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Heliothrips haemorrhoidalis and its relatives, with one new species and one new genus (Thysanoptera: Thripidae)

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Abstract

Heliothrips similis **sp.n.** is described as a close relative of the greenhouse thrips, *Heliothrips haemorrhoidalis*. This is the third species recognized here in the Neotropical genus *Heliothrips*. A pest species described from South Africa as *Heliothrips sylvanus* is transferred to a new genus, *Neoheliothrips* **gen.n.,** as *Neoheliothrips sylvanus* (Faure) **comb.n**.

Key words: greenhouse thrips, *Heliothrips*, Neotropics, new species, new genus

Introduction

The greenhouse thrips, *Heliothrips haemorrhoidalis*, is one of the most ubiquitous members of the insect order Thysanoptera. It probably originated, as discussed below, in the southwestern part of the Amazon Basin, but is now known widely around the world, breeding on the leaves of a wide range of plants in many different families (Scott-Brown & Simmonds 2006).The species was first described in 1833 by Bouché as *Thrips haemorrhoidalis*, from specimens damaging leaves of plants in "warmen und kalten Häusen" presumably in Berlin. In 1836, and without any reference to this publication from Germany, the genus *Heliothrips* was erected by Haliday for a new species that he called *adonidum*, based on specimens collected in "hothouses" by Francis Walker, presumably in England. The original specimens of both *adonidum* and *haemorrhoidalis* are considered lost, and to achieve nomenclatural stability Wilson (1975) selected lectotypes for two subsequent subspecies dating from 1891 and 1923 respectively —*haemorrhoidalis abdominalis* Reuter and *haemorrhoidalis angustior* Priesner. The lectotype of *angustior* he further designated as the neotype of both *haemorrhoidalis* and *adonidum*, thus securing the synonymy of those species. Wilson (1975: 146) then stated that his redescription of *haemorrhoidalis* was based on this neotype. However, this is not strictly correct, because the structure of the metascutum in that redescription, and the measurements he provided, are based on a few specimens collected in 1948 near Rio de Janeiro, Brazil. Presumably he used these specimens because they were the best available slide-mounts, and moreover included the rarely seen males. However, these few specimens are structurally distinct from the world-wide species *haemorrhoidalis* as based on the neotype, and they are here described as a new species.

Biogeographically, the three South American *Heliothrips* species are of interest because each seems to be associated with a major refugium of the Quaternary dry period (Haffer 2008), in the Southwest, Southeast, or Atlantic forest to the East of the Amazon basin. In considering this distribution pattern, the systematic position of the South African species, *Heliothrips sylvanus*, needed re-assessment. Based on morphological data it apparently is not sister-group to the South American species of *Heliothrips* (Mound *et al*. 2001), and a new genus is proposed below for this species. Full nomenclatural information for all Thysanoptera is available at ThripsWiki (2015).

Heliothrips Haliday

Only three extant species are here recognized in this genus, although two further names are listed in ThripsWiki

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(2015). One of these, *H. ardisiae* Zimmermann, is an unrecognizable *nomen dubium* from Java, and the other a fossil species in Baltic Amber. The three species are all Neotropical in origin, with one South African species previously placed here referred below to a new genus. The species of *Heliothrips* have 8-segmented antennae with segment VIII elongate (Figs 4–6), simple sense cones on segments III and IV, fore wing with apex rounded, the costal margin with long cilia, and the costal and first veins fused and bearing minute setae (Fig. 13). An identification key to the world genera of Panchaetothripinae is provided by Wilson (1975).

Diagnosis: Macropterous, body surface dark brown when mature, strongly reticulate. Antennae 8-segmented, III and IV each with one simple sense cone, VIII longer than VII, segments with no microtrichia. Head with short neck, compound eyes with 6 pigmented facets; maxillary palps 2-segmented. Pronotum transverse, with no long setae. Metascutum with prominent sculptured triangle. Fore wing apex round, costal vein fused to first longitudinal vein and bearing long cilia, veinal setae inconspicuous. Tarsi 1-segmented. Abdominal tergites reticulate except sub-medially on III–VII, with strong antecostal ridge; VIII with long comb of microtrichia complete medially, VII with comb weak and irregular medially; tergal median setae longer than distance between their bases, submedian setae arise close to campaniform sensilla; IX and X bearing microtrichia, at least near posterior margins, X divided longitudinally. Male tergite IX with 3 pairs of stout setae; sternites III–VII each with transverse pore plate.

