



Frankliniella tenuicornis (Thysanoptera: Thripidae), a novel harmful insect to banana (*Musa* sp.) crops

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Abstract

Aim of study: This study aimed to record a previously unknown harmful insect to banana (*Musa* sp.) crops, *Frankliniella tenuicornis* (Uzel).

Area of study: Thrips individuals were collected from banana fields located in Paphos District, Cyprus.

Material and methods: Specimens of thrips were mounted in permanent microscope and identified using specialized literature. Voucher specimens are deposited in Coleção de História Natural da UFPI, Brazil. Images for species and damage recognition were obtained.

Main results: The thrips causes a red-brownish discoloration at the spots where banana fruits touch each other. This cosmetic damage reduces the marketability and/or price of banana fruits. In addition, *F. tenuicornis* is recorded for the first time in the island of Cyprus.

Research highlights: This is the first record of *F. tenuicornis* damaging banana crops. It constitutes the basic step for future studies in order to produce possible suitable control methods against the new phytosanitary problem.

Additional key words: pest thrips; identification; damages; chlorosis

Authors' contributions: Field work: CM. Insect identification: EFBL. Manuscript drafting and approval: CM and EFB.

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Introduction

Thrips are among the most important pests of banana crops (*Musa* spp.), one of the most consumed fruits in the world. These insects cause qualitative damages resulting from feeding and/or oviposition in plant tissue, especially in banana rinds, which depreciates the fruits for commercialization (Lewis, 1997; Lima, 2015).

These problems appear due to thrips small size and cryptic habits, which makes their control sometimes difficult, as they easily hide between leaves or fruits and escape from chemicals. To prevent colonization, growers usually eliminate old plants with high infestations in order to reduce the thrips population (Rey, 2002) or use untreated plastic bags to cover bunches before harvesting (Hawaiian Banana Industry, 2010).

Banana crops are attacked by several thrips species. The most common are *Bradinothrips musae* (Hood), *Chaetanaphothrips leeuweni* (Karny), *Chaetanaphothrips orchidii* (Moulton), *Chaetanaphothrips signipennis* (Bagnall),

Elixothrips brevisetis (Bagnall), *Frankliniella brevicaulis* Hood, *Frankliniella parvula* Hood, *Hercinothrips femoralis* (Reuter) and *Hoodothrips lineatus* (Hood) (Lewis, 1997; Fancelli, 2004; Carval *et al.*, 2015). Most of these are widespread, although *Frankliniella* spp., *He. femoralis* and *Ho. lineatus* seem to be native to the Neotropics, whereas the remaining species are probably native to the Oriental region (Hoddle *et al.*, 2012; Mound & Tree, 2020; Lima, 2015).

In this work, we report *Frankliniella tenuicornis* (Uzel) as an additional thrips species damaging banana crops in Cyprus.

Material and methods

The specimens studied to perform the record were collected in Paphos, Cyprus (at sea level) and mounted on permanent microscope slides, following Mound & Marullo (1996). They were identified based on Zur Strassen

(2003) and deposited in the Coleção de História Natural da Universidade Federal do Piauí, Floriano, PI, Brazil (CHNUFPI).

Results and discussion

Individuals of *F. tenuicornis*, feeding on the fruit tissue, were causing a red-brownish discoloration especially at spots where the two fruits were in contact in bunches of bananas (Figs 1a-d). Although no major damage was observed on the fruit pulp, the qualitative damage, often observed in the sampled area, reduced significantly the marketability and/or the price of the product. Similar injury on the fruit rind is caused by other thrips species that were not found on the study area, such as *B. musae* (Monteiro *et al.*, 1999), *C. signipennis* (Hara *et al.*, 2002), *E. brevisetis* (Lima & Milanez, 2013) and *He. femoralis* (Roditakis *et al.*, 2006).

This is the first report of damages caused by *F. tenuicornis* on banana crops. In the Americas, other *Frankliniella* species, such as *F. brevicaulis*, *F. fulvipennis* Moulton, *F. musaeparda* Hood and *F. parvula*, are reported as pests of banana (Hood, 1952; Harrison, 1963; Mound & Marullo, 1996; Mound & Kibby, 1998; Monteiro *et al.*, 2001). In addition, it is the first record of *F. tenuicornis* in Cyprus.

Frankliniella tenuicornis is widespread in the northern hemisphere from the US to Japan and likely native to Europe (Hoddle *et al.*, 2012; Wang *et al.*, 2019). The species is known to cause damage to some crops, especially cereals, but in most cases, plants can tolerate thrips populations (Larsson, 2005). In Central Europe, it is an economically important species, causing considerable yield loss in small grain cereals (Obrist *et al.*, 2005). On millet (*Panicum miliaceum*), the thrips causes whitening of inflorescences with consequent shrunken of the grains; on oats (*Avena sativa*), rye (*Secale cereale*)

