EPPO Datasheet: *Scirtothrips citri*

Last updated: 2022-07-08

IDENTITY

Preferred name: *Scirtothrips citri*
Authority: (Moulton)
Taxonomic position: Animalia: Arthropoda: Hexapoda: Insecta: Thysanoptera: Thripidae
Other scientific names: *Euthrips citri* Moulton
Common names: California citrus thrips, citrus thrips
view more common names online...
EPPO Categorization: A2 list
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EU Categorization: Quarantine pest ((EU) 2019/2072 Annex II A)
EPPO Code: SCITCI

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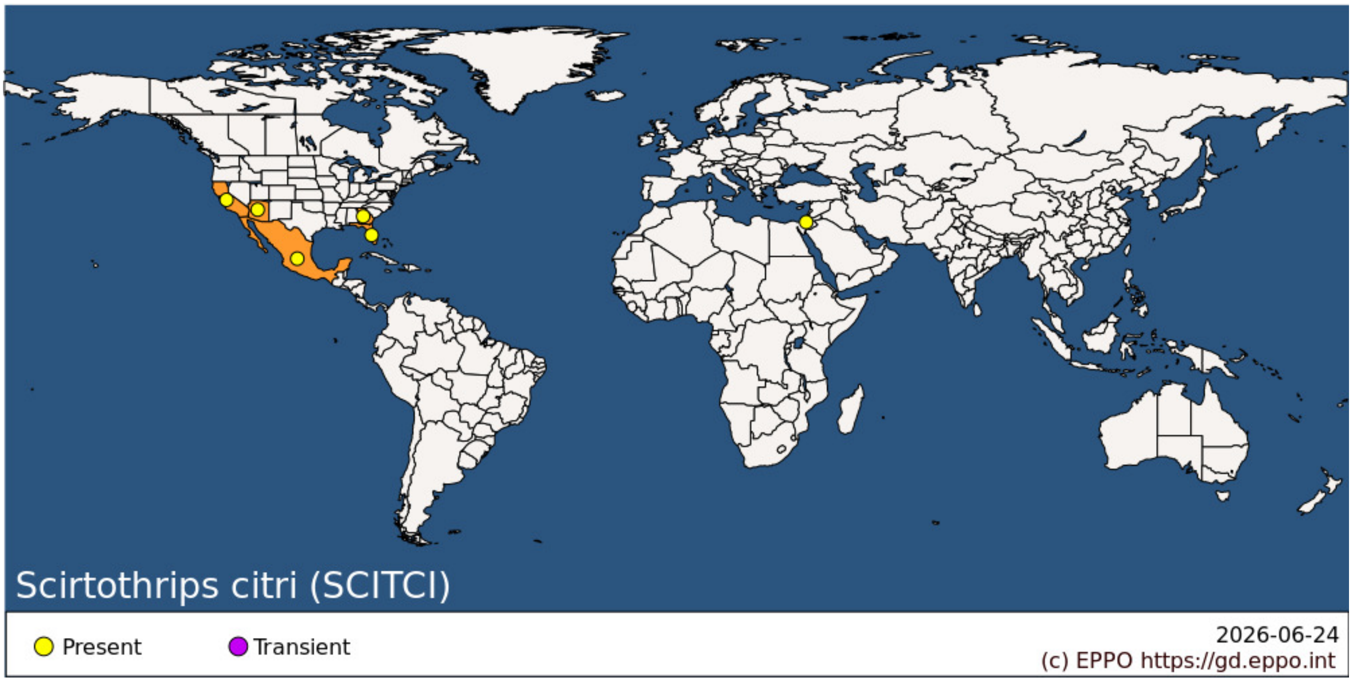
HOSTS

Scirtothrips citri (Moulton), also commonly known as 'Citrus thrips' but not to be confused with 'South African citrus thrips' (*Scirtothrips aurantii* Faure) is primarily a pest of *Citrus* and blueberries. *S. citri* has a broad host range: overall, *S. citri* has been found on over 50 plant species. However, many are likely to not be hosts on which the life cycle can be completed. Its native host plant is possibly one or more species of *Quercus* (Bailey, 1964), or more likely *Rhus laurina* (Morse, 1995).

Host list: *Adenostoma fasciculatum*, *Carya illinoinensis*, *Citroncirus*, *Citrus medica*, *Citrus reticulata*, *Citrus trifoliata*, *Citrus x aurantiifolia*, *Citrus x aurantium var. clementina*, *Citrus x aurantium var. paradisi*, *Citrus x aurantium var. sinensis*, *Citrus x aurantium var. unshiu*, *Citrus x limon*, *Citrus*, *Coffea arabica*, *Dahlia imperialis*, *Fortunella*, *Gossypium hirsutum*, *Larrea tridentata*, *Magnolia tripetala*, *Magnolia*, *Mangifera indica*, *Medicago sativa*, *Myrtus*, *Phoenix dactylifera*, *Prosopis*, *Quercus*, *Rhizophora mangle*, *Rhus laurina*, *Rosa*, *Salix*, *Schinus molle*, *Simmondsia chinensis*, *Umbellularia californica*, *Vaccinium corymbosum*, *Vaccinium hybrids*, *Vitis vinifera*, *x Citrofortunella microcarpa*

GEOGRAPHICAL DISTRIBUTION

Scirtothrips citri is found in warm climates that are ranging from tropical to arid conditions. It is known to be found in North America in the USA and Mexico. There are some uncertainties on the distribution outside of North America. In 2022, it was first found in the EPPO region in Israel.



