



Eretmocerus warrae – Greenhouse whitefly parasitoid

Eretmocerus warrae is a parasitoid wasp which attacks whiteflies, particularly greenhouse whitefly. It also predares non-parasitised stages. It does not attack silverleaf whitefly. *Eretmocerus* is tolerant of a wide range of temperatures and relative humidity, and should be particularly useful in summer where very hot conditions are experienced which are less conducive to *Encarsia* development.

Description and Biology:

Eretmocerus are <1mm long, (a little larger than *Encarsia*), and completely yellow except for three distinctive red ocelli on the top of the head arranged in a triangle. They are winged and can travel several hundred metres in a day, possibly wind assisted. Males are very rare. The life-cycle has not yet been studied in detail, but the female prefers 2nd stage whitefly nymphs for egg laying, depositing a single egg in the ventral surface of the whitefly nymph. On hatching, after ~4 days, the larva bores into the whitefly and waits until the whitefly pupates. It then releases digestive enzymes which dissolve the whitefly innards. There are three larval stages, with development from egg to adult taking about 10-14 days, depending on temperature. The yellow body of the final stage with red eyes is visible within the whitefly shell. Unlike *Encarsia*, the whitefly body turns a light yellow rather than black making establishment a little harder to monitor. The adult parasitoid cuts a circular hole in the upper shell upon emergence. Eggs are laid early in the life of the female (~150 in total), which lives only 1-2 weeks. Host feeding on older, non-parasitised whitefly nymphs is an important source of nutrients for the female and contributes to control of the whitefly.

Suitable Crops:

Eretmocerus can be used on all crops where greenhouse whitefly is present, and should be better suited to those with hairs on the lower leaf surface than *Encarsia*. It is primarily for use in greenhouse crops until more trials have been conducted. Target crops include greenhouse vegetable (tomato, cucumber, eggplant), ornamental (gerbera, chrysanthemum, rose), strawberry and herbs. In summer and in warmer climates they may also be useful in outdoor nursery stock and gardens.

When to Release:

Eretmocerus works best when used preventatively, or when whiteflies are first noticed in the crop. The

parasitoid is not long-lived so needs to be placed near young whitefly nymphs for maximum established and efficacy. This is usually in the upper canopy in tall crops. If whitefly numbers are already high it is advisable to use a non-disruptive insecticide to lower the whitefly population density prior to release. Residual broad spectrum insecticides should not be used for at least four weeks prior to release.

How to Release:

Eretmocerus are sent as parasitised whitefly pupae glued to the centre of cards joined in sheets. At least 100 adult wasps should emerge from each card. Cards should be separated in the greenhouse and hung individually from leaf petioles in the shade near whitefly colonies. Avoid handling the parasitised scales. Cards should be placed in the top 30cm of the crop as soon as possible after received. If provided as loose pupae, place these in specially designed bug boxes near whitefly colonies or on leaves in shade and not exposed to overhead irrigation. Do not place on the ground or ants may eat them. Ants need to be controlled as they may also target cards. *Eretmocerus* can be stored for a few days at 6-10°C if necessary but emergence and performance may be affected.

Release Rates:

Rates will vary depending on the crop and time of year. The following rates have been determined overseas for *Eretmocerus eremicus* and can be used as a guide. Release *Eretmocerus* into previous whitefly hotspots, or known infested areas. Continue to use *Encarsia formosa* in conjunction with *Eretmocerus*.

Preventative: 0.5-1/m² weekly.

After whitefly detection: 2-3/m² weekly for at least 4 applications, or apply higher rates in hot-spots until parasitisation is at least 80%. Hotspots – release 10/m².

Chemical use:

Eretmocerus is sensitive to many pesticides, particularly pyrethroids, organophosphate and neonicotinoids, though they have shown more tolerance to insecticides than *Encarsia*. Residues on foliage and structural components may remain toxic for many weeks and negatively impact on their survival and ability to effect control. Check side-effects charts carefully and avoid using pesticides before and during *Eretmocerus* use unless they are known to be safe. Note that not all *Eretmocerus* species are affected similarly. Contact Biological Services for specific information.