Key to *Heliothrips* species

1. Metascutal triangle with posteromarginal flange absent, or not reaching anterior margin of metascutellum (Fig. 2); abdominal tergite I with median minute setal pair arising on reticulate area (Fig. 2); tergites III–VIII with reticulation in front of antecostal ridge weakly developed or absent (Fig. 9) . . . . . *similis* **sp.n.**
-. Metascutal triangle with posteromarginal flange extending over anterior margin of metascutellum (Fig. 1); tergite I with median minute setal pair arising anterior to reticulate area (Fig. 1); tergites III–VIII with reticulation in front of antecostal ridge strongly developed (Fig. 8) 2
2. Femora dark brown; antennal segment VI dark brown with base slightly paler; antennal segment IV 0.65 as long as III (Fig. 6), with ventral sense cone 0.75 as long as segment . . . . . *zucchi*
-. Femora yellow; antennal segment VI yellow at least in basal half; antennal segment IV 0.75 as long as III (Fig. 4), with ventral sense cone no more than 0.5 as long as segment . . . . . *haemorrhoidalis*

Heliothrips haemorrhoidalis (Bouché)

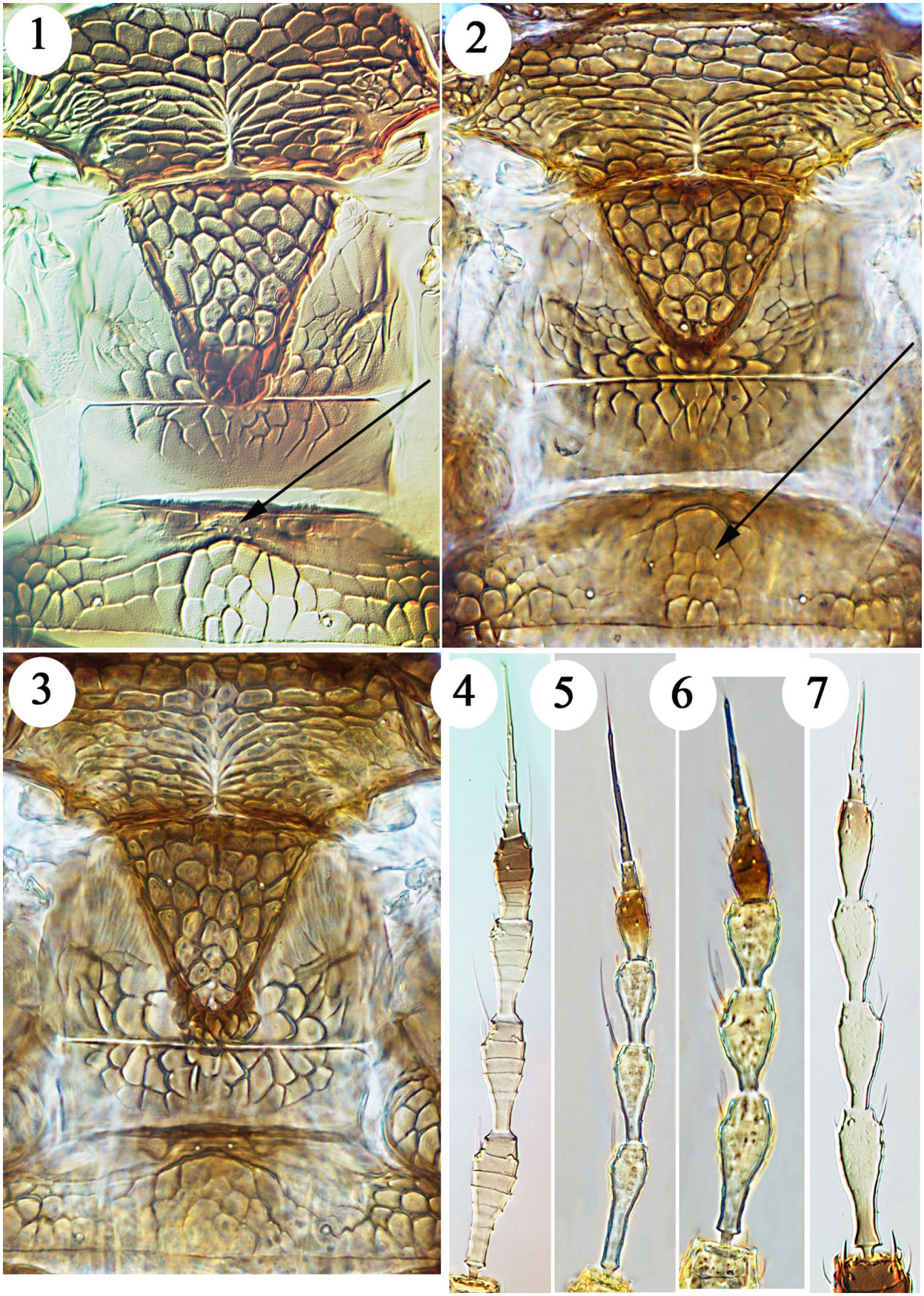
(Figs 1, 4, 8, 13)

