

## Thrips species (Insecta: Thysanoptera) associated to Cowpea in Piauí, Brazil

Élison Fabrício Bezerra Lima<sup>1,4</sup>, Lúcia da Silva Fontes<sup>1</sup>, Silvia Marisa Jesien Pinent<sup>2</sup>,

Adriana Saraiva dos Reis<sup>1</sup>, Francisco Rodrigues Freire Filho<sup>3</sup> & Angela Celis de Almeida Lopes<sup>1</sup>

<sup>1</sup>Departamento de Biologia, Centro de Ciências da Natureza, Universidade Federal do Piauí – UFPI, Campus Ministro Petrônio Portella, Ininga, CEP 64049-550, Teresina, PI, Brasil. [www.ufpi.br](http://www.ufpi.br)

<sup>2</sup>Departamento de Fitossanidade, Universidade Federal do Rio Grande do Sul – UFRGS, Av. Bento Gonçalves, 772, CEP 91540-000, Porto Alegre, RS, Brasil. ([www.ufrgs.br](http://www.ufrgs.br))

<sup>3</sup>Embrapa Meio-Norte, Av. Duque de Caxias, 5650, Bairro Buenos Aires, CEP 64006-220, Teresina, PI, Brasil. [www.cpamn.embrapa.br](http://www.cpamn.embrapa.br)

<sup>4</sup>Corresponding author: Élison Fabrício Bezerra Lima, e-mail: [elisonfabricio@hotmail.com](mailto:elisonfabricio@hotmail.com)

LIMA, E.F.B., FONTES, L.S., PINENT, S.M.J., REIS, A.S., FREIRE FILHO, F.R. & LOPES, A.C.A. **Thrips species (Insecta: Thysanoptera) associated to Cowpea in Piauí, Brazil.** Biota Neotrop. 13(1): <http://www.biotaneotropica.org.br/v13n1/en/abstract?short-communication+bn03713012013>

**Abstract:** Thrips are still poorly known in cowpea, *Vigna unguiculata* (L.) Walp., in Piauí, despite their economic importance in this crop, which stands out as one of the major cultures of North and Northeast regions from Brazil. Thus, this study aimed to identify the thrips species associated to the crop in Teresina and Bom Jesus, Piauí, Brazil. From October 2007 to August 2008, cowpea inflorescences were sampled in the municipalities by the technique of simple bagging. After screenings, thrips were preserved in AGA, mounted on permanent microscope slides and identified. The identified species were: *Frankliniella brevicaulis* Hood, 1937, *F. insularis* (Franklin, 1908), *F. schultzei* (Trybom, 1910), *F. tritici* (Fitch, 1855) and *Haplothrips gowdeyi* (Franklin, 1908). The slides are deposited at the entomological collection of the Departamento de Biologia, Universidade Federal do Piauí. A key to the species is provided.

**Keywords:** pests, Phlaeothripidae, Thripidae, *Frankliniella*, *Vigna unguiculata*.

LIMA, E.F.B., FONTES, L.S., PINENT, S.M.J., REIS, A.S., FREIRE FILHO, F.R. & LOPES, A.C.A. **Espécies de tripses (Insecta: Thysanoptera) associadas ao caupi no Piauí, Brasil.** Biota Neotrop. 13(1): <http://www.biotaneotropica.org.br/v13n1/pt/abstract?short-communication+bn03713012013>

**Resumo:** Tripses ainda são pouco conhecidos em caupi, *Vigna unguiculata* (L.) Walp., no Piauí, a despeito de sua importância econômica na cultura, que se destaca como um dos principais cultivos das regiões Norte e Nordeste do Brasil. Assim, esse estudo objetivou identificar as espécies de tripses associadas à cultura em Teresina e Bom Jesus, Piauí, Brasil. De outubro de 2007 a agosto de 2008, inflorescências de caupi foram amostradas nos dois municípios, por meio técnica do ensacamento simples. Após triagens, os tripses foram preservados em AGA, montados em lâminas de microscopia permanentes e identificados. As espécies identificadas foram: *Frankliniella brevicaulis* Hood, 1937, *F. insularis* (Franklin, 1908), *F. schultzei* (Trybom, 1910), *F. tritici* (Fitch, 1855) e *Haplothrips gowdeyi* (Franklin, 1908). As lâminas estão depositadas na coleção entomológica do Departamento de Biologia, Universidade Federal do Piauí. Uma chave de identificação para as espécies é fornecida.

