GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Bemisia tabaci***

Bemisia tabaci 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Arthropoda	Insecta	Homoptera	Aleyrodidae

Common name

Weisse Fliege (German), sweet potato whitefly (English), cotton whitefly (English), mosca blanca (English, Dominican Republic)

Synonym

Aleyrodes tabaci , Gennadius
Aleyrodes inconspicua , Quaintance
Bemisia inconspicua , Quaintance
Bemisia emiliae , Corbett
Bemisia signata , Bodnar
Bemisia bahiana , Bondar
Bemisia costa-limai , Bondar
Bemisia gossypiperda , Misra and Lamba
Bemisia achyranthes , Singh
Bemisia hibisci , Takahashi
Bemisia longispina , Priesner and Hosny
Bemisia gossypiperda , var. *mosaicivectura* Ghesquiere
Bemisia goldingi , Corbett
Bemisia nigeriensis , Corbett
Bemisia rhodesiaensis , Corbett
Bemisia tabaci , (Gennadius) Takahashi
Bemisia manihotis , Frappa
Bemisia vayssierei , Frappa
Bemisia (Neobemisia) hibisci , Visnya
Bemisia (Neobemisia) rhodesiaensis , Visnya
Bemisia lonicerae , Takahashi
Bemisia minima , Danzig
Bemisia miniscula , Danzig

Similar species

Trialeurodes vaporariorum

Summary

Bemisia tabaci has been reported from all continents except Antarctica. Over 900 host plants have been recorded for B. tabaci and it reportedly transmits 111 virus species. It is believed that B. tabaci has been spread throughout the world through the transport of plant products that were infested with whiteflies. Once established, B. tabaci quickly spreads and through its feeding habits and the transmission of diseases, it causes destruction to crops around the world. B. tabaci is believed to be a species complex, with a number of recognised biotypes and two described extant cryptic species.

view this species on IUCN Red List

Species Description
Eggs, deposited on the underside of leaves, (Note: circular egg deposition for *Bemisia* is rare) are tiny, oval-shaped, about 0.25mm in diameter and stand vertically on the leaf surface. Newly laid eggs are white then turn brownish. Upon hatching the first instar nymph (0.3mm in length), commonly called the “crawler”, moves about the leaf in search of a place to insert its needle-like mouthparts into the plant to suck up plant phloem. When the crawler finds this site, it molts to the second instar; its legs are pulled up under its body and the rest of the immature stage is sessile. There are three additional nymphal instars (0.4-0.8mm) with the successive stage molting to a slightly larger form. The last nymphal instar develops red eye spots and is commonly called the “red-eyed nymph.” This stage is often incorrectly called the pupal stage; incorrect because insects in this order Hemiptera have incomplete metamorphosis, thus there is no pupa. Throughout the nymphal stages, the body of the whitefly is opaque white in colour and is covered by a waxy exoskeleton. As nymphs feed, they excrete large quantities of liquid waste in the form of honeydew. Honeydew is rich in plant carbohydrates and as whiteflies feed and excrete, this waste is distributed onto plant leaves, flowers and fruit and supports the growth of sooty mould fungus, causing the plant to turn black. Adult whitefly are about 1mm long with two pairs of white wings and light yellow bodies. Their bodies are covered with a waxy powdery material. While whitefly adults can be seen on all plant surfaces, they spend most of their time feeding, mating and ovipositing on the under surfaces of leaves. Males and females are present, typically in even ratios, and mating takes place after an elaborate courtship period. Whiteflies have an interesting biology (called arrhenotoky) in which females can lay eggs that have not been fertilised and these eggs will result in male offspring. Fertilised eggs will result in female offspring. Each female can produce as many as 200 eggs in her lifetime.. It takes 30-40 days to develop from egg to adult, depending on the temperature (OISAT, 2004). The EPPO (2004) states that, \"Infested plants may exhibit a range of symptoms due to direct feeding damage, contamination with honeydew and associated sooty moulds, whitefly-transmitted viruses and phytotoxic responses. There may be one, or a combination of the following symptoms: chlorotic spotting, vein yellowing, intervein yellowing, leaf yellowing, yellow blotching of leaves, yellow mosaic of leaves, leaf curling, leaf crumpling, leaf vein thickening, leaf enations, leaf cupping, stem twisting, plant stunting, wilting and leaf loss. Phytotoxic responses such as a severe silvering of courgette and melon leaves usually indicate the presence of a *Bernisia argentifolii* infestation.\"
Please see PaDIL (Pests and Diseases Image Library) Species Content Page *Bugs: Silverleaf whitefly* for high quality diagnostic and overview images.

