



## Control of greenhouse whitefly by augmentation

Greenhouses provide perfect conditions for the establishment and growth of certain pests. Higher temperatures favour the growth of invertebrates and fungi, and food plants are typically available in high densities. A common greenhouse pest is the greenhouse whitefly *Trialeurodes vaporariorum*. This small, moth-like insect is related to the aphids and, like them, feeds on the sap of plants, which it accesses using piercing mouth parts.

Whiteflies cause injuries to plants by feeding on them, but can also harm plants indirectly through the production of honeydew. This sticky excretion encourages a variety of fungi to grow, especially sooty moulds that can blemish plants and interfere with photosynthesis.

*Trialeurodes vaporariorum* is parasitized by the tiny parasitoid (Section 2.2.3) wasp *Encarsia formosa* (Figure A), which lays its eggs in *T. vaporariorum* larvae. The wasp larvae develop by consuming and eventually killing their hosts, preventing them from reaching the adult stage. When *E. formosa* was found parasitizing *T. vaporariorum* feeding on tomatoes in the 1920s, an industry to supply the parasitoid to greenhouses for the biocontrol of whitefly developed (Van Lenteren & Woets, 1988).



*Encarsia formosa* was used widely for greenhouse whitefly control in Europe, Canada, Australia, and New Zealand, although its use declined as synthetic insecticides became popular after World War II (Section 9.4.2). Insecticide resistance (Section 9.4.4) emerging through the 1970s led to a resurgence of interest in parasitoid biocontrol, and *E. formosa* is now widely used commercially for whitefly control (Hoddle *et al.*, 1998).

The wasps are distributed in the form of pre-parasitized whitefly pupae glued to cards. One strategy of introducing the parasitoids involves the use of 'banker plants'. Banker plants support a population of both host and parasitoid but are isolated from the main crop by a fine mesh that prevents whitefly movement but allows the smaller wasp to move out in search of whitefly hosts on crop plants (Hoddle *et al.*, 1998).

### REFERENCES

- Hoddle, M.S., VanDriesche, R.G., & Sanderson, J.P. (1998) Biology and use of the whitefly parasitoid *Encarsia formosa*. *Annual Review of Entomology*, Volume 43, 645–669.
- Van Lenteren, J.C. & Woets, J. (1988) Biological and integrated control in greenhouses. *Annual Review of Entomology*, Volume 33, 239–269

Online Case Study 9 Figure A The greenhouse whitefly *Trialeurodes vaporariorum* can be controlled by the use of the parasitoid wasp *Encarsia formosa*.

Source: Photograph by Denis Crawford / Alamy Stock Photo.