**Palavras-chave:** pragas, Phlaeothripidae, Thripidae, *Frankliniella*, *Vigna unguiculata*.

## Introduction

Almost a hundred of the about 6,000 described thrips species (Mound & Morris 2007) are notorious for causing extensive crop damage by feeding on leaf tissue or by vectoring viral diseases (Reynaud 2010). In Brazil, 546 thrips species are currently known (Monteiro & Lima 2011), from which about 24 are considered harmful to cultivated plants (Monteiro 2002).

Thrips are pests of cowpea, *Vigna unguiculata* (L.) Walp., in the state of Piauí, attacking flowers, causing flower abortion and, thus, huge economic losses by reducing the crop productivity (Freire Filho et al. 2005). This crop is very important in northeastern Brazil, where, according to Freire Filho et al. (1999) it constitutes the main protein source for the population. However, thrips are poorly known on cowpea, despite their economic importance. *Frankliniella schultzei* (Trybom, 1910) is the only thrips species recorded on cowpea in northeastern Brazil, in the states of Rio Grande do Norte and Piauí (Chagas 1993, Fontes et al. 2011).

The aim of this research was to identify the thrips species on cowpea in two municipalities in the state of Piauí, Brazil. A key to species is provided.

## Materials and Methods

Thrips collections were weekly performed in October and December 2007 and January, February, July and August 2008 in Teresina and in April 2008 in Bom Jesus, according to the flowering of cowpea. Samples were collected in experimental fields at Embrapa Meio-Norte, in a transition area between the Caatinga and pre-Amazon in Teresina (05° 05' 21" S, 42° 48' 07" W, 72 m altitude) and in an area of Cerrado in Bom Jesus (09° 04' 28" S, 44° 21' 31" W, 277 m altitude).

The technique used to collect thrips was the simple bagging (Waquil et al. 1986), in which cowpea inflorescences were removed and placed in clear plastic bags. After two hours of collection, the material was taken to the laboratory of Entomology of the Departamento de Biologia, Universidade Federal do Piauí, for screening.

In the laboratory, the insects, still in plastic bags, were placed in a freezer at -5 °C for one hour before screening, to facilitate this stage. Then, fine-bristled brushes, under stereomicroscope, helped transferring the thrips to microtubes containing AGA (60% ethyl alcohol, glycerin and glacial acetic acid in the ratio 10:1:1 respectively). Slides were prepared according to the technique proposed by Mound & Marullo (1996) and Mound & Kibby (1998). The identification was based on the keys proposed by Moritz et al. (2004), Mound & Kibby (1998), Mound & Marullo (1996) and Monteiro (1994).

## Results and Discussion

Five thrips species were identified, four belonging to the family Thripidae, *Frankliniella brevicaulis* Hood, 1937, *F. insularis* (Franklin, 1908), *F. schultzei* (Trybom, 1910), *F. tritici* (Fitch, 1855) and one to the family Phlaeothripidae, *Haplothrips gowdeyi* (Franklin, 1908). All of them, except for *Frankliniella schultzei*, are recorded for the first time in the state of Piauí and on cowpea in Brazil. The material is deposited in the entomological collection of the Departamento de Biologia, Centro de Ciências da Natureza, Universidade Federal do Piauí. The number of specimens collected in each municipality can be visualized in Table 1.

Knowing thrips species that occur on cowpea is very important for this crop in the state of Piauí, and perhaps for the entire northeastern

region, since these insects have become important pests in the crop in recent years, especially in dry periods (Andrade Junior et al. 2002).

