

*Eco-friendly Management of Red Pumpkin Beetle (*Aulacophora foveicollis* Lucas) in Bottle Gourd*

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ABSTRACT

Bottle gourd (*Lagenaria siceraria* (Molina) Standl.) is an important cucurbit crop, but its yield is greatly reduced by the red pumpkin beetle (*Aulacophora foveicollis* Lucas). The pest attacks the crop from the seedling stage, feeding on cotyledons, leaves, and tender parts, causing serious damage. To ensure safe and sustainable management, eco-friendly approaches are essential. Cultural practices like early sowing, crop rotation, and field sanitation help reduce infestation. Mechanical methods such as hand picking and use of sticky traps are also useful. Botanical treatments including NSKE (5%), neem oil (0.5%), and azadirachtin (3000 ppm) effectively reduce feeding and egg laying. Biological control using *Beauveria bassiana* and *Metarhizium anisopliae* further supports pest management. Thus, integration of these eco-friendly methods provides an effective and sustainable solution for managing red pumpkin beetle in bottle gourd.

INTRODUCTION

Bottle gourd (*Lagenaria siceraria*) is an important vegetable crop belonging to the family Cucurbitaceae. It is widely grown in tropical and sub-tropical regions and requires a warm and humid climate for good yield. In India, it is cultivated in almost all states. The plant is a climbing vine with alternate leaves, soft hairs on the stem, and well-developed tendrils. The fruits are nutritious and are consumed both as a vegetable and in juice form. They are rich in calcium, phosphorus, iron, and vitamins C and Bs. Bottle gourd also has medicinal value and is considered beneficial for heart health. Its high fibre content helps in digestion and is useful for liver disorders and diabetes (Ahmad *et al.*, 2022).

However, the crop is affected by several insect pests and diseases. Among them, the red pumpkin beetle (*Aulacophora foveicollis* Lucas) is one of the most serious pests of cucurbit crops. The adult beetle is small (6–8 mm long) and attacks the crop from the seedling stage. It feeds on cotyledons and leaves, making irregular holes (Khan *et al.*, 2015). Severe infestation can cause 35–75 per cent damage and may even require re-sowing of the crop (Atwal *et al.*, 2002). Therefore, considering the importance of this pest, the present study was conducted to evaluate the effectiveness of bio-pesticides and botanical treatments under field conditions (Hussain *et al.*, 2011).

Systematic position:

Kingdom: Animalia

Phylum : Arthropoda

Class : Insecta

Order : Coleoptera

Family : Chrysomelidae

Genus : *Aulacophora*

Species : *foveicollis*

Damaging stage:

Both grubs and adults of red pumpkin beetles (*Aulacophora foveicollis*) cause damage, but the adult stage is more destructive.

Nature of damage:

The adult beetles mainly attack young plants. They feed on cotyledons, leaves, flowers, and tender fruits by scraping the green tissues, resulting in irregular holes (Fig.1). Under severe infestation, the leaves are eaten completely, leaving only the veins, which gives a skeleton-like appearance. This type of damage is most harmful at the seedling stage and may lead to drying and death of young plants. The grubs remain in the soil and feed on roots and underground stem portions. This damages the root system, causing wilting, stunted growth, and reduced plant strength.

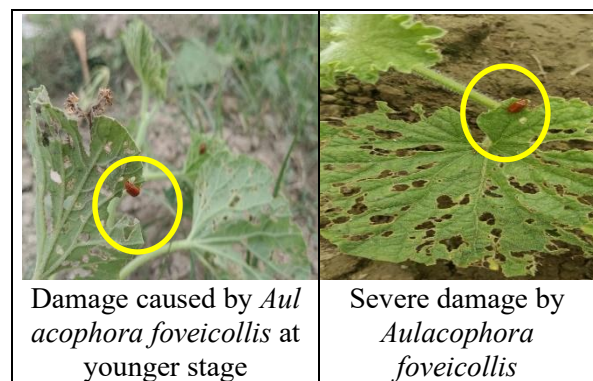


Fig:1 Damage symptoms caused by *Aulacophora foveicollis*

Due to continuous feeding by both stages, the plant becomes weak, growth is affected, flowering is reduced and ultimately yield declines significantly.

Life cycle:

The red pumpkin beetle (*Aulacophora foveicollis*) completes its life cycle through

four stages: egg, grub, pupa, and adult. The female beetle lays eggs in the soil, usually near the base of the plant. The eggs are yellowish and hatch within about 5–8 days (Fig.2).

After hatching, the grubs (larvae) come out and remain in the soil. They feed on roots and underground parts of the plant. The larval stage lasts for about 10–20 days, during which the grubs pass through several stages of growth.

Fully grown grubs then transform into the pupal stage in the soil. This stage lasts for about 7–10 days, after which adult beetles emerge. The adult beetles are reddish orange in color and actively feed on leaves, flowers, and fruits. They can live for several weeks and continue to reproduce, leading to multiple generations in a year, especially during warm and humid conditions.

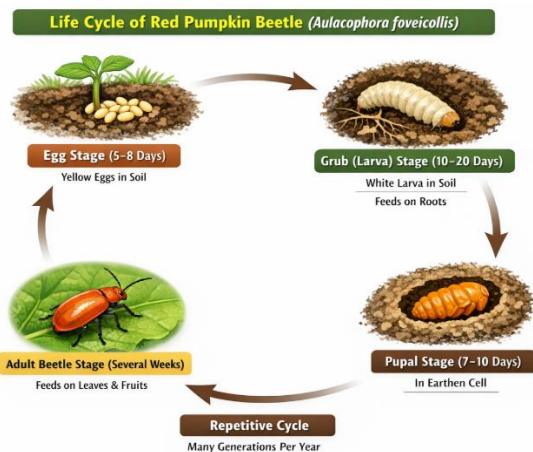


Fig:2 Life cycle of *Aulacophora foveicollis*

Management:

Management of red pumpkin beetle can be effectively achieved through eco-friendly and sustainable approaches that minimize environmental hazards and preserve beneficial organisms. Adoption of cultural, mechanical, botanical and biological methods in an integrated manner is essential for effective control.

1. Cultural Practices:

- ❖ Early sowing of the crop helps escape peak beetle infestation.
- ❖ Deep summer ploughing exposes and destroys grubs and pupae present in the soil.
- ❖ Crop rotation with non-cucurbit crops reduces pest carryover.
- ❖ Maintain proper field sanitation and remove weeds and infested plant parts.

2. Mechanical Control:

- ❖ Hand picking and destruction of adult beetles during early morning hours is effective, especially at seedling stage.
- ❖ Install yellow sticky traps @ 10–12 traps per acre (25–30 traps/ha) for monitoring and control.
- ❖ Use insect-proof netting (40–50 mesh) to protect young plants during early growth stages.

3. Botanical Control:

- ❖ **NSKE (5%):** Apply @ 50 g neem seed kernel powder per litre of water.
- ❖ **Neem oil (0.5%):** Apply @ 5 ml per litre of water + mild soap solution as emulsifier.
- ❖ **Azadirachtin (3000 ppm):** Apply @ 2 ml per litre of water.
- ❖ Apply sprays at initial infestation and repeat at 7–10-day intervals.

4. Biological Control:

- ❖ *Beauveria bassiana* (1×10^8 cfu/g) @ 5 g per litre of water.
- ❖ *Metarhizium anisopliae* (1×10^8 cfu/g) @ 5 g per litre of water.

- ❖ Spray during evening hours and repeat at 10–15-day intervals under humid conditions.

5. Soil Amendment:

- ❖ Apply neem cake @ 250–500 kg/ha at the time of land preparation to reduce soil-dwelling grubs.

CONCLUSION:

The red pumpkin beetle is a serious pest of cucurbit crops, particularly at the early growth stage, causing significant yield losses. Its management can be effectively achieved through the integration of eco-friendly practices such as timely cultural operations, mechanical removal, and the use of neem-based botanicals and biological agents. Regular monitoring and timely application of these methods not only reduce pest incidence but also help in conserving natural enemies and maintaining environmental safety. Thus, an integrated eco-friendly approach offers a sustainable and effective solution for managing red pumpkin beetle in bottle gourd.

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