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Data Sheets on Quarantine Pests

# *Thrips palmi*

## IDENTITY

**Name**: *Thrips palmi* Karny
**Synonyms**: *Thrips leucadophilus* Priesner
*Thrips gossypicola* (Priesner) Ramakrishna & Margabandhu
*Chloethrips aureus* Ananthakrishnan & Jagadish
*Thrips gracilis* Ananthakrishnan & Jagadish
**Taxonomic position**: Insecta: Thysanoptera: Thripidae
**Common names**: Palm thrips (English)
**Bayer computer code**: THRIPL
**EPPO A1 list**: No. 175
**EU Annex designation**: I/A1

## HOSTS

*T. palmi* is a polyphagous pest, especially of Cucurbitaceae and Solanaceae. It has been reported as an outdoor pest of aubergines (Solanum melongena), *Benincasa hispida*, *Capsicum annuum*, cotton (*Gossypium* spp.), cowpeas (*Vigna unguiculata*), cucumbers (*Cucumis sativus*), *Cucurbita* spp., melons (*Cucumis melo*), peas (*Pisum sativum*), *Phaseolus vulgaris*, potatoes (*S. tuberosum*), sesame (*Sesamum indicum*), soyabeans (*Glycine max*), sunflowers (*Helianthus annuus*), tobacco (*Nicotiana tabacum*) and watermelons (*Citrullus lanatus*). It can infest flowers, for example of citrus in Florida (USA) or mango in India. It can also infest weeds (e.g. in unheated glasshouses in Japan: *Vicia sativa*, *Cerastium glomeratum* and *Capsella bursa-pastoris*; Nagai & Tsumuki, 1990). In Japan, it does not attack tomatoes (*Lycopersicon esculentum*), whose leaves have been show to contain a feeding deterrent (Hirano *et al.*, 1994); in the Caribbean, however, *T. palmi* has been recorded on outdoor tomatoes (Pantoja *et al*., 1988). In glasshouses, economically important hosts are aubergines, *Capsicum annuum*, chrysanthemums (*Dendranthema morifolium*), cucumbers, *Cyclamen, Ficus* and Orchidaceae. Within the EPPO region, *T. palmi* could infest, for example, *Capsicum annuum*, cucurbits and ornamentals under glass.

## GEOGRAPHICAL DISTRIBUTION

*T. palmi* was described in 1925 from Sumatra and Java (Indonesia) (Karny, 1925). A few years later this species was discovered as far west as Sudan, and as far north as Taiwan. Since 1978, extensive outbreaks are reported yearly from southern Japan (Sakimura *et al.*, 1986). Since 1985 it has been spreading in the Caribbean region, and since 1988 there have been several limited outbreaks in the Netherlands.
**EPPO region**: Netherlands (four outbreaks since 1988, each in turn eradicated).
**Asia**: Bangladesh, Brunei Darussalam, China (Guangdong, Guangxi, Hebei), Hong Kong, India (Andhra Pradesh, Delhi, Haryana, Jammu and Kashmir, Karnataka, Maharashtra,

Madhya Pradesh, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal), Indonesia (Java, Sumatra), Japan (Honshu, Kyushu, Ryukyu Archipelago, Shikoku), Malaysia (peninsular, Sabah, Sarawak), Myanmar, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan and Thailand. It is likely that the pest is present in other countries in south and south-eastern Asia.
**Africa**: Mauritius, Nigeria, Réunion, Sudan.
**North America**: USA (reported only from Hawaii, and in 1991 from Florida; reports from California and Texas were erroneous). A report from Bermuda was also erroneous.
**Central America and Caribbean**: Reported from Antigua and Barbuda, Barbados, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Martinique, Puerto Rico, St. Lucia, St. Kitts and Nevis, Trinidad and Tobago, but is actively spreading in the Caribbean and likely to be present in other countries. Guatemala: *Ficus* plants of Guatemalan origin were found infested in Netherlands but the pest is declared absent from Guatemala.
**South America**: Brazil (São Paulo, Guyana, Venezuela.
**Oceania**: Australia (Northern Territory, Queensland), Guam, New Caledonia, Samoa, Wallis and Futuna.
**EU**: Absent.
**Distribution map**: See IIE (1992, No. 480).

## BIOLOGY

*T. palmi* cannot overwinter on outdoor vegetation beyond a northern limit. The species can overwinter outside glasshouses only in a small part of southern Japan (Yoshihara, 1982). Similarly, Tsumuki *et al.* (1987) analysed the cold hardiness of *T. palmi* in Japan and concluded that it could not survive winter conditions in southern Honshu, and thus in most of Japan. However, a recent study (Nagai & Tsumuki, 1990) reported no reduction of adult populations at temperatures as low as -3 to -7°C in an unheated glasshouse in Japan.