EPPO Region: Israel
Asia: Israel
North America: Mexico, United States of America (Arizona, California, Florida, Georgia)

BIOLOGY

Scirtothrips citri has a short life cycle and high fecundity. Each adult female lays about 25 eggs embedded in the new leaf tissue or young fruit. *Scirtothrips* have four developmental stages: two actively feeding immature instars (first and second instar larva), two non-feeding immature instars (prepupa and pupa) and the feeding adults. *S. citri* adults can live as long as 25-30 days under warm conditions and could live longer under cooler conditions, but do not develop below 14°C. Citrus thrips can produce 8-12 generations per year. In California, overwintering eggs from the previous season hatch in March as the new leaf flush begins (Grafton-Cardwell *et al.*, 2020). Larvae feed actively on tender leaves and fruit, especially under the sepals of young fruit. The pre-pupal and pupal phase is spent in cracks in the bark of trees or on the ground. The lifecycle can be completed in 2-3 weeks during summer.

DETECTION AND IDENTIFICATION

Symptoms

Citrus thrips are thigmotactic, they like hiding in tight spaces. This behaviour results in thrips hiding/feeding under the sepals of young developing fruit. Feeding damage often results in a conspicuous ring of scarred tissue around the apex of young fruits. If the infestation is not controlled the silvery-textured damage on the rind can spread to a broader region of the fruit, greatly reducing its marketability. Most economic damage to fruits occurs in the first 2-8 weeks after petal fall. Citrus thrips cause surface rind damage reducing the economic value of citrus. Heavily scarred fruits show more rapid weight loss than undamaged fruits and it is likely that the indirect effect of citrus thrips feeding on immature fruit may advance fruit maturity (Arpaia & Morse, 1991). Damage is greatest to fruits on the outside of the canopy (Olendorf *et al*., 1994).

Morphology

Members of the genus *Scirtothrips* are readily distinguished from all other Thripidae by the following characteristics: antennae 8-segmented, sense cones forked; head transversely striate with 3 pairs of ocellar setae; pronotum transversely striate with 4 pairs of posteromarginal setae; mesonotum with median pair of setae arising well in front of the posterior margin; metanotum with median pair of setae at or near to anterior margin of the plate; abdominal tergites with regular microtrichial fields on lateral thirds, tergite VIII with well-developed posteromarginal comb; sternites with marginal setae arising at posterior margin; males with sternal glandular areas not developed. At present, 106 extant *Scirtothrips* species are known (ThripsWiki, 2020). In summary, *S. citri* may be characterised by the following structures.

Larvae

First-instar larvae are very small, and translucent whereas second-instar larvae are about the size of adults, spindle-shaped, and wingless.

Adults

Adult thrips are orange yellow insects with fringed wings. Living adults that are feeding on citrus are usually pale-yellow, but when feeding on other plants the body contents may be orange. Females measure 0.6-0.88 mm and have a wider abdomen then males. Unlike *S. aurantii*, males of *S. citri* do not have a pair of dark lateral processes (drepanae) on the ninth abdominal tergite. Females have the following characters: median ocellar setae on head usually arising close together behind the first ocellus; forewing posteromarginal cilia wavy not straight; median abdominal sternites without microtrichia medially; abdominal tergites and sternites pale, without a transverse anterior dark line.

Detection and inspection methods

Scirtothrips spp. primarily infest young growing buds, so these should be examined particularly carefully. *S. citri* adults are ~1mm long, orange yellowish with fringed wings. Immature stages feed on the young flush of leaves and are usually found on new flush or at the base of the young developing fruit. A hand lens, 10-20x is required to clearly see the thrips. It is important to distinguish *S. citri* from Western Flower Thrips (*Frankliniella occidentalis*) which can be present in field at the same time. Thrips can be monitored by tapping a flush point (citrus) onto a white sheet of paper. For citrus, the base of the young fruit from branches on the outside of the canopy in good sunlight should be monitored to determine percentage infestation. Treatment recommendations are based on percentage infested fruit and can vary based on growing regions, citrus variety, presence of beneficial insects, and weather conditions. Young fruits are most vulnerable, and the treatment threshold is higher as the fruit grows and rind thickens. Furthermore, younger trees and new flush points attract more thrips to the tree.

The EPPO Diagnostic Protocol for *S. aurantii, S. citri* and *S. dorsalis* provides recommendations on how to detect and identify the pest (EPPO Standard PM 7/56, 2005). Detailed protocols for surveillance, sampling and detection are indicated in the EFSA pest survey card (EFSA, 2019).

PATHWAYS FOR MOVEMENT

The potential of *Scirtothrips* spp. for natural spread is relatively limited. In international trade, *S. citri* could be carried on host plants for planting (on young leaves or in the growing medium attached) as well as on cut flowers or cut foliage), but in fact no interceptions of *S. citri* have been reported in trade (EFSA, 2018; Australian Government, 2017). Unlike many Thysanoptera, *Scirtothrips* spp. seem to require access to soft green tissues, except when pupating in bark or on soil. So only seedlings or cuttings with young growing leaf buds are liable to carry these pests. As only young fruits are attacked, the risk of *S. citri* being carried on harvested fruits is small.

PEST SIGNIFICANCE

Economic impact

At least ten species of *Scirtothrips* are known as pests of various crops in different parts of the tropics, but most of them have restricted geographic ranges and tropical host plants, such as *S. kenyensis* which damages tea and coffee in Eastern Africa, or *S. manihoti* which causes serious leaf distortion of cassava in Central and South America. *Scirtothrips* spp. are particularly associated with plants that are growing actively in warm, dry conditions; they are usually more abundant on terminal shoots rather than within the canopy of a tree. Along with *S. aurantii* and *S. dorsalis*, *S. citri* is, as a pest of citrus, one of the most important *Scirtothrips* species for international agriculture. Feeding injury by these three pests results in scarring of the rind tissue in a fairly uniform ring that encircles the stem end, subsequently, reducing the market value of fresh citrus.

S. citri is of greatest importance on navel oranges in the San Joaquin Valley, California, and also on lemons in desert and coastal areas in California. As damage is cosmetic rather than affecting fruit yield, control is only recommended when significant levels of fruit damage are anticipated, not when foliar damage alone is observed (Olendorf *et al.*, 1994, Cass *et al.*, 2019; Grafton-Cardwell *et al.* 2020). *S. citri* is not reported as a citrus pest in Florida (Childers & Nakahara, 2006).

In recent years, citrus thrips has found a new host, becoming a key pest of blueberries in the San Joaquin Valley (Haviland *et al.*, 2016). Damage in blueberry consists of curling and abnormal growth of new leaves, as well as scarring of new twigs, which may reduce fruit yield the following year (Haviland *et al.*, 2016).

No damage is reported on the other hosts mentioned in the literature.

Control

A wide range of insecticides is employed for management of *S. citri* on citrus in San Joaquin Valley of California from petal fall until the fruit size is approximately 3 cm in diameter and the rind thickens. Treatment thresholds vary by the growing region, citrus cultivar, presence of beneficial mites, fruit growth stage and the type of insecticide applied. Navel oranges are susceptible to citrus thrips and have a lower threshold than other *Citrus* species. Similarly, an orchard sheltered from wind damage has a lower threshold compared to an orchard with a history of fruit on the outside of the canopy scarring from seasonal winds. An Integrated Pest Management (IPM) approach combines monitoring for pest populations and determining if spray is necessary and choosing a chemical that preserves natural enemies. Several insecticides including carbamates, organophosphates and pyrethroids are effective. Newer active substances such as pyrifluquinazon, spinetoram, spireotetramat, spinosad, abamectin, and cyantraniliprole are popular choices in recent years (Grafton-Cardwell *et al.* 2020). Insecticide resistance is easily induced but can be delayed if modes of action are rotated (Immaraju *et al.*, 1990). Insecticidal mixtures are not recommended. Spinosad and cyantraniliprole are less harmful to the predatory mite *Euseius tularensis* compared to other substances used to control *S. citri* (Grafton-Cardwell, 2019).

In blueberry production, fewer active substances are available than in citrus production, which makes control more problematic (Haviland *et al.*, 2016).

Phytosanitary risk

S. citri is a very polyphagous species. It could be introduced with host plants for planting, cut foliage or cut flowers. The occurrence of *S. citri* in citrus-growing areas with a subtropical or Mediterranean climate suggests that it could probably establish on citrus in Southern Europe and the Mediterranean area. *S. citri* is a damaging pest of citrus and blueberry, and requires specific control that may challenge current IPM practices.

PHYTOSANITARY MEASURES

Importation of citrus plants for planting is prohibited or restricted in many EPPO countries to prevent introduction of important pests. However, *S. citri* could be introduced with other plant species, as it is very polyphagous, and adults may be found on plants on which they may not complete their full life cycle. To prevent introduction of the pest, plants for planting should either be dormant (i.e., without leaves) with no growing medium attached or come from a pest-free area or a pest-free place of production. An insecticide treatment before shipping may also be an option.

Measures for cut flowers/foliage may not be justified as the risk of transfer to host plants at destination is limited.

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Datasheet history

This datasheet was first published in 1997 in the second edition of 'Quarantine Pests for Europe', and revised in 2022. It is now maintained in an electronic format in the EPPO Global Database. The sections on 'Identity', 'Hosts', and 'Geographical distribution' are automatically updated from the database. For other sections, the date of last revision is indicated on the right.

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