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## *Cryptolaemus montrouzieri*: A Natural Solution to Horticultural Insect Pest Problem

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### Abstract:

Mealybugs are a common pest in horticulture, causing significant damage to plants by feeding on sap and excreting honeydew, which attracts other pests like ants and sooty mold. *Cryptolaemus montrouzieri* Mulsant (Coccinellidae: Coleoptera), commonly known as destroyer of mealybugs native to Australia. The *C. montrouzieri* is a successful predator and is still being used worldwide. It provides a natural and effective solution for horticultural insect pest problems, especially in controlling mealybug infestations. The *C. montrouzieri* is a voracious feeder of mealybugs; a single larva may consume up to 250 small mealybugs. Release of Australian lady beetle adult/grub *C. montrouzieri* @ ten adults/ tree or 5,000 beetles/ha, twice a season, especially during August–September and December- January. By efficiently preying on mealybugs, these beetles can reduce the reliance on chemical insecticides in pest management programs.

### Introduction:

*Cryptolaemus montrouzieri* Mulsant (Coccinellidae: Coleoptera), commonly known as the mealybug destroyer or the Australian ladybird beetle, belongs to the species of ladybird beetles. The *C. montrouzieri* is a successful predator and is still being used worldwide. This predatory ladybird beetle is native to Australia and has been introduced to at least 64 countries or regions for classical or augmentative biological control purposes since 1891. It provides a natural and effective solution for horticultural insect pest problems, especially in controlling mealybug infestations. Mealybugs are a common pest in horticulture, causing significant damage to plants by feeding on sap and excreting honeydew, which attracts other

pests like ants and sooty mold. By efficiently preying on mealybugs, these beetles can reduce the reliance on chemical insecticides in pest management programs (Kairo *et al.*, 2013).

The beetle proves particularly successful in controlling mealybug infestations on ornamental plants and crops such as grapes, citrus, and vegetables. This predator is set apart because it solely targets mealybugs, sparing other beneficial insects and pollinators. Additionally, using these beetles does not leave harmful residues on plants or the environment. The success of *C. montrouzieri* can be attributed to its efficient predation of mealybug pests and easy mass rearing. The *C. montrouzieri* is a voracious feeder of mealybugs in both the larval and adult stages - a single larva may consume up to 250 small mealybugs. They are most effective when mealybug populations are high, and repeated releases may be necessary if mealybug populations are low.

#### **Life Cycle of *Cryptolaemus montrouzieri*:**

The life cycle of *C. montrouzieri* consists of four stages: egg, larva, pupa, and adult.

**Egg:** The female beetle lays small clusters of pale yellow, oval-shaped eggs near mealybug colonies. The incubation period for the eggs lasts around 3-5 days.

**Larva:** After hatching, the larvae appear black with orange-brown markings and have spiny bodies. They voraciously feed on mealybugs, significantly reducing their population during their 12-14 day development.

**Pupa:** Following the larval stage, the beetle enters the pupal stage, undergoing metamorphosis into its adult form. This stage typically lasts around 6-8 days.

**Adult:** The adult beetle emerges from the pupa, ready to mate and lay eggs. Measuring about 3-4 mm in length, adult beetles are black or dark brown with reddish-brown legs and antennae. They have a lifespan of several weeks and continue to consume large numbers of mealybugs during this period.

#### **Adverse impacts of Mealybugs and estimated yield loss:**

Mealybugs can significantly damage horticultural crops, affecting yield and produce quality. The extent of damage varies based on the infestation severity and crop growth stage. The following are some ways mealybugs can negatively impact horticultural crops: Stunting plant growth, reduced yield, poor-quality produce, and transmission of plant diseases. The extent of yield loss in horticultural crops due to mealybug pests depends on factors such as infestation severity, crop type, environmental conditions, and management practices. Studies have

shown that mealybug infestations can lead to substantial yield losses in certain horticultural crops. For instance, severe mealybug infestations in citrus crops have been known to cause up to a 30% reduction in yield. In grapevines, mealybugs can decrease yield and grape quality, resulting in lower revenues for growers. Apple orchards also experience reduced fruit size and quality due to mealybugs, leading to significant economic losses. A study on ornamental plants found that mealybug infestations caused a 25-30% reduction in plant biomass, affecting plant height, stem diameter, and leaf count (Shivakumara *et al.*, 2022).



Fig 1. Infestation of *Paracoccus marginatus* on *Gymnema sylvestre* and development of sooty mould

#### Success story:

One of the early pioneers of biological control, Albert Koebele, introduced *C. montrouzieri* from Australia to the United States in 1891 intending to control citrus mealybug in California. While the initial impact of *C. montrouzieri* on citrus mealybug populations in citrus groves was significant, it faced a challenge surviving the winter, except in coastal regions.



*Cryptolaemus montrouzieri* feeding on mealybugs (Source: <https://www.biobestgroup.com/> )

#### **What are the benefits of the *Cryptolaemus* ?**

1. The adults are good fliers with a good search capability
2. Most efficient biological control agent of large mealybug hot spots
3. The larvae are covered in white waxy threads to mimic the mealybugs
4. Also, survive on alternative prey such as aphids and scale bugs

#### **How does biological control of the *Cryptolaemus* work?**

1. Females lay up to 400 eggs in the hot spots
2. Adults and old larvae are the most voracious ones
3. Adults and young larvae prefer eggs and young mealybugs, while adult larvae feed on all stages of the mealybug
4. They consume 30 to 70 prey a day
5. The damned larvae penetrate a mealybug colony inconspicuously.

#### **Conclusion:**

Release of Australian lady beetle adult/grub *C. montrouzieri* @ ten adults/ tree or 5,000 beetles/ha, twice a season, especially during August–September and December- January (Tanwar *et al.* 2007). The *C. montrouzieri* stands as a promising example of using nature's agents to combat agricultural pests, providing a sustainable approach to mealybug control and promoting healthier and more resilient agricultural systems.

**References:**

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