

Data Sheets on Quarantine Pests

*Aleurocanthus spiniferus***IDENTITY****Name:** *Aleurocanthus spiniferus* (Quaintance)**Synonyms:** *Aleurodes spinifera* Quaintance
Aleurodes citricola Newstead
Aleurocanthus citricolus (Newstead)
Aleurocanthus rosae Singh**Taxonomic position:** Insecta: Hemiptera: Homoptera: Aleyrodidae**Common names:** Orange spiny whitefly, spiny blackfly (English)
Aleurode épineux du citronnier (French)**Bayer computer code:** ALECSN**EPPQ A1 list:** No. 186**EU Annex designation:** II/A1, under "*Aleurocanthus* spp."**HOSTS**

Citrus spp. are the main hosts of economic importance but *A. spiniferus* has been recorded on other crops, for example grapes (*Vitis vinifera*), guavas (*Psidium guajava*), pears (*Pyrus* spp.), persimmons (*Diospyros kaki*) and roses (*Rosa* spp.). *A. spiniferus* occurs throughout much of the Asian range of *A. woglumi* and possibly shares many of its hosts.

The potential host range in the EPPQ region would be essentially citrus, with some possibility of establishment on other woody plantation crops growing in the southern part of the region in climatic conditions suitable for the pest.

GEOGRAPHICAL DISTRIBUTION

A. spiniferus originated in south-east Asia and has spread widely in tropical and subtropical Asia, and into Africa and the Pacific. Its range overlaps that of *A. woglumi* in many regions, but it has not been introduced into the American continent.

EPPQ region: Absent.**Asia:** Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China (Fujian, Guangdong, Hunan, Jiangsu, Yunnan, Zhejiang), Hong Kong, India (Assam, Bihar, Karnataka, Maharashtra, Tamil Nadu, Uttar Pradesh), Indonesia (Java, Sumatra), Japan (Honshu, Kyushu, Ryukyu Archipelago, Shikoku), Korea Democratic People's Republic, Korea Republic, Lao, Macau, Malaysia (Peninsular, Sabah, Sarawak), Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Viet Nam.**Africa:** Kenya, Mauritius, Nigeria, South Africa, Swaziland, Tanzania (including Zanzibar), Uganda.**North America:** USA (Hawaii only).**South America:** Absent. Records in the literature are based on misidentifications (Weems, 1974).

Oceania: Australia (Northern Territory, Queensland), Guam, Micronesia, Northern Mariana Islands, Papua New Guinea.

EU: Absent.

Distribution map: See CIE (1990, No. 112).

BIOLOGY

In tropical conditions all stages of *A. spiniferus* may be found throughout the year, but little breeding occurs during cold periods. The biology of *A. spiniferus* is essentially similar to that of *A. woglumi* (EPPO/CABI, 1996) as follows. Eggs, laid in a spiral path on leaf undersides in batches of 35-50, hatch in 4 to 12 days depending on conditions. Active, black, flattened six-legged crawlers (nymphs) emerge. They disperse for a short time, staying mainly on lower leaf surfaces to avoid strong sunlight. The crawlers then insert their mouthparts into the leaves and begin sucking phloem sap. They then moult, losing their legs in the process, to become minute, flattened, oval bodies attached to the leaf by their mouthparts. Immature stages often form dense colonies of up to several hundred individuals on a single leaf. After two more moults the adults emerge. Both sexes are winged and feed by sucking phloem sap. Each female may lay 35-100 or more eggs in her lifetime. Depending on conditions, the life cycle generally takes 2-4 months but there can be three to six overlapping generations a year.

In the very similar *A. woglumi*, development is most favoured by temperatures of 20-34°C (optimum 25.6°C) and relative humidities of 70-80%. The species does not survive at temperatures below freezing and is not found in areas with temperatures of 43°C or over. The occurrence of *A. woglumi* and *A. spiniferus* on citrus in Kenya, at lower and higher altitudes respectively, suggests these species may differ in their ecological tolerances. It may also be noted that *A. spiniferus* occurs further north in Asia than *A. woglumi* (Jiangsu and Shandong provinces in China; Japan, Korea).