Judging from the presence of males in samples from southern Brazil (Mound 1976) and southern Peru (Mound &Marullo 1996), this species presumably originated in the southwestern part of the Amazon basin. However, it is now found worldwide, and breeds on the leaves of many plant species in a wide range of families. Living mainly on older leaves, particularly of plants that are growing sub-optimally (Mound 1997), it avoids plants with trichomes on the leaves (Scott-Brown & Simmonds 2006). The body colour varies with the degree of maturity, newly emerged females commonly have a yellow abdomen contrasting with the dark brown head and thorax, but the body of mature adults is dark brown, contrasting with the yellow legs. Males are smaller than females, with legs all pale and pore plates on sternites III–VII similar in shape and size to males of *similis*. The lectotype of the subspecies *angustior*, collected at "Paramaribo, Surinam", was studied at the Senckenberg Museum, Frankfurt, and has the metascutal triangle prolonged onto the metascutellum. This lectotype is accepted as the reference specimen for the name of this widespread pest thrips. Full nomenclatural details of the many synonyms of *haemorrhoidalis* are available in ThripsWiki (2015).

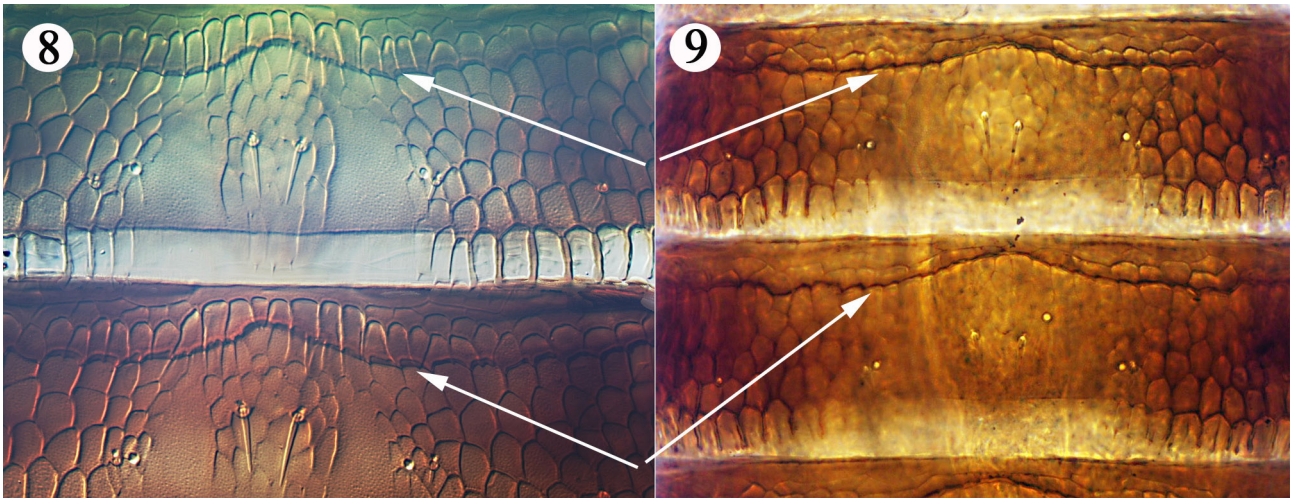
Heliothrips similis sp.n.

