Prepared by CABI and EPPO for the EU under Contract 90/399003

Data Sheets on Quarantine Pests

Scirtothrips citri

IDENTITY

Name: *Scirtothrips citri* (Moulton)
Synonyms: *Euthrips citri* Moulton
Taxonomic position: Insecta: Thysanoptera: Thripidae
Common names: California citrus thrips (English)
Thrips des agrumes (French)
Trips de los cítricos (Spanish)
Orangenblasenfuss (German)
Notes on taxonomy and nomenclature: This North American species is currently not satisfactorily separated from several other less well-known species described from the southern parts of USA. Bailey (1964) distinguished these species mainly on colour characteristics, but these are possibly more variable than was previously considered, and thus unreliable as indicators of specific differences.
Bayer computer code: SCITCI
EPPO A1 list: No. 222
EU Annex designation: II/A1

HOSTS

Primarily a pest of *Citrus* in California (USA), this species has been taken from 53 different plant species; not all of these are likely to be breeding host plants and many, like *Citrus*, are not native Californian plants (Morse, 1995). Other crops on which it has been found include cotton (*Gossypium hirsutum*), dates (*Phoenix dactylifera*), grapevine (*Vitis vinifera*) lucerne (*Medicago sativa*) and pecans (*Carya illinoensis*), and also ornamentals such as *Magnolia* and *Rosa*. The native host plant is possibly one or more species of *Quercus* (Bailey, 1964), or more likely *Rhus laurina* (Morse, 1995).

GEOGRAPHICAL DISTRIBUTION

EPPO region: Absent.
North America: Known only from the southern parts of North America. Mexico (northern), USA (Arizona, California, Florida (on grapevine; Flowers, 1989)).
EU: Absent.
Distribution map: See CIE (1961, No. 138).

BIOLOGY

The life history and biology are essentially similar to those of *S. aurantii* (EPPO/CABI, 1996). Development does not occur below 14°C, but up to 8 generations can be produced in a year. Each female lays about 25 eggs in young tissues of leaves, fruits or green twigs; overwintering eggs are laid in the last flush growth of the season. Pupae are found on the ground or in crevices of bark.

DETECTION AND IDENTIFICATION

Symptoms

Feeding damage often results in a conspicuous ring of scarred tissue around the apex of young fruits. Most economic damage to fruits occurs in the first 3-6 weeks after petal fall, and heavily scarred fruits show more rapid weight loss than undamaged fruits (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 characters: surface of pronotum covered with many closely spaced transverse striae; abdominal tergites laterally with numerous parallel rows of tiny microtrichia; sternites with marginal setae arising at posterior margin; metanotum with median pair of setae arising near anterior margin. The only closely similar species is *Drepanothrips reuteri*, a native European pest of grapevine, but that has the antennae 6-segmented (the 3 terminal segments being fused) instead of 8-segmented. Most of the 59 species described in *Scirtothrips* were defined originally by their authors on unreliable colour and silhouette characters; Mound & Palmer (1981) describe many structural details by which each pest species may be distinguished. Many undescribed species are known from Central America (Mound & Marullo, in press). *Scirtothrips* spp. primarily infest young growing buds, so these should be examined particularly carefully.

Unlike *S. aurantii* (EPPO/CABI, 1996), 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. Living adults that are feeding on citrus are usually pale-yellow, but when feeding on other plants the body contents may be orange.

MEANS OF MOVEMENT AND DISPERSAL

The potential of *Scirtothrips* spp. for natural spread is relatively limited. In international trade, *S. citri* could be carried on plants for planting, but in fact interceptions are relatively rare. Unlike many Thysanoptera, *Scirtothrips* spp. seem to require access to soft green tissues, except when pupating in leaf litter and soil. So only seedlings or cuttings with young growing leaf buds are liable to carry these pests. Only young fruits are attacked, so the risk of these thrips being carried on harvested fruits is small. There is no direct evidence that *S. citri* has been dispersed beyond its natural range by human activity.

PEST SIGNIFICANCE

Economic impact

At least ten *Scirtothrips* spp. 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. With *S. aurantii* and *S. dorsalis* (EPPO/CABI, 1996), *S. citri* is, as a pest of citrus, one of the most important *Scirtothrips* spp. for international agriculture.

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. Control is only recommended when significant levels of fruit damage are anticipated, not when foliar damage alone is found (Olendorf *et al*., 1994).

