

## Ladybird Beetle: An Ecofriendly Pest Management

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### **Abstract:**

A commercially significant group of insects, ladybird beetles are members of the Coccinellidae family. The majority of significant and harmful agricultural pests, particularly hemipteran insects, are the preferred prey of the predatory Coccinellidae. Phytophagous ladybird species are regarded as agricultural pests because they consume leaves, blossoms, and other plant components. Pesticide use in agriculture is reduced when biocontrol agents are used to lower insect populations. Sustainable agriculture would result from the use of biocontrol, an environmentally benign method that is self-sustaining and ultimately cost-effective. These biological control agents are killed by the widespread use of pesticides, thus conservation measures for these economically significant insects are required.

### **Introduction:**

The insects are members of the family Coccinellidae and order Coleoptera. The majority of ladybird beetles serve as biocontrol agents and are predatory in nature. Certain phytophagous members of the Coccinellidae family, which includes the subfamilies Epilachninae and Coccinellinae, are pests that affect crop plants. These insects are the most well-known and adored. Because of their spherical bodies and membership in the Coleoptera order, they are known as beetles. Their functioning, membrane-based rear wings are shielded by their large, leathery forewings. Ladybirds are really interesting, and their shapes are used in many human items. Children all throughout the world are drawn to them. They have long been connected to charms that bring good fortune.

### **Species of Ladybird Beetle:**

#### **Two spotted ladybird beetles: *Adalia bipunctata***

- These adult beetles are native to North America and Europe. They have red wings with two black or brown spots, and their bodies are 4-5 mm long and fashioned like a dome. They can survive for one or two years after overwintering as adults and emerging in the

early to mid-spring. Both adults and larvae consume a variety of soft-bodied plant pests, such as aphids. The beetle may be purchased commercially from insectaries.

**Twice stabbed ladybird beetle:** *Chilocurus stigma*

- Similar to the two-spotted ladybird beetle, these adorable tiny ladybugs are black with two red spots on their backs. They are little, measuring only 3 ¾ to 5 mm, but they are fierce eaters, mostly feeding on scales, which may be difficult insect problems to manage. These ladybugs frequently search in trees for their next meal.

**Seven spotted ladybird beetles:** *Coccinella septempunctata*

- This 7 mm long bug, in contrast to many other ladybird beetles, has an odd number of spots on its back, with one spot typically divided in half between its two wings. This European native has become established in North America after being released there several times as a biological control agent to consume pest aphids.

**Pink spot ladybird beetle:** *Coleomegilla muculata*

- Originally from North America, these beetles are widespread in the eastern United States, Canada, and even the Midwest in the west.
- Adult "pinks" have an oval form and range in color from pink to red. They are 5–6 mm length. Make sure your yard has plenty of flowering plants if you wish to draw these beneficial insects, since pollen may make up as much as half of their diet.

**Mealy bug destroyer ladybird beetle:** *Cryptolaemus montrozieri*

- This particular beetle is a feeder. It was introduced to the US from Australia in 1891 to reduce citrus mealybugs because it loves to feed on mealybugs and other soft scales.
- These ladybugs are frequently bought from commercial insectaries and released instead of using pesticides. They are an active feeder that is 3–4 mm long, with an orange head and a dark brown body. The larvae are fluffy and white.

**Multicolored Asian ladybird beetle:** *Harmonia axyridis*

- Originally introduced to the United States to aid in pest management, this Asian native beetle has spread far.
- This helpful insect is regarded as a gardener's best friend since it consumes a variety of soft-bodied insect species, such as aphids, scales, and psyllids.
- The adults are somewhat oval, 6 mm long, and exhibit a wide variety of red and orange hues. There can be wide variations in the number of spots, and occasionally there are none at all. The "m" or "w" on the back of their skulls serves as a distinguishing feature.

**Convergent ladybird beetle: *Hippodamia convergens***

- In the United States, this is among the most well-known native ladybird beetles. The adults are long, ranging in length from 4 to 7 mm. Their heads have noticeable black and white markings that help identify them, and their red wings can have anything from a few to thirteen spots.
- Many insect pests are the food source for these ladybugs. Despite being gathered from the wild, which is not a very sustainable method, they are frequently sold for scale.

**Ladybird beetle Use as biological control:**

Because they are predators of Homoptera, many of which are regarded as pests, the majority of ladybird species are seen as helpful. These predatory ladybirds help control prey numbers, and in certain cases, they help control populations at a high degree. People may benefit when ladybirds naturally offer a high degree of pest management or when they work in tandem with other predators, parasitoids, and illnesses to contribute a high level of pest population regulation. Thus, "manipulative biological control" refers to one kind of biological control. Simply put, the goals are to take use of the existing ladybirds, manipulate their environment to make it as favorable as possible, and, most importantly, refrain from using chemicals (herbicides, fungicides, or insecticides) that may kill them. "Augmentative biological control" is a second kind of biological control. This starts with realizing that there are ladybirds in every pest situation, but not enough of them to perform the necessary function, and then purchasing additional from a commercial manufacturer to release in order to supplement the ones that are already there. There is a chance that many adult ladybirds may fly away if they are released. However, if released, ladybird larvae can either devour the pest they are exposed to or starve to death since they are unable to fly. It goes without saying that this calls for matching the pest to a species of ladybird that has been obtained and will consume it. "Classical or inoculative biological" control is a third category of biological control. In this case, a few individuals of a ladybird (or other) species that are not yet present are released with the intention of establishing a colony and ultimately controlling the problematic pest.

**Role of predaceous ladybirds in eco-system:**

- Why Predaceous ladybirds are more likely to provide food for dangerous pests in the ecosystem.



- The number of insect pests is kept below the level of economic harm by predatory ladybirds.
- Predaceous ladybirds keep the ecosystem's food web or chain intact.
- Predaceous ladybirds may reduce dangerous insects that have developed resistance or resurgence to pesticides, and they have a significant impact on their ecosystems as a whole.
- Why By raising them in a lab, predatory ladybirds are readily employed in the field.

**Conclusion:**

The future of predaceous ladybirds in the biocontrol of agriculturally significant insect pests is bright. Some ladybirds are specialists, but most are generalists. The topic of prey specialization in predaceous ladybirds is hotly debated. However, predaceous ladybirds may have acquired prey specialization due to resource partitioning and constant exposure to a particular species of prey. Furthermore, it is generally accepted that the prey specialization of ladybirds is a function of body size, prey size, and prey density. Understanding the function of ladybirds in pest management requires extensive ecological and ethological research backed by lab testing, glasshouse studies, and field research. Pesticide use in agriculture is reduced when biocontrol agents are used to lower insect populations. Sustainable agriculture would result from the use of biocontrol, an environmentally benign method that is self-sustaining and ultimately cost-effective.