants would struggle to reproduce, which could lead to a decline in the overall health of ecosystems.

Butterflies

Like bees, butterflies are important pollinators. While they might not be as efficient as bees, butterflies still help pollinate a wide range of plants, including many flowers, fruits, and vegetables. As they move from flower to flower, in search of nectar, they transfer pollen, which helps plants reproduce. They also contribute to maintaining biodiversity by aiding in the reproduction of various plants, which in turn support other wildlife, such as birds, small mammals, and insects. Healthy butterfly populations often indicate a thriving, diverse ecosystem.

Wasps

Wasps, despite their often misunderstood and intimidating reputation, are beneficial insects. They are often predators of other insects, including pests that can damage crops. Many wasps feed on insects like aphids, caterpillars, and beetles. This makes them natural pest controllers in gardens, orchards, and agricultural fields. While not

as effective as bees, some wasps also contribute to pollination. They visit flowers to collect nectar and, in the process, transfer pollen. Certain species of wasps pollinate plants that might not be as attractive to other pollinators, such as fig trees, which depend on a specific kind of wasp for pollination.

How can we help pollinators?

- Planting flowers: Grow a variety of native, nectar-rich flowers, shrubs, and trees in different colors, shapes, and sizes.
- Providing water: Put out a shallow dish of water on your deck or windowsill.
- Creating nesting sites: Leave dead leaves and plant material or install a bee hotel.
- Limiting pesticides: Use pesticides as a last resort and apply them at night when pollinators are inactive.
- Educating others: Spread the word about the importance of pollinators.