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Data Sheets on Quarantine Pests

Diaphorina citri

IDENTITY

Name: *Diaphorina citri* Kuwayana
Taxonomic position: Insecta: Hemiptera: Homoptera: Psyllidae
Common names: Citrus psyllid (English) Psylle de l'oranger (French) Psilideo de l'aranjeira (Portuguese)
Bayer computer code: DIAACI
EPPO A1 list: No. 37
EU Annex designation: II/A1

HOSTS

D. citri is confined to Rutaceae, occurring on wild hosts as well as on *Citrus*, especially lemons (*C. limon*) and limes (*C. aurantiifolia*). *Murraya paniculata*, a rutaceous plant often used for hedges, is a preferred host. Within the EPPO region, the host species are generally confined to countries surrounding the Mediterranean.

GEOGRAPHICAL DISTRIBUTION

The distribution of *D. citri* is wider than that of citrus greening bacterium, the major pathogen which it transmits (EPPO/CABI, 1996a), since it occurs in Afghanistan, Bangladesh, Brazil, Hong Kong, Japan, Macau, Myanmar, Singapore and Sri Lanka where the bacterium has not been recorded.
EPPO region: Absent.
Asia: Afghanistan, Bangladesh, Cambodia (unconfirmed), China (Fujian, Guangdong, Guangxi, Henan, Zhejiang), Hong Kong, India (Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Punjab, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal), Indonesia (Java, Kalimantan, Maluku, Sulawesi, Sumatra), Japan (Ryukyu Islands), Lao, Macau, Malaysia (Peninsular, Sabah), Myanmar, Nepal, Pakistan, Philippines, Saudi Arabia, Singapore, Sri Lanka, Taiwan, Thailand, Viet Nam.
Africa: Mauritius, Réunion.
Central America and Caribbean: Honduras (intercepted on fruits exported to France).
South America: Brazil (Amazonas, Bahia, Ceará, Pará, Pernambuco, Rio de Janeiro, São Paulo), Paraguay, Uruguay.
EU: Absent.
Distribution map: See CIE (1974, No. 334).

BIOLOGY

D. citri (Catling, l970) has a short life cycle and high fecundity. It is more prevalent in hot coastal areas. Pairing starts soon after emergence, the insects being most active during

March to April in India (Pande, 1971) and May to June in the Philippines (Catling, 1970). Eggs are laid singly from March to May inside half-folded leaves of the buds, in leaf axils or other suitable places on the young tender parts of the tree. Females have a pre-oviposition period of about 12 days, and are capable of laying up to 800 eggs within 2 months. Eggs hatch within 3-23 days (in summer or winter, respectively) and nymphs pass through five instars in 11-30 days. In an insectary, at 25-26°C, females laid eight eggs per day, and nymphal development took 11-15 days. In dry periods, adults are numerous, but nymphs usually absent. The complete life cycle thus takes l4-48 days, there being up to ten overlapping generations per year. The adults overwinter and can live for up to 6 months. They are very active and jump on the slightest disturbance. Nymphs will move away when disturbed but normally lead a sedentary existence clustered in groups. Population fluctuations are closely correlated with flushing rhythm of citrus trees, since eggs are laid exclusively on young flush points.

Yang (1989) carried out a recent investigation on the effects of light, temperature and humidity on development, production and survival of *D. citri*. Xu *et al.* (1994) reported on the longevity of nymphs and adults in Fujian province (China) and recorded that nymphs were killed by -1°C for 1 and adults by -10°C.

D. citri transmits the Asian form of citrus greening bacterium under natural conditions in Asia (including Saudi Arabia) (Capoor *et al*., 1967). It has been shown experimentally that *D. citri* is also able to transmit the African form (Lallemand *et al*., 1986). In Mauritius and Réunion, where both forms occur, *D. citri* probably transmits both.

DETECTION AND IDENTIFICATION

Symptoms

D. citri stunts and twists young shoots, so that the growing tips present a rosetted appearance, Leaves are badly curled, and may be covered with honeydew and sooty mould; leaves drop prematurely.

Morphology

Eggs

Orange-coloured and almond-shaped; 0.01-0.15 mm.

Nymph

Light-yellow to dark-brown, bearing well-developed wing pods.

Adult

2.5 mm long, body yellowish-brown, legs greyish-brown. Wings are transparent with white spots or light-brown with a broad, beige, longitudinal band in the centre.

MEANS OF MOVEMENT AND DISPERSAL

D. citri is only liable to be locally spread by natural dispersal. Citrus material (budwood, grafted trees, rootstock seedlings) from infected areas can carry eggs and/or nymphs over longer distances. Such 5th or 6th-instar nymphs, as well as the adults born from these nymphs, are capable of transmitting the greening agent to citrus. This is probably the way by which the Asian form of citrus greening bacterium was introduced into Saudi Arabia. The rutaceous plant *Murraya paniculata*, frequently used as an ornamental bush or hedge, is one of the best hosts of *D. citri*. This plant can carry eggs or nymphs of the vector and therefore its introduction into disease and vector-free regions could be dangerous. Entry on citrus fruits is extremely unlikely.

PEST SIGNIFICANCE

Economic impact

The main economic importance of *D. citri* is as the vector of the very serious citrus disease caused by citrus greening bacterium (EPPO/CABI, 1996a). In addition, *D. citri* typically causes defoliation and dieback. Serious damage to growing points can occur, which can lead to dwarfing as well as lack of juice and taste in fruit. Heavy *D. citri* populations can cause blossom and fruitlet drop.

Control

Dimethoate is used against *D. citri* in orchards with low infection rates. Dahiya *et al.* (1994) report on trials on 12 insecticides (organophosphorus compounds and pyrethroids) against *D. citri.* In Réunion, *D. citri* has been successfully controlled by the introduction of a parasite (*Tamarixia radiata*, from India) (Aubert *et al*., 1980). Chien *et al*. (1989) also report on the successful release of this parasite in Taiwan, where it is used in IPM programmes. In Saudi Arabia, however, *T. radiata* is present but does not keep *D. citri* populations down to a low level.

Phytosanitary risk

Like the other vector of citrus greening (*Trioza erytreae*; EPPO/CABI, 1996b), *D. citri* is listed as an A1 quarantine pest by EPPO (OEPP/EPPO, 1988) and is also a quarantine pest for CPPC and OIRSA. It could probably establish and spread in Mediterranean countries without difficulty. Besides its role in citrus greening, this psyllid has significant damage potential in itself. Though biological control may be possible, there is no guarantee that it could keep populations to a sufficiently low level to prevent transmission of greening.

PHYTOSANITARY MEASURES

EPPO recommends (OEPP/EPPO, 1990) that importation of plants for planting and cut branches of citrus from countries where citrus greening bacterium or either of its vectors occur should be prohibited. It is possible to fumigate citrus budwood material against *D. citri* (FAO, l983).

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