*Frankliniella schultzei* is recorded in several plant species in Brazil, and is considered pest on cotton, eggplant, lettuce, melon, soybean, rose, tobacco, tomato and watermelon. From the species collected in this survey, this is the one that may cause greater agricultural problems to the crop, either because of the number it was found or taking into account the wide range of other plant species in which it causes economic losses. Its agricultural importance worldwide is given by both feeding damage and vectoring tospoviruses (Hoddle et al. 2008). Only yellow specimens were collected.

*Frankliniella brevicaulis* is widely distributed in the Neotropics, and is recorded in Brazil in banana (Monteiro et al. 1999), where it causes damage to the fruits in the form of brown rough punctures, which reduces the commercial value of the fruits (Fancelli 2004).

*Frankliniella insularis* is widely distributed in Brazil, where it feeds on legumes (Mound & Marullo 1996), but it is not considered a pest. However, it can be considered a minor pest of leguminous crops in Central America, such as *Cajanus* spp. and *Pachyrhizus* spp. (Hoddle et al. 2008).

*Frankliniella tritici* is well distributed in North America, associated to a wide range of plant species with flowers, and is considered a pest of roses (Hoddle et al. 2008). In Brazil, the species is recorded only in wheat in Rio Grande do Sul (Monteiro 1999).

In Brazil, *H. gowdeyi* is recorded in peach (Schuber et al. 2008), nectarine (Hickel & Ducroquet 1998) and chrysanthemums (Carvalho et al. 2006), with no economic importance.

## Key to Species

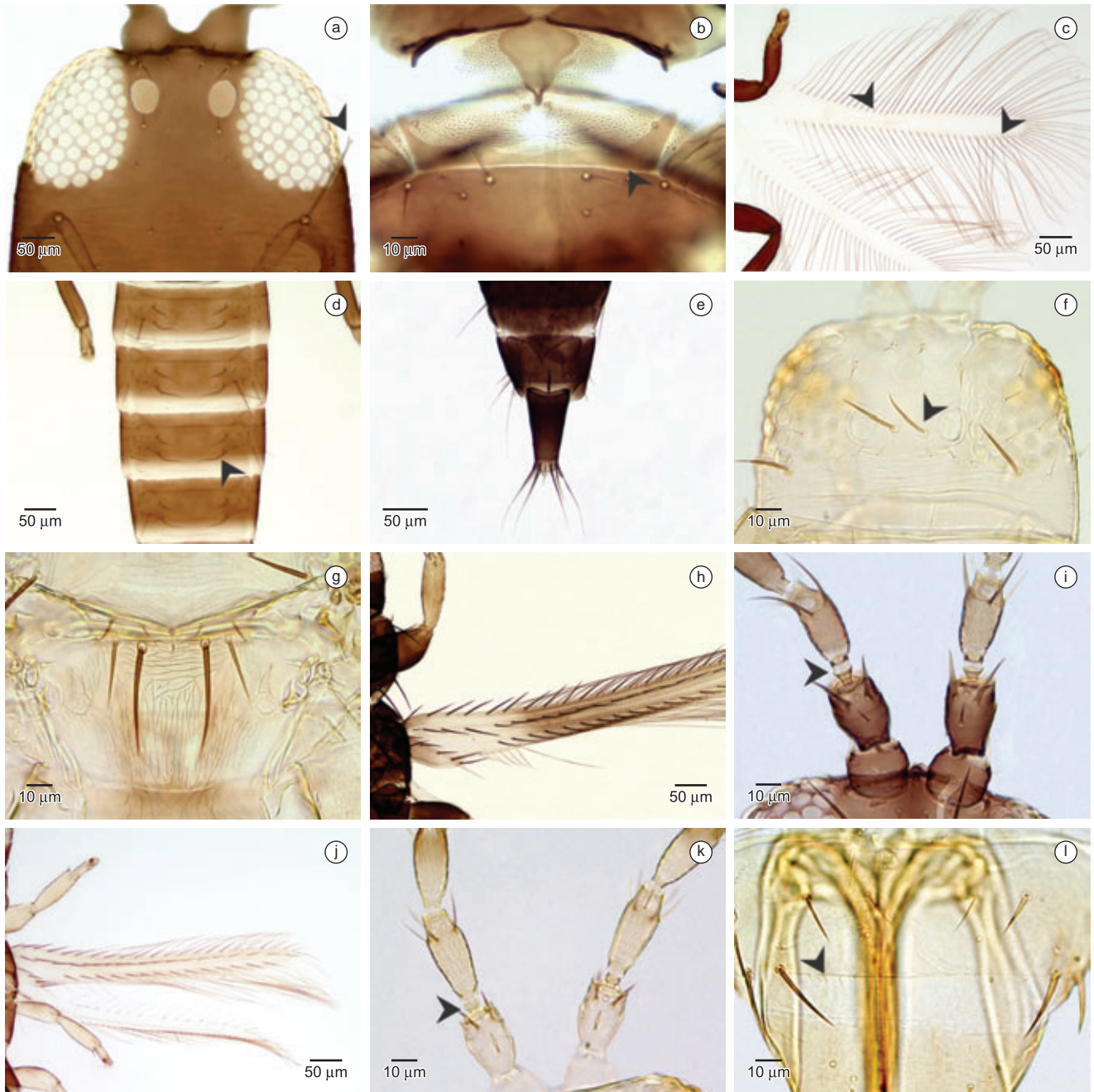
1. Abdominal segment X tubular (Figure 1e), female without visible ovipositor, forewing without vein setae, with a median constriction and series of duplicated cilia in the apical region of the posterior margin (Figure 1c). Antennal segments III and IV with two and four simple sensilla, respectively. Post-ocular setae with expanded apex (Figure 1a). Maxillary bridge present. Mesopresternum boat-shaped (Figure 1b). Abdominal tergites III-VII with two pairs of wing retaining setae (Figure 1d) .....*Haplothrips gowdeyi*