At 25°C, the life cycle from egg to egg lasts only 17.5 days. The life cycle differs little from that of most phytophagous Thripidae: the adults emerge from the pupa in the soil and go to the leaves or flowers of the plant, where they lay their eggs. The second-stage larva goes into the soil, develops there and pupates, thus completing the cycle. The specialized mouthparts are adapted for sucking. As a consequence the type of plant injury caused by feeding is always sucking damage. The life cycle and population dynamics of *T. palmi* in Japan has been reviewed by Kawai (1990a).

## DETECTION AND IDENTIFICATION

### Symptoms

*T. palmi* can be found in pockets, cracks or crevices on host plants. At inspection, silvery feeding scars on the leaf surface, especially alongside the midrib and veins, can be seen.

Heavily infested plants are characterized by a silvered or bronzed appearance of the leaves, stunted leaves and terminal shoots, and scarred and deformed fruits. Individuals may be found on all parts of many kinds of plants (Sakimura *et al.*, 1986).

### Morphology

*T. palmi* can easily be mistaken for *T. flavus* Schrank, which is a common, economically unimportant flower thrips, found world-wide. For the distinction between the two species microscopic examination is necessary. *T. palmi* is characterized by the length of the female (about 1.3 mm compared with 1.7 mm in *T. flavus*), clear yellow body, with blackish setae, abdominal tergite II with four lateral setae, interocellar setae outside the ocellar triangle (*T. flavus*: interocellar setae inside), abdominal tergite VIII with complete comb in both sexes

(*T. flavus* (male): comb incomplete). Strassen (1989) provides an account of characters distinguishing *T. palmi* from widespread thrips in Europe.

## MEANS OF MOVEMENT AND DISPERSAL

*T. palmi* has only moderate dispersal potential by itself, but is liable to be carried on fruits, or plants for planting of host species, or in packing material. *T. palmi* has been intercepted in several EPPO countries on consignments from, for example, Guadeloupe, Martinique, Mauritius, Thailand.

## PEST SIGNIFICANCE

### Economic impact

*T. palmi*, a polyphagous feeder with a wide host range, quickly builds up heavy infestations causing severe injuries. Both larvae and adults feed gregariously on leaves (first along the midribs and the veins), stems (particularly at or near the growing tips), flowers (among the petals and developing ovary) and fruits (on the surface), leaving numerous scars and deformities, and finally killing the entire plant. In tropical countries, *T. palmi* damages outdoor crops but in Japan, large-scale infestations of glasshouses have occurred (for example, on aubergine). In Hawaii (USA), *T. palmi* damages ornamental orchids. In Guadeloupe, *T. palmi* has had disastrous economic effects on cucurbit crops (melons, cucumbers) and solanaceous crops (aubergines, *Capsicum*). Aubergine exports fell from 5000 t in 1985 to 1600 t in 1986. In Martinique, 37% of the vegetable crops of the two main cooperatives were attacked and 90% of aubergine crops (Guyot, 1988). In India, *T. palmi* is the vector of groundnut bud necrosis tospovirus, in Japan and Taiwan of watermelon silvery mottle tospovirus (Honda *et al*., 1989; Yeh *et al*., 1992; Yeh & Chang, 1995). These viruses are closely related to TSWV, but *T. palmi* has not yet been found to vector TSWV itself.

### Control

*T. palmi* is difficult to control chemically in the field and especially in glasshouses. Insecticides such as imidacloprid and pyrethroids are used, but may have serious effects on natural enemies (Nemoto, 1995). In Martinique (Bon & Rhino, 1989), profenofos, avermectin and carbofuran were the most effective insecticides on outdoor vegetables. In trials under glass in Japan, none of the (repeated) applications gave more than 80% mortality. Supplementary cultural and mechanical methods were required to control the pest (Yoshihara, 1982; Kawai, 1990b). *T. palmi* populations can be monitored with blue sticky traps or water-tray traps (Layland *et al.*, 1994). At present, biological control of *T. palmi* is not achievable. Preliminary studies have been carried out concentrating on *Orius* sp. (Hemiptera: Anthocoridae) (Nagai *et al.*, 1988; Kawai, 1995) and *Amblyseius* spp. (Acarina: Phytoseiidae) (Kajita, 1986).

### Phytosanitary risk

*T. palmi* is an A1 quarantine pest for EPPO (OEPP/EPPO, 1989) and an A2 pest for CPPC. In the EPPO region, *T. palmi* presents a serious threat to a wide variety of crops grown under glass. It could possibly establish on field crops in southern areas of the EPPO region, as has happened for *Frankliniella occidentalis* (EPPO/CABI, 1996a) which was originally considered to present a risk only under glass. Although *T. palmi* is not apparently a vector of TSWV (EPPO/CABI, 1996b), it does vector closely related viruses in Japan and Taiwan. In view of the situation which developed in Europe with *F. occidentalis* and TSWV, the vector capabilities of *T. palmi* merit close attention.

## PHYTOSANITARY MEASURES

Because *T. palmi* is difficult to detect at low density in consignments, inspections should be made during the growing season at the place of production (OEPP/EPPO, 1990). Alternatively, or additionally, consignments and/or the place of production should be treated against the pest.

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