

A minute wasp to tackle a big job — control of silverleaf whitefly

By Louise Lawrence, CSIRO Entomology

The Australian Government Departments of Environment and Heritage, and Agriculture, Fisheries and Forestry have granted permission for the release of a tiny parasitic wasp in Australia. After extensive testing in quarantine in Brisbane, *Eretmocerus hayati* will be released in southeast Queensland to control silverleaf whitefly (SLW), *Bemisia tabaci* Biotype B. It will be the battle of the midge with SLW being around one millimetre long and the wasp even smaller.

Despite its size, SLW is considered one of the major global pests of vegetables, cotton and ornamental production. It is found across Europe, Asia, Africa, the Americas and several Pacific countries and is known to attack more than 600 plant species. It arrived unnoticed in Australia in 1994, probably from the US, and carried with it resistance to many insecticides.

SLW liked it here, spread quickly and is now causing severe problems in Queensland, northern NSW and parts of Western Australia. It is a major problem for vegetable and soybean producers in most parts of Queensland and for cotton growers in the state's Central Highlands. Here it threatens the viability of the area's cotton production.

The large quantities of honeydew produced cause 'sticky cotton' which can bring a cotton gin to a standstill. Sooty mould, which grows on honeydew, necessitates the costly washing of produce and fouls cotton. The pest is still spreading with a recent outbreaks occurring in the Carnarvon area of Western Australia and the Darling Downs of Queensland.



Silverleaf whitefly adult.

SILVERLEAF WHITEFLY, *BEMISIA TABACI* BIOTYPE B

Silverleaf whitefly (SLW) is a small, white, sucking insect related to aphids. It can be distinguished from other closely related whitefly by the tentlike way it holds its wings. Females produce between 50 and 300 eggs, depending on the host plant, and these are laid on the underside of leaves. A generation lasts between two and three weeks and there are four juvenile stages (three nymphs and a pupa from which the adult emerges). Only the first instar is mobile but it moves only a short distance from its egg. Therefore, older instars tend to occur on older leaves with eggs on new leaves. A crop under attack can host billions of whitefly.

ERETMOCERUS HAYATI

This tiny parasitic wasp is less than one mm long. The female lays her eggs under a SLW nymph. The wasp larva, when it hatches, bores into the nymph slowly developing along with the whitefly. Once the whitefly enters the final development stage the parasite kills the whitefly and completes its development and the adult finally emerges through a hole it chews in the surface of the whitefly.

Outbreaks cost growers dearly. In 2000, more than \$6 million extra was spent on SLW control in the coastal strip from northern NSW to the Burdekin in Queensland. In 2001–02, it caused an extra \$3 million to be spent on control on cotton in Queensland's Central Highlands.

The only means of control currently available to growers is pesticides and the capacity of SLW to develop resistance makes reliance on chemical control unsustainable. This makes biological control an attractive option.

After a long search for a suitable potential biocontrol agent, Dr Paul De Barro and his team at CSIRO Entomology began evaluating *E. hayati*. This wasp, originally from Pakistan, has been used successfully against SLW in the Lower Rio Grande in south Texas — an area very similar climatically to coastal and Central Highland areas of Queensland. In the Rio Grande, the numbers of SLW have been reduced to a



Silverleaf whitefly parasitised.

level where they are readily managed by existing programs.

The process of finding and getting approval for the release of a potential biological control agent is long and complicated with each step requiring unanimous approval from 21 independent agencies representing all Federal and State Departments of Environment and Agriculture. Once permission is given to import a potential agent into quarantine in Australia, the long and sometimes tedious process of assessing its suitability begins. This is to ensure that the agent attacks only the pest it is intended to control and that it won't move on to other species.

It is hoped that once this agent becomes established it will have the same effect here as it had in the Rio Grande and growers will be able to manage SLW more easily.

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