1'. Abdominal segment X conical, female with visible ovipositor. Forewings with two complete rows of veins setae (Figures 1h, j). Antennal segments III and IV with forked sensilla (Figures 1i, k).....2

2. Ocellar setae III near, between the hind ocelli (Figure 1f). Metanotum without campaniform sensilla (Figure 1g). Posteromarginal comb on abdominal tergite VIII incomplete, with short teeth laterally .....*F. schultzei*

**Table 1.** Number of thrips collected in the municipalities.

Municipality	Species	Thrips (n)	
		♀	♂
Teresina	<i>Frankliniella brevicaulis</i>	4	-
	<i>F. insularis</i>	527	7
	<i>F. schultzei</i>	2823	99
	<i>F. tritici</i>	190	35
	<i>Haplothrips gowdeyi</i>	4	-
Bom Jesus	<i>F. schultzei</i>	43	28
Total		3589	169



**Figure 1.** *Haplothrips gowdeyi*. a) head with post-ocular setae with expanded apex; b) mesopresternum boat-shaped; c) wings with median constriction and duplicated cilia on forewing; d) abdominal tergites IV-VII with wing retaining setae; e) abdominal segments VIII-X; *Frankliniella schultzei*. f) head with ocellar setae III close together; g) metanotum; *F. insularis*. h) forewing; *Frankliniella brevicaulis*. i) antennal segments I-III with pedicel on III cup-shaped; j) wings; *Frankliniella tritici*. k) antennal segments I-IV with pedicel on III swollen; l) abdominal tergites VIII and IX with posteromarginal comb on VIII with teeth laterally.

2'. Ocellar setae III apart. Metanotum with a pair of campaniform sensilla ..... 3

3. Forewings dark with basal fourth clear (Figure 1h). Posteromarginal comb on abdominal tergite VIII with moderately long teeth and variable failure medially ..... *Frankliniella insularis*

3'. Forewings with uniform coloration (Figure 1j) ..... 4

4. Pedicel on antennal segment III cup-shaped (Figure 1i). Posteromarginal comb on tergite VIII complete with median teeth smaller than the lateral ones ..... *Frankliniella brevicaulis*

4'. Pedicel on antennal segment III swollen (Figure 1k). Posteromarginal comb on abdominal tergite VIII incomplete, with small teeth laterally (Figure 1l) ..... *Frankliniella tritici*

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Received 16/02/2012

Revised 16/02/2012

Accepted 19/03/2013