

### **Banded-winged whitefly**

## Trialeurodes abutiloneus



Figure 1. Adult Trialeurodes abutiloneus. © UK Crown copyright – Courtesy of Fera

### Background

In April 2005, sixty *Hibiscus rosa-sinensis* var. Kopper King plants imported from the USA were inspected at Gatwick Airport and a commercial plant nursery by the Plant Health and Seeds Inspectorate (PHSI). The plants were found to be infested with whiteflies, later identified as *Trialeurodes abutiloneus* (Haldeman) (Hemiptera: Aleyrodidae), the bandedwinged whitefly. A second interception was made in November 2010 on a consignment of *Acacia* sp., *Banisteriopsis caapi* and *Brugmansia* sp. plants imported by courier from the

USA. In both cases, the infested plants were destroyed, and there have been no further interceptions or findings reported by the PHSI.

### **Geographical Distribution**

*Trialeurodes abutiloneus* occurs naturally in North, South and Central America and the Caribbean. In the United States, it is most commonly found in the southern and eastern states, including Alabama, Arizona, Arkansas, California, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Texas, and Virginia. However, *T. abutiloneus* has been found in glasshouses in New York, Massachusetts, and Vermont, as well as in Ontario, Canada.

This whitefly species has been intercepted in Great Britian and Europe on a few occasions but there is no evidence of its establishment anywhere outside the Americas.

#### **Host Plants**

*Trialeurodes abutiloneus* is a highly polyphagous pest, currently recorded to feed on approximately 140 host species in 33 plant families, but it is thought that the host range will broaden over time as it adapts to new regions. Commercially important ornamental host genera include Acacia, Aster, Bidens, Citrus, Eucalyptus, Euphorbia, Fuchsia, *Hibiscus, Impatiens, Pelargonium, Petunia, Solidago* and *Veronica*. Field and orchard crops that may be affected include *Brassica* spp., beans (*Phaseolus* spp.), cucumber (*Cucumis sativus*), lettuce (*Lactuca sativa*), maize (*Zea mays*), potato (*Solanum tuberosum*), and tomato (*Solanum lycopersicum*). This whitefly exhibits a preference for plants belonging to the families Malvaceae and Solanaceae.

### **Biology**

The biology of *T. abutiloneus* is similar to the glasshouse whitefly (*Trialeurodes vaporariorum*). Temperature greatly affects the time required to complete a generation. *Trialeurodes abutiloneus* has six developmental stages: the egg, four nymphal (larval) instars with the final nymphal instar forming the puparium, and the adult. Eggs are laid either singly in a random manner or in small groups on the undersides of leaves. The first instar nymphs are mobile and crawl a short distance before selecting a suitable feeding site. The subsequent nymphal stages are immobile. The adults have the ability to both walk and fly.

#### **Description**

The puparia of *T. abutiloneus* (Fig. 2) may be easily mistaken for those of the glasshouse whitefly (*Trialeurodes vaporariorum*) (Fig. 3) and other whitefly species, due to their typical

top flattened oval shape and production of waxy fringe. However, there are some key characteristics which may be used to identify *T. abutiloneus*. Puparia of *T. abutiloneus* may exhibit a variable amount of dark brown dorsal pigmentation (Figs. 4-5), which is absent in *T. vaporariorum*. However, this characteristic is variable and separation of unpigmented *T. abutiloneus* puparia from those of *T. vaporariorum* requires study of a slide-mounted specimen. The adults of *T. abutiloneus* are easily identified as they have zig-zag markings on their forewings (Fig. 6), whereas *T. vaporariorum* adults have no markings on their wings (Fig. 7). The eggs of the two species are also easily separated. The eggs of *T. abutiloneus* (Fig. 8) are scattered, laid singly or in small random groups. The eggs have a long peduncle and usually lie horizontally, parallel to the leaf surface. The mature eggs are cream or yellow in colour. The eggs of *T. vaporariorum* (Fig. 9) are often laid in semi-circles, or in small groups. The eggs have a short stalk and remain erect, at right angles to the leaf surface. The mature *T. vaporariorum* eggs become a dark grey to black colour.



**Figure 2**. Banded-winged whitefly puparium. Magnification x 55. © UK Crown copyright – Courtesy of Fera



**Figure 3.** Glasshouse whitefly puparium. Magnification x 55. © UK Crown copyright – Courtesy of Fera



**Figure 4.** Banded-winged whitefly puparium with extensive dorsal pigmentation. Magnification x 55. © UK Crown copyright – Courtesy of Fera



**Figure 5.** Banded-winged whitefly puparium with two dorsal pigmented spots. Magnification x 55. © UK Crown copyright – Courtesy of Fera



**Figure 6.** Banded-winged whitefly adult with distinct zigzag banded wings. Magnification x 40. © UK Crown copyright – Courtesy of Fera



Figure 7. Glasshouse whitefly adult with clear white wings. Magnification x 40.  $\ensuremath{\mathbb{C}}$  UK Crown copyright – Courtesy of Fera



**Figure 8**. Banded-winged whitefly mature eggs are oval, lie flat on the leaf surface and are cream to yellow. Magnification x 75. © UK Crown copyright – Courtesy of Fera



**Figure 9**. Glasshouse whitefly mature eggs are elliptical, erect, and almost black. Magnification x 75. © UK Crown copyright – Courtesy of Fera

#### **Dispersal and Detection**

The adult whitefly is capable of flight and may also be blown by the wind, but they are not thought to travel long distances this way. Spread is more likely to be through trade, especially with plants. Eggs and nymphs are very small and difficult to detect and could be easily confused with other whitefly species.