(Figs 2, 5, 9)

Female macroptera. With the characters in the generic definition above, and very similar to *haemorrhoidalis* in colour, with the body generally brown when mature and antennal segments III–V and base of VI yellow, and structure differing as follows: metascutal median reticulate area with anterior margin subequal to or longer than



FIGURES 1–7. *Heliothrips* species, mesonotum, metanotum and tergite I, 1–3: **(1)** *haemorrhoidalis*; **(2)** *similis* **sp.n.**; **(3)** *zucchi*. Antennae, 4–7: **(4)** *haemorrhoidalis*; **(5)** *similis* **sp.n.**;**(6)** *zucchi*; **(7)** *Neoheliothrips sylvanus* **comb.n**. (arrows indicate paired minute pores on first abdominal tergite).



FIGURES 8–9. *Heliothrips* species, tergites III–IV: **(8)** *haemorrhoidalis*; **(9)** *similis* **sp.n.** (arrows indicate tergal antecostal ridge; note reticulation strong or weak in front of this line).

lateral margins (Fig. 2), either without posterior flange or with weak flange not extending to anterior margin of metascutellum. Tergite I with median pair of minute setae arising on reticulate area (Fig. 2); tergites III–VIII with no, or with weak, reticulations in front of antecostal ridge medially (Fig. 9).

Measurements (holotype female in microns). Body length 1455. Head, length 195; width across cheeks 210. Pronotum, length 125; width 235. Fore wing length 680. Length of abdominal tergites IX 145, X 60. Antennal segments I–VIII length 17, 40, 75, 50, 45, 37, 15, 70; III about 3.3 times as long as wide, simple sense cone 22–27; IV simple sense cone 25, associated seta 54–59.

Male macroptera. Similar to female but smaller, body length 1080–1150. Tergite IX discal setae stout, spine-like, S1 25 microns long; pore plate on sternite III 95 microns wide, on VII 65 microns.

Specimens studied. Holotype female, **BRAZIL**, Jacarepaguá, Rio de Janeiro, from Mango leaves, 16.v.1948, Thomaz Borgmeier (Hood No. 1540) (USNM).

Paratypes: 3 males with same data as holotype; same locality, 1 male from bamboo, 21.vi.1948; Rio de Janeiro, 4 females, 1 male from *Eugenia* leaves, 10.vi.1948; leaf gall on *Eugenia*, 1 female, no date but collected Costa Lima; Bahia, 4 females, 2 males collected G. Bondar, 1926, with no further data; Minas Gerais, Viçosa, 9 females on *Miconia calvescens*, vi.1902 (all USNM).

Comments. This species seems to be closely related to *haemorrhoidalis* and is known only from the area between Rio de Janeiro, Bahia and Minas Gerais.