DETECTION AND IDENTIFICATION

Symptoms

Dense colonies of immature stages develop on leaf undersides; the adults fly actively when disturbed. Leaves and fruit have spots of sticky, transparent honeydew, which become covered in black sooty mould fungus. A heavy infestation gives trees an almost completely black appearance.

Morphology

Eggs

Elongate-oval to kidney-shaped, 0.2 mm long, laid in a very characteristic spiral pattern, attached to the underside of leaves by a short pedicel; yellowish at first, turning darker to brown and black as the embryo develops.

Nymph

1st instar: 6-legged, elongate, 0.3 x 0.15 mm, dusky in colour, with 2 long and several shorter, radiating spiny filaments.

2nd instar: No legs, ovate-convex, 0.4 x 0.2 mm, dark-brown to pale-black with yellow markings, with easily distinguished, radiating spiny filaments.

3rd instar: More ovate, 0.74-0.87 mm, generally black with a rounded, greenish spot on the anterior part of the abdomen, spiny filaments obvious.

4th instar = "puparium": Ovate, shiny-black, females about 1.25 mm in diameter, males slightly smaller, up to 1 mm in diameter. Dorsal surface with many long, acute glandular spines; insect surrounded by a white fringe of waxy secretion. Exuviae of earlier instars often remain stacked up on median area of immature insect.

Authoritative identification of *Aleurocanthus* spp. involves detailed microscopic study of external puparial morphology by a specialist.

Adult

A. spiniferus resembles *A. woglumi*, as follows. Females about 1.7 mm in length, males up to 1.35 mm long: at rest, the general appearance is metallic grey-blue, being the colour of the wings which cover most of the body; light markings on the wings appear to form a band across the middle of the red abdomen. The eyes are reddish-brown and the antennae and legs are white with pale-yellow markings.

MEANS OF MOVEMENT AND DISPERSAL

Adults of *Aleurocanthus* spp. are capable of limited down-wind flight but this is not a major means of long-range dispersal (Meyerdink *et al.*, 1979). The whiteflies are most likely to be moved between countries on planting material of citrus or other host species, or possibly on fruits. Species of *Aleurocanthus* have been intercepted on the leaves of infested host plants moving in international trade (e.g. USDA, 1988).

PEST SIGNIFICANCE

Economic impact

A. spiniferus excretes copious amounts of sugary honeydew, which coats leaf and fruit surfaces. Sooty mould fungus develops on the honeydew, reducing respiration and photosynthesis and rendering plants and fruit unsightly and unsaleable. Badly contaminated foliage may drop. Nitrogen levels in infested leaves are reduced and young leaf growth is damaged by heavy infestations. Fruit set may be reduced. *A. spiniferus* is regarded as a threat to citrus in Swaziland and South Africa, and requires control in Japan and other Pacific countries. It has not been recorded as a glasshouse pest.

Control

Chemical control of *A. spiniferus* is possible but biological control, using hymenopteran parasites, has proved more economic and effective in several parts of the world (Smith, 1945; Quezada, 1974; Clausen, 1978). *Encarsia smithi* (Silvestri) and *Amitus hesperidum* have been used to control *A. spiniferus* in Japan and Guam (Clausen, 1978) and in Ponape, Federated States of Micronesia (Muniappan *et al.*, 1992).

Phytosanitary risk

A. spiniferus has recently been added to the EPPO A1 list and is also a quarantine pest for NAPPO. It presents a risk to citrus in Mediterranean countries. It has a well documented history of spread to new continents from its south-east Asian origin. It appears to be fairly well restricted by natural enemies in its native range, but is liable to cause problems if introduced into new areas.

PHYTOSANITARY MEASURES

The measures recommended by EPPO for *A. woglumi* would also be appropriate for *A. spiniferus* (EPPO/CABI, 1996).

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