Notes
Considerable research has been done on the taxonomy of *Bemisia tabaci*, and Perring (2001) proposed 7 distinct groups within the complex. *Bernisia tabaci* is believed to be a species complex, with a number of recognised biotypes and two described extant cryptic species. Nineteen biotypes have been identified based on non-specific esterase banding patterns (biotypes A-T), and the two described species are *Bernisia tabaci* and *Bemisia argentifolii* Bellows and Perring (Bellows *et al.* 1994). *B. argentifolii* carries the common name of silverleaf whitefly.

Lifecycle Stages
McAuslane (2000) outlines the life cycle of *Bemisia tabaci* stating that, \"*Bernisia tabaci* eggs are oval in shape and somewhat tapered towards the distal end. The egg is pearly white when first laid but darkens over time. At 25 ºC, the eggs will hatch in six to seven days. The first nymphal instar is capable of limited movement and is called the crawler. The dorsal surface of the crawler is convex while the ventral surface, appressed to the leaf surface, is flat. The crawlers usually move only a few centimeters in search of a feeding site but can move to another leaf on the same plant. After they have begun feeding, they will molt to the second nymphal instar, usually two to three days after eclosion from the egg. The second, third and fourth nymphal instars are immobile with atrophied legs and antennae, and small eyes. The nymphs secrete a waxy material at the margins of their body that helps adhere them to the leaf surface. The second and third nymphal instars each last about two to three days. The red-eyed nymphal stage is sometimes called the \"pupal stage\". There is no molt between the fourth nymphal instar and the red-eyed nymphal stage but there are morphological differences. The fourth and red-eyed nymphal stages combined lasts for five to six days. The stage gets its name from the prominent red eyes that are much larger than the eyes of earlier nymphal instars.\" Adult females insert their eggs into the foliage of host plants and the newly-hatched nymphs settle for larval life with little movement on the plant chosen by the parent. Winged adults fly about, however, and move between crops (Byrne *et al.*. 1996). Individual females often feed on a variety of different plants, including crops and weeds within crops (Byrne *et al.* 1990). The species of plants fed upon differ in quality, and while some plant species are best for survival, others are better for egg production (Costa *et al.* 1991). Adults live for a week or more (Byrne & Bellows 1991) and much of the egg production depends on the food ingested during adulthood.\"

Habitat Description
The EPPO (2004) states that, \"*Bemisia tabaci* are usually detected by close examination of the undersides of leaves, which will reveal adults and/or nymphs. Shaking the plant may disturb the small white adults, which flutter out and quickly resettle. Adults may also be found on sticky traps placed above infested plants.\"