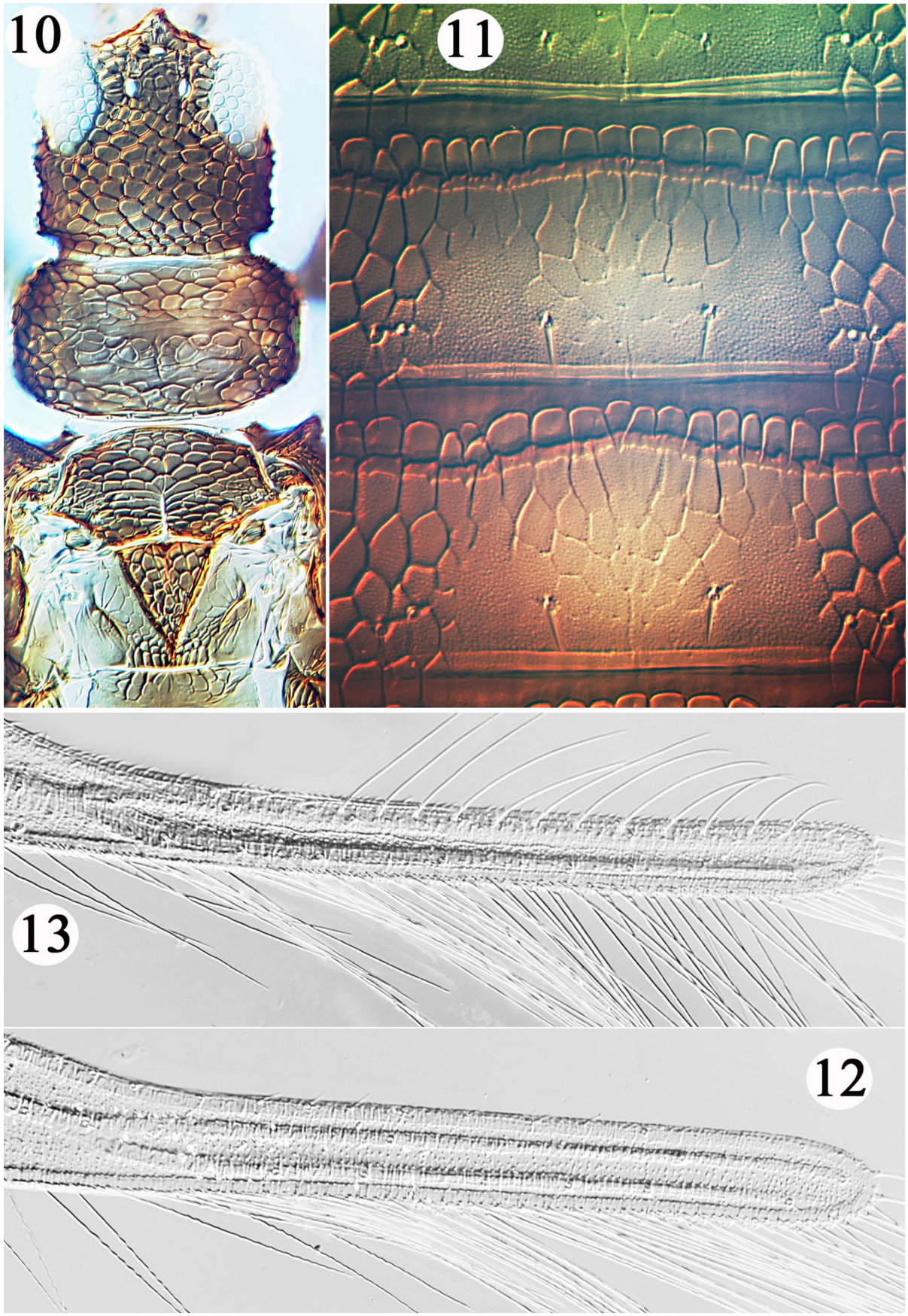
***Heliothrips zucchi* Mound & Monteiro**

(Figs 3, 6)

This species is known only from the original specimens that were collected in the southeastern part of Brazil, between São Paulo and Rio de Janeiro (Mound & Monteiro 1998). In structure it is very similar to *haemorrhoidalis* but is readily distinguished by all three pairs of femora being dark brown instead of as yellow as the tibiae. Antennal segment IV is also relatively shorter and stouter (Fig. 6).

***Neoheliothrips* gen.n.**

Diagnosis. Head, body and legs reticulate. Antennae 8-segmented, without microtrichia, III with pronounced basal flange, III and IV each with one simple sense cone, VIII much longer than VII. Head slightly longer than wide, compound eyes with 6 pigmented facets, maxillary palps 2-segmented. Pronotum with median transverse band of large irregular reticles. Mesoscutum with short posteromedian cleft; metascutum with prominent reticulate triangle.



FIGURES 10–13. *Neoheliothrips sylvanus* **comb.n**. 10–12: **(10)** head and thorax; **(11)** tergites V–VI; **(12)** fore wing; **(13)** *Heliothrips haemorrhoidalis* fore wing.

Tarsi 1-segmented. Fore wing apex rounded, first longitudinal vein distinct from costal vein (Fig. 12), both bearing minute setae, costa with no fringe cilia, posteromarginal cilia almost straight. Abdominal tergite I with paired minute median setae arising on reticulate area; tergites II–VII median setae small, distance between their bases more than twice their length; VII with no marginal comb, VIII with posteromarginal comb weak or absent medially