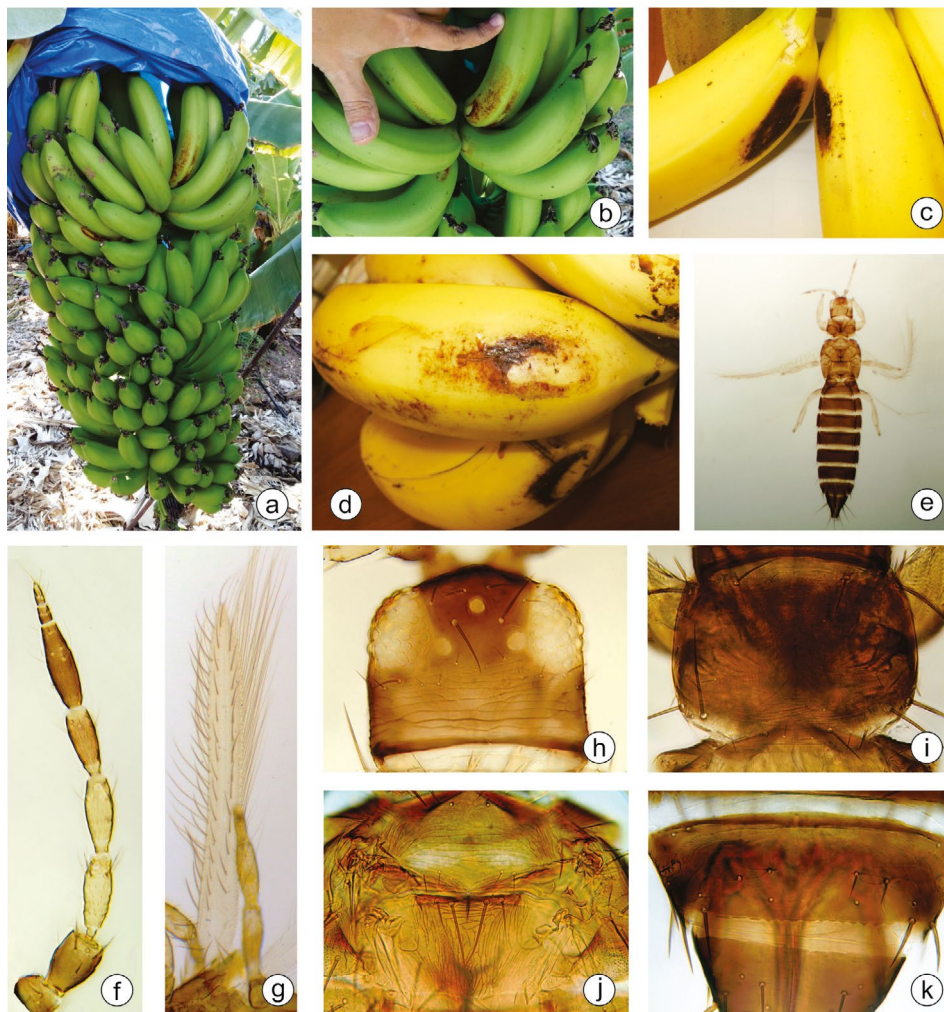


Figure 1. Morphology of *Frankliniella tenuicornis* and damage caused on banana. a) bunch of bananas with symptoms of attack; b) symptoms on green fruits; c, d) damage on the fruit rind on mature fruits; e) female of *F. tenuicornis*; f) antenna; g) fore wing; h) head; i) pronotum; j) meso- and metanotum; k) abdominal tergites VIII and IX.

and wheat (*Triticum sativum*), it causes silvering of leaf sheaths and blades, leaving oviposition scars on blades, resulting in the appearance of ears with whitened spikelets, either empty or with shriveled grains (Lewis, 1997). Köppä (1970) reported heavy damage on barley (*Hordeum vulgare*). Corn, cattail, grasses, tomato and onion are other host plants of this thrips (Wang *et al.*, 2010). It is also reported as vector of *Tomato spotted wilt virus* (Souiri *et al.*, 2020).

Along with *Frankliniella fusca* (Hinds), *Frankliniella intonsa* (Trybom) and *Frankliniella schultzei* (Trybom), *F. tenuicornis* is one of the brown-colored species of the genus commonly found in cultivated plants in Europe and the Mediterranean region, but can be distinguished by the anteriorly projected head (Zur Strassen, 2003). In addition, it distinguishes from *F. fusca* by the absence of campaniform sensilla on metanotum; from *F. schultzei* by the ocellar setae on lateral margins of ocellar triangle (between posterior ocelli in *F. schultzei*); and from *F. intonsa* by the absence of teeth on posteromarginal comb on abdominal tergite VIII.

Morphological traits. Body color brown (Fig. 1e). Antenna 8-segmented; Segments I-II and V-VII brown; III-IV yellow; pedicel on segment III simple (Fig. 1f). Head slightly longer than wide, projected in front of eyes; three pairs of ocellar setae present; pair III anterior to lateral margin of ocellar triangle; postocular setae pair I present (Fig. 1h). Pronotum with five pairs of major setae; anteromarginal shorter than anteroangular (Fig. 1i). Metanotum with two pairs of setae at anterior margin; campaniform sensilla absent (Fig. 1j). Fore wing with two complete rows of setae (Fig. 1g). Abdominal tergites IV-VIII with paired ctenidia; teeth on posteromarginal comb on tergite VIII not developed (Fig. 1k).

Material examined. Cyprus: Paphos, Paphos District, on banana (*Musa sp.*) fruits, 27.ix.2013, 14 ♀ 2 larvae (Michael, C. col.) (Lima, E.F.B. det.) (CHNUFPI).

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