General Impacts
600 host plants have been cited in, Oliveira *et al.* (2001). *Bemisia tabaci* possibly originated in India (Fishpool & Burban, 1994) and as a result of widespread dispersal, particularly during the last 15 years, is now distributed nearly worldwide. *B. tabaci* is also a vector of over 100 plant viruses in the genera *Begomovirus* (Geminiviridae), *Crinivirus* (Closteroviridae) and *Carlavirus* or *Ipomovirus* (Potyviridae) (Jones, 2003). Damage is caused not only by direct feeding, but also through transmission of viruses. *Begomoviruses* are the most numerous of the *B. tabaci* transmitted viruses and can cause crop yield losses of between 20% and 100% (Brown & Bird, 1992). The EPPO (2004) states that, \"Since the early 1980s, *B. tabaci* has caused escalating problems to both field and protected agricultural crops and ornamental plants. Heavy infestations of *B. tabaci* and *B. argentifolii* may reduce host vigour and growth, cause chlorosis and uneven ripening, and induce physiological disorders. The larvae produce honeydew on which sooty moulds grow, reducing the photosynthetic capabilities of the plant, resulting in defoliation and stunting. *B. tabaci* is known to be a potentially damaging pest of crops such as cotton, brassicas, cucurbits, okra, solanums in the tropics and subtropics (Goolsby *et al.* 2004). Ellsworth and Martinez-Carrillo (2001) state that, \"*B. tabaci*'s small size belies its ability to move relatively large distances locally, placing many hosts within communities at risk of infestation. This ability to disperse is made worse by its extensive movement through commerce of plant products around the globe. The small size and rapid reproductive potential are other characteristics that result in explosive population growth. The damage potential of this pest as a direct plant stressor, virus vector, and quality reducer (e.g., by contamination with excreta) is substantial. These attributes, among others, render this species a shared pest within agricultural communities.\" Cassava mosaic disease (CMD) and cassava mosaic *geminiviruses* (CMGs) are transmitted by the whitefly (Colvin *et al.* 2004) destroying cassava crops. Cassava (*Manihot esculenta*) is one of the most widely grown staple food crops in sub-Saharan Africa. It is particularly important to the poorest farmers because of its role in food security and as a source of income. Agriculture in tropical and subtropical regions are most threatened, with crops such as beans, cucurbits, peppers, cassavas and tomatoes particularly being affected (Brown, 1994). Tomato yellow leaf curl virus (TYLCV) limits tomato production in several geographic regions, including the Middle East and Far East (Zeidan *et al.* 1998).

Management Info
Integrated Pest Management: The *Whitefly IPM Project* provides a paradigm for future work on cassava mosaic begemoviruses and whiteflies on cassava in both Africa and elsewhere. Ellsworth and Martinez-Carrillo (2001) offer an extensive integrated management approach. The report details the exact plans and steps that are necessary to adopt and follow through with the integrated pest management guidelines suggested. A summary of the guidelines sketches out the steps to be taken.
For details on preventative measures, chemical, physical, cultural and biological control options, please see *management information*.

Principal source: *Diagnostic protocols for regulated pests: Bemisia tabaci* (EPPO, 2004)
Ellsworth and Martinez-Carrillo, 2001 IPM for *Bemisia tabaci*: a case study from North America.

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ALIEN RANGE

[1] AFRICA
[1] AUSTRALIA
[1] BERMUDA
[1] BURKINA FASO
[1] CANADA
[1] COSTA RICA
[1] DOMINICAN REPUBLIC
[1] EGYPT
[1] EUROPE
[1] FRENCH POLYNESIA
[1] GREECE
[1] INDIA
[1] IRAN, ISLAMIC REPUBLIC OF
[1] JAMAICA
[1] JORDAN
[1] LATIN AMERICA
[1] MEDITERRANEAN AREA
[1] MEXICO
[1] NEW CALEDONIA
[1] PAKISTAN
[1] PAPUA NEW GUINEA
[1] PUERTO RICO
[1] SAINT KITTS AND NEVIS
[1] SAMOA
[1] SOUTH AMERICA
[1] TANZANIA, UNITED REPUBLIC OF
[1] TURKEY
[19] UNITED STATES
[1] ATLANTIC - WESTERN CENTRAL
[1] BANGLADESH
[1] BRAZIL
[1] BURUNDI
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[1] CURACAO
[1] EAST AFRICA
[1] EL SALVADOR
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[1] INDONESIA
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[1] JAPAN
[1] KIRIBATI
[1] MALTA
[1] MEDITERRANEAN & BLACK SEA
[1] MICRONESIA, FEDERATED STATES OF
[1] NIUE
[1] PALAU
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[1] REUNION
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[1] SUDAN
[1] THAILAND
[1] UGANDA
[1] VANUATU

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General information

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Summary: An online database that provides taxonomic information, common names, synonyms and geographical jurisdiction of a species. In addition links are provided to retrieve biological records and collection information from the Global Biodiversity Information Facility (GBIF) Data Portal and bioscience articles from BioOne journals.
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Summary: The Pacific Islands Pest List Database (PLD) stores records of pests that are currently known to affect agriculture, forestry and the environment in Pacific Island countries and territories (PICTs).
PLD is available from: http://www.spc.int:8088/pld/index.jsp
This distribution report is available from: http://www.spc.int:8088/pld/report? action=8&searchString=bemisia&pest=1171 [Accessed 5 October 2005]

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