The most common form of monitoring is with the use of yellow sticky traps. Whiteflies are attracted to these traps, which can be used to monitor adult densities and allow early

detection of whiteflies. *Trialeurodes abutiloneus* adults may be identified by looking for the distinctive bands on the wings. However, these wing patterns may be obscured by glue from the sticky traps or may be confused with native whitefly species with spotted wings. Therefore, species can only be confirmed by a laboratory.

Whitefly populations can also be detected by regularly checking the undersides of leaves for presence of whitefly eggs, nymphs, and adults. As well as looking for signs of infestations. Heavy infestations can lead to yellow spots, early leaf drop, stem dieback, and wilting. Besides the direct damage from feeding, the sugary honeydew egested by the whitefly can encourage sooty mould to grow on the leaves and fruit. This mould reduces the area for photosynthesis and lowers the value of ornamental plants and produce.

#### **Economic Impact**

*Trialeurodes abutiloneus* is an occasional pest in the USA, affecting ornamental plants and crops like cotton, soybeans, and various vegetables. This pest could harm field crops in southern Europe, as well as ornamental plants and protected crops in glasshouses in continental and northern Europe.

In the USA, this whitefly is considered a minor pest. It mainly causes problems by egesting honeydew, which leads to sooty mould that affects crop quality. Direct damage from feeding is rare and usually not severe. In the UK, the risk of direct impacts is considered to be small.

The adult whiteflies can also spread eight viruses: Abutilon yellows virus (AYV) (*Crinivirus abutilonis*), Blackberry yellow vein associated virus (BYVaV) (*Crinivirus rubi*), Diodia vein chlorosis virus (DVCV) (*Crinivirus diodiae*), Sweet potato chlorotic stunt virus (SPCSV) (Crinivirus ipomeae), Tomato chlorosis virus (ToCV) (*Crinivirus tomatichlorosis*), Tomato marchitez virus (ToMarV) (*Torradovirus marchitezum*), Tomato torrado virus (ToTV) (*Torradovirus lycopersici*), and Tomato chocolate virus (ToChV). These viruses can affect fruit yield and quality, cause dieback, stunting, and leaf yellowing. Little is known about this whitefly's impact as a virus carrier, and known associated viruses are not found in the UK.

### **Pest Management and Reporting**

In the USA, where *T. abutiloneus* occurs naturally, systemic compounds are used for its control. Work is also being conducted to develop varieties of crops, such as cotton and soybean, which are resistant to whitefly species, including *T. abutiloneus*.

Natural enemies attacking *T. abutiloneus* in its native range include the parasitoid wasp, *Eretmocerus staufferi*, the entomopathogenic fungus, *Orthomyces aleyrodes*, the predatory bug *Orius insidiosus* and a variety of coccinellid beetles. Although none of these are commercially sold in the UK, other *Eretmocerus* and *Orius* spp. are available, but their efficacy against *T. abutiloneus* is unclear.

Outbreaks of *T. abutiloneus* occurring in the UK should be eradicated by the destruction of infested material and/or insecticide applications, under the advice of the relevant authority (see below). Insecticides currently used for the eradication of outbreaks of *Bemisia tabaci*, the tobacco whitefly, are expected to be effective against *Trialeurodes abutiloneus*.

Suspected outbreaks of *T. abutiloneus* should be reported to the relevant authority:

# For **England and Wales**, contact your local **APHA Plant Health and Seeds Inspector** or the **PHSI Headquarters**, York.

Tel: 0300 1000 313

Email: planthealth.info@apha.gov.uk

For Scotland, contact the Scottish Government's Horticulture and Marketing Unit:

Email: hort.marketing@gov.scot

#### For Northern Ireland, contact the DAERA Plant Health Inspection Branch:

Tel: 0300 200 7847 Email: planthealth@daera-ni.gov.uk

Web: www.daera-ni.gov.uk/topics/plant-and-tree-health

For additional information on UK Plant Health please see:

planthealthportal.defra.gov.uk/pests-and-diseases/uk-plant-health-risk-register/

planthealthportal.defra.gov.uk/

www.gov.uk/plant-health-controls

www.gov.scot/Topics/farmingrural/Agriculture/plant/PlantHealth/PlantDiseases

www.daera-ni.gov.uk

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