Control

A wide range of insecticides is employed: carbamates, organophosphates and pyrethroids. Insecticide resistance is easily induced, but arises less rapidly if the chemicals used are rotated (Immaraju *et al*., 1990). Insecticidal mixtures are not recommended. Under laboratory conditions, involving 10 selections over 10 months, resistance at the LC90 rose 1380-fold (Immaraju & Morse, 1990). Various sampling methods are used in relation to treatment thresholds (Rhodes & Morse, 1989). The botanical insecticides, sabadilla and ryania, have been recommended as causing least damage to the important natural enemies of thrips in citrus orchards (Olendorf *et al*., 1994). These include the predatory mite *Euseius tularensis* (Grafton-Cardwell & Ouyang, 1993). New integrated and biological approaches to citrus thrips control are now being developed in California (Morse *et al*., 1988).

Phytosanitary risk

S. citri has recently been added to the EPPO A1 list but has not been classed as a quarantine pest by any other regional plant protection organization. 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. It is a damaging pest of citrus, and requires insecticide treatments. It is a damaging pest on citrus, and requires insecticide treatments. Its potential effect on other hosts in the EPPO region does not merit any particular concern.

PHYTOSANITARY MEASURES

Importation of *Citrus* plants for planting from countries where *S. citri* occurs should be prohibited or restricted, as it is in general already on account of other important pests.

BIBLIOGRAPHY

Arpaia, M.L.; Morse, J.G. (1991) Citrus thrips *Scirtothrips citri* (Moulton) (Thysanoptera: Thripidae) scarring and navel orange fruit quality in California. *Journal of Applied Entomology* **111**, 28-32.

Bailey, S.F. (1964) A revision of the genus *Scirtothrips* Shull (Thysanoptera: Thripidae). *Hilgardia* **35**, 329-362.

CIE (1961) *Distribution Maps of Pests, Series A* No. 138. CAB International, Wallingford, UK.

EPPO/CABI (1996) *Scirtothrips aurantii*. *Scirtothrips dorsalis.* In: *Quarantine pests for Europe*. 2nd edition (Ed. by Smith, I.M.; McNamara, D.G.; Scott, P.R.; Holderness, M.). CAB INTERNATIONAL, Wallingford, UK.

Flowers, R.W. (1989) The occurrence of the citrus thrips, *Scirtothrips citri* (Thysanoptera: Thripidae) in Florida. *Florida Entomologist* **72**, 385.

Grafton-Cardwell, E.E.; Ouyang, Y. (1993) Toxicity of four insecticides to various populations of the predacious mite *Euseius tularensis* from San Joaquin Valley California citrus. *Journal of Applied Entomology* **10**, 21-29.

Immaraju, J.A.; Morse, J.G. (1990) Selection for pyrethroid resistance and cross-resistance with citrus thrips (Thysanoptera: Thripidae). *Journal of Economic Entomology* **83**, 698-704.

Immaraju, J.A.; Morse, J.G.; Hobza, R.F. (1990) Field evaluation of insecticide rotation and mixtures as strategies for citrus thrips (Thysanoptera: Thripidae) resistance management in California. *Journal of Economic Entomology* **83**, 306-314.

Milne, D.L.; Manicom, B.Q. (1978) Feeding apparatus of the South African citrus thrips *Scirtothrips aurantii* Faure. *Citrus and Subtropical Fruit Journal* No. 535, 6-11.

Morse, J.G. (1995) Prospects for integrated management of citrus thrips (Thysanoptera: Thripidae) on citrus in California. In: *Thrips biology and management* (Ed. by Parker, B.L.; Skinner, M.; Lewis, T.). Plenum Publishing Corporation, New York, USA.

Morse, J.G.; Immaraju, J.A.; Brawner, O.L. (1988) Citrus thrips: looking to the future. *Citrograph* **73**, 112-115.

Mound, L.A.; Marullo, R. (1994) *The thrips of Central and South America: an introduction* (in press).

Mound, L.A.; Palmer, J.M. (1981) Identification, distribution and host-plants of the pest species of *Scirtothrips* (Thysanoptera: Thripidae) *Bulletin of Entomological Research* **71**, 467-479.

Olendorf, B.; Flint, M.L.; Brush, M. (1994) University of California IPM pest management guidelines. *University of California Publication* No. 3339, pp. 27-30.

Rhodes, A.A.; Morse, J.G. (1989) *Scirtothrips citri* sampling and damage prediction on California navel oranges. *Agriculture, Ecosystems and Environment* **26**, 117-129.

Sakakibara, N.; Nishigaki, J. (1988) Seasonal abundance of the chilli thrips, *Scirtothrips dorsalis*, in a kiwi fruit orchard. *Bulletin of the Faculty of Agriculture, Shizuoka University* **38**, 1-6.