

Flower flies -protectors and pollinators of crop plants

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Abstract

Hoverflies are distinguished by their unusual hovering flying style, which allows them to stay still in the air as they search for pollen or nectar. They play an eminent role in pollination, making them valuable contributors to ecosystem health and agriculture. Many hoverfly species play a vital role in pollinating crops and wildflowers. One prominent feature of hoverflies is their larval stage, which efficiently feeds on aphids thus making them effective aphid predators. This characteristic of syrphids makes them valuable partners in integrated pest management strategies in agriculture. In gardens and natural ecosystems, attracting hoverflies can help with pollination and ecological balance. Planting flowers that bloom at different times of the year can assist hoverfly populations by giving nectar and pollen.

Keywords: Hoverflies, Pollinator, Predator, Aphids

Introduction:

Syrphid (pronounced 'sir-fid') flies, also known as hover flies or flower flies, commonly occur in field crops, orchards, gardens and home landscapes. They belong to the family Syrphidae, order Diptera. As a large group of about 6,000 described species, syrphids habitats in a wide variety of aquatic and terrestrial ecosystems occupying diverse ecological roles. The larvae of many species of hover flies often plays an eminent role as beneficial predators of small soft-bodied pests like aphids. Adults are potential pollinators of different crops of the families Apiaceae,

Asteraceae and most of the commercial crops.

As syrphids provides 'dual advantage' of larvae as aphid predators and adults as pollinators, they are fit candidates for use in the "One stone- two birds" strategy in crop management.

Economic importance of Hover flies

There are two larval feeding habits in syrphids viz., predatory syrphids and Scavengers/ Saprophagous syrphids. Predatory aphidophagous syrphids include *Episyrphus balteatus*, *Allograpta* sp, *Paragus serratus*, *Ischiodon scutellaris*, *Eupeodes* sp and *Syrphus* sp. *Xylota*, Saprophagous syrphids

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include *Syrpita* and Eristalinae which live in highly polluted aquatic habitats. Encouraging efficient and eco-friendly beneficial predator populations in crop fields can be a promising component of an integrated pest management program to protect crop plants from excessive aphid damage without using chemical pesticides.

Biology of Hover flies

These flies have four life stages namely egg, larva, pupa and adult.

Egg: The egg appears oblong-oval in shape, chalky white in color with longitudinal ornamentations on the surface and blunt ends. The adult female fly oviposits near the aphid colonies to ensure prey availability to the larvae upon hatching. The incubation period of eggs ranges between 3 to 4 days (Fig 1a).

across the entire body length and brown spots that flank the median white line on the lateral sides of the body. The duration of larval stage lasts for 5 to 7 days (Fig 1b).

Pupae: Pupae formed after the larvae attach themselves to vegetation, bark, or a stationary object and become enveloped in a tear drop or bulb-shaped case. They are immobile, leathery or paper-like in texture with small posterior bumps. The pupal period ranges from 6 to 7 days (Fig 1c).

Adults: Adult flies are very attractive having color patterns (light green, yellow, orange, red, or black). Their coloration often mimics bees, bumble bees, hornets, or wasps, but they cannot sting or bite. They actively hover around the flowers foraging for pollen and nectar in the flowers.

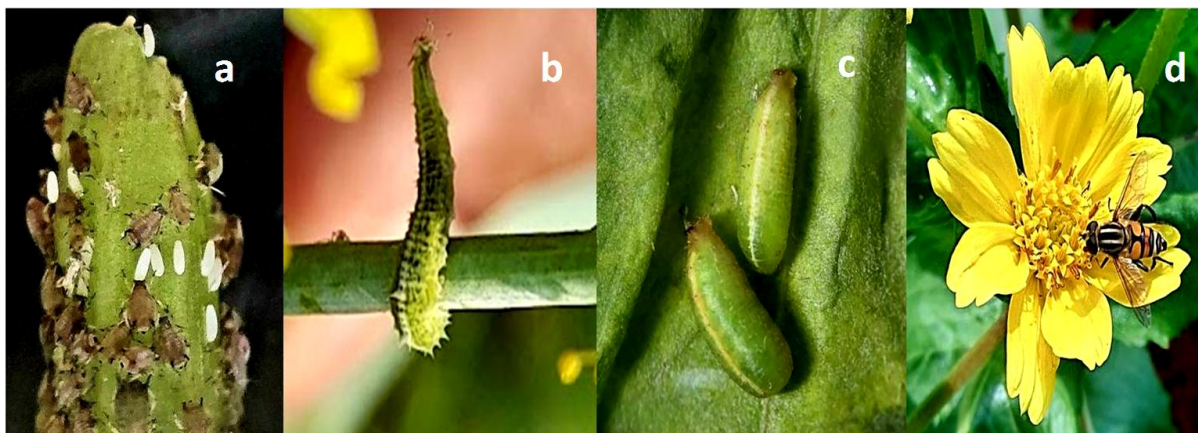


Fig 1: Life stages of Syrphid fly

a) Egg b) Larva c) Pupae d) Adult

Larvae: The larvae are voracious predators of aphids with three instars. Larvae appear greenish-brown in color with a median white line on the dorsal surface that runs

across the entire body length and brown spots that flank the median white line on the lateral sides of the body. These flies exhibit mimicry that protects them from other cautious predators (Fig 1d).

Crops pollinated by Hover flies:

These flies pollinate some important commercial crops like Apple, Beans, Carrot, Cherries, Fennel, Mustard, Onion, Pea, Raspberry, Strawberry, Mango and other wild plants.

Biocontrol potential of Hover flies:

Aphidophagous syrphids are voracious predators of different species of aphids infesting many crops. Aphids are the destructive sucking pests of most of the important crops. The nymphs and adults suck the phloem sap, reduce the yield and also transmit several viral diseases as vectors. They are known to feed on several economically important aphids like cowpea aphid, *Aphis craccivora*, maize aphid, *Rhopalosiphum maidis*, fennel aphid, *Hyadaphis coriandri*, cabbage aphid *Brevicoryne brassicae*, green peach aphid, *Myzus persicae*, and pomegranate aphid, *Aphis punicae* etc.

Threats for hoverflies

According to the first continent-wide assessment of the essential pollinator group on the International Union for Conservation of Nature (IUCN) European Red List assessment found that 314 (37%) out of 890 species of hoverflies in Europe are vulnerable, endangered or critically endangered.

Causes for extinction

- ❖ Intensive agriculture

- ❖ Unsustainable farming practices like land conversion of suitable habitat, habitat degradation by livestock overgrazing, and urbanization.
- ❖ Fragmentation of natural and semi-natural habitats leads to the loss of their natural breeding habitats thereby affecting their abundance and multiplication.
- ❖ Indiscriminate use of pesticides during the flowering stage of the crop was directly lethal to flower-visiting adults of the hoverflies.

Conservation strategies for hoverflies

- ❖ Growing or maintaining hedgerows in the field borders with flowering crops or pulses
- ❖ Spot application of insecticides or need-based application of plant protection chemicals.
- ❖ The creation of habitats with aquatic features near the agricultural habitats will aid in the survival of larvae of hoverflies.
- ❖ Selection of appropriate seed mix of different flower types like disc-shaped, funnel-shaped, and wider flowers suiting the proboscis type of different species of syrphids will help in the in-situ conservation of different species of hoverflies.

Summary

Hover flies are a diverse family of insects that can provide both biocontrol and pollination services. Natural populations of syrphids can be conserved through judicious use of insecticides and enhancing floral resources in the cropping system. Many beneficial insects, including syrphid flies, are useful candidates for home gardeners and commercial agriculturalists alike to keep damaging pest populations to a minimum.

