

Eretmocerus hayati

Parasitoid wasp for control of silverleaf whitefly



Adult female Hayati wasps (Images: Denis Crawford)

Target pest

- Silverleaf whitefly (*Bemisia tabaci*)

Advantages

- Excellent searching ability
- Efficient biocontrol even at low host densities
- Both adult and immature wasps attack whiteflies
- Adult wasps kill whitefly nymphs by feeding on them
- Wasp larvae develop as parasitoids of whitefly nymphs, eventually killing them

Biology and description

Eretmocerus hayati (Hayati) is a wasp that is classified as both a predator and parasitoid of silverleaf whitefly.

Female wasps lay their eggs under whitefly nymphs. After hatching, the wasp larva penetrates into and develops within the whitefly nymph. It eventually kills its host, pupates and then emerges as an adult wasp through a round exit hole. Having developed as parasitoids within whitefly nymphs, adult wasps then go on to act as predators, feeding directly on immature whiteflies.

Hayati wasps are very small (up to 1 mm long). The life cycle takes 2-4 weeks depending on temperature.

Suitable crop environments

- Successfully used within an IPM program in outdoor vegetable production, cotton and greenhouse vegetables
- Beneficial insects, especially tiny wasps, prefer a protected environment - Hayati are most effective in a crop that has good foliage development, is well irrigated and free from pesticide residues and dust

Release rates

Release rates vary depending on the crop and level of infestation. Refer to the following table as a guide.

Situation	Rate (per release)	Notes
Field crops	5,000 wasps/ha	Make 5 releases at intervals of 2-3 weeks. Further releases may be required following adverse conditions or during periods of intense whitefly activity.
Greenhouses	5 wasps/m ²	Begin weekly releases before or at the first sign of whitefly activity. Continue until control is achieved or parasitism reaches 80%. If whitefly is already active in the crop higher release rates may be required.

Unlike chemicals, when it comes to beneficials, more is always better. However, they are costly to produce and our goal is to achieve the best results at minimal expense. Factors to consider include the value of the crop, the severity of the pest outbreak and the activity (or otherwise) of naturally occurring beneficial species.

Multiple releases of modest numbers is better than a single large release. This reduces risk, improves establishment and accelerates the development of multiple overlapping generations. Hayati releases are inoculative and we anticipate that they will establish and breed up within the crop to give extended protection.

Pack size, storage and handling

- Supplied in small plastic vials with a cotton plug insert
- Each vial contains 500 wasp pupae
- Sold in packs of 10 vials (total 5,000 wasps per pack)
- Wasps begin to emerge in transit or shortly after arrival
- If adult wasps are not yet visible in the vials, store at room temperature (out of direct sunlight) until the first wasps emerge
- Release as soon as possible after adult wasp activity is detected – storage of adult wasps is not recommended, but if immediate release is not possible they may be stored for up to 2 days at 8-12°C

When to release

- Release before or at the first sign of whitefly activity
- Preventative release into neighbouring vegetation where whiteflies are present can help establish the beneficial population early in the life of the crop

How to release

- Before release, check prior history of chemical use to ensure toxic residues are no longer present
- Place vials uniformly throughout the crop
- Hang vial cap over a leaf petiole, tie wire or similar
- Remove cotton plug to allow wasps to emerge
- Dedicated beneficial insect release drones can greatly speed up the release process for area wide treatment

Monitoring after release

- It is not easy to find adult wasps after release
- With experience it is possible to assess the level of parasitism by examining whitefly nymphs and empty whitefly pupal cases with a hand lens or microscope
- This [CottonInfo video](#) describes how to do this

Cultural practices to aid establishment

- Watch for ant activity as aggressive ant populations can interfere with wasp establishment – ants may need to be controlled if this is the case

Complementary biocontrol

- [Montdorensis](#) predatory mites

Chemical use

Hayati are very effective biocontrol agents but they are sensitive to many pesticides. Harmful pesticides may be directly toxic or have sublethal effects, preventing Hayati from establishing and/or reducing their efficacy. Some insecticides (e.g. synthetic pyrethroids, organophosphates and neonicotinoids) can have residual toxicity that affects Hayati for many weeks.

If pesticides are required, always check for side-effects and select products that are least harmful to *Eretmocerus hayati* and other key beneficials in your IPM program. As a guide, consult the [Biobest Side Effects App](#) for information about the effects of pesticides on *Eretmocerus spp.* and other biocontrol agents.



Hayati emerging from release vial



Hayati wasp developing inside whitefly nymph
(Image: Denis Crawford)



Adult Hayati wasps emerge from a round exit hole
(Image: Denis Crawford)



Adult silverleaf whitefly leave a characteristic T-shaped exit hole when they emerge from their pupal case
(Image: Denis Crawford)



Adult silverleaf whitefly
(Image: Denis Crawford)