

# Macrolophus-System

Since a few years tomato and eggplant growers get support from the predatory bug *Macrolophus* to control whiteflies. As this beneficial builds up its army slowly, it is important to introduce the bug early in the season. But once it is at full strength, it does not only protect the crop efficiently against whiteflies, but now and then it also likes to eat a spider mite, a moth egg or an aphid.

## WHITEFLIES

Adult whiteflies measure about 1 mm and are typically covered with a white waxy powder. Two species commonly occur in greenhouses: the greenhouse whitefly (*Trialeurodes vaporariorum*) and the tobacco whitefly (*Bemisia tabaci*). Adults of the latter species can be mainly distinguished by the wings which they hold closer to their body than *Trialeurodes* adults do. Moreover, *Bemisia* pupae have a more pointed and irregular shape, with less and shorter wax threads, and a more yellowish colour than *Trialeurodes* pupae.

The female whitefly deposits its oval shaped eggs of 0.2 mm on the underside of young leaves at the top of the plant. The larva that hatches is first mobile during a few hours to search for a suitable place on the leaf to settle. Later on, and in the subsequent larval stages and pupal stage, it does not move anymore. The four larval stages look very similar, but differ clearly in size. After the fourth larval stage a pupa is formed. Finally an adult whitefly emerges from the pupa through a T-shaped exit hole. On tomato development from egg to adult takes 20 days at 27°C (80.6°F) or 38 days at 17°C (62.6°F), but on other host plants this can be quite different.

Also fertility depends on temperature and host plant. At 17°C (62.6°F) a female lays 100 - 150 eggs on tomato, 250 - 300 eggs on cucumber and 450 - 600 eggs on eggplants.

As well larvae as adults suck plant juices. Secretion of honeydew fouls the leaves and the fruits, which become not marketable. Often moulds (*Cladosporium* spp.) grow on the honeydew, which stunts photosynthesis and respiration of the plant. Moreover, whiteflies can transmit several viruses.

## *MACROLOPHUS PYGMAEUS*

*Macrolophus pygmaeus* originates from the Mediterranean. There it often appears in greenhouses or tunnels where only few pesticides are used.

*Macrolophus pygmaeus* is a bright green predatory bug of 2.9 to 3.6 mm. It has red eyes and long, green antennae with a black base. It has long legs with which it can move rapidly, even on leaves covered with glandular hairs. The female is a little bit taller than the male, and has a bigger abdomen with an ovipositor.

Three days after copulation the female deposits her eggs with her ovipositor in the tissue of the leaf, vein or stalk. After 11 days at 25°C (77°F), or after 37 days at 15°C (59°F) nymphs are born. There are 5 nymphal stages. During the first stages nymphs are yellowish green, but older nymphs are bright green as the adults. In the last two stages the growth of the wings can be seen.

The five nymphal stages take about 19 days in total at 25°C (77°F), or 58 days at 15°C (59°F). So *Macrolophus* development is quite slow.

Female *Macrolophus* bugs live for 40 days at 25°C (59°F) or for 110 days at 15°C (77°F). Males live a bit longer. A female deposits in total between 100 and 250 eggs, depending on temperature and food. On a diet of only whitefly eggs more eggs are laid than when aphids or spider mites are eaten.

Although *Macrolophus* predate several pest insects, it clearly prefers whitefly, as well its eggs as its larvae and pupae. An adult can suck empty about 40 to 50 whitefly eggs per day. A punctured egg, larva or pupa can be recognized by a small hole where the bug has injected its rostrum. Sometimes empty preys are collapsed. *Macrolophus* eats both *Bemisia* and *Trialeurodes*.

As already mentioned above, *Macrolophus* also eats spider mites, moth eggs and aphids. Sometimes the bug sucks plant sap.

## APPLICATION

*Macrolophus* is used in tomato and eggplant greenhouses to control whiteflies in combination with the parasitic wasp *Encarsia formosa*.

Because of the slow population build-up the bug has to be released early in the season. Usually 5 to 10 *Macrolophus*/m<sup>2</sup> are introduced for a few weeks in the first whitefly hot spots until a total of 0.5 - 2 *Macrolophus* is reached in the greenhouse. In this way *Macrolophus* makes use of the presence of whiteflies for its development and assists *Encarsia* in controlling the first whitefly hot spots. If during the first months no whitefly is observed, *Macrolophus* is best introduced in the warmer places of the greenhouse.

The first 3 to 4 weeks *Macrolophus* can hardly be found in the crop. It will take at least 2 months before a good *Macrolophus* population is built up. In this initial period the use of other beneficials against whiteflies (such as *Encarsia formosa* or *Eretmocerus eremicus*) is indispensable. After a few generations the *Macrolophus* population is at full strength to safeguard the crop against any unexpected infestations of whiteflies. Also for controlling other pests *Macrolophus* is an ally which should not be underestimated. For instance it is striking how the number of treatments against caterpillars in tomato has decreased since the use of *Macrolophus*. The *Macrolophus* nymphs are very appreciated for their contribution to the spider mite control.

## WARNING

*Macrolophus* can exceptionally cause crop damage (such as poor fruit setting; flower drop; irregularly formed flowers, fruit or trusses; feeding spots on fruit) when the following conditions occur:

- High population of *Macrolophus*, i.e. hundreds of individuals on the entire plant or 50 individuals in the head of the plant;
- Few or no prey available;
- Reduced fruit set caused by unfavourable climatic conditions or strong vegetative growth;
- Sensitive crops and varieties, e.g. cherry tomatoes and small-truss tomato types.

If there is a lack of prey *Macrolophus* feeds itself with plant juices. Economical significant damage occurs only rarely.

## MACROLOPHUS-SYSTEM

Biobest presents *Macrolophus* per 250 or 500 pieces on vermiculite in a 125 ml and 250 ml tube respectively. The bugs are all in the latest nymphal or adult stage. *Macrolophus* is best released in the whitefly hot spots or in warmer parts of the greenhouse, in sufficiently large piles, to make a population build-up possible.

*Macrolophus* can be stored for a short time at 8 - 10°C (46.4 - 50°F).

## MACROLOPHUS-N-SYSTEM

Biobest offers *Macrolophus* nymphs per 500 with vermiculite and a leaf as carrier in a plastic tube. The *Macrolophus* nymphs have the same prey preferences as the adults but they act more locally, as they do not fly. They can thus remain locally in hot spots (for instance, for the control of spider mites).

## ADVANTAGES

- Long-lasting protection;
- Controls both tobacco whitefly and greenhouse whitefly;
- Also tackles other pests;
- Can be combined with *Encarsia* or *Eretmocerus*;
- Also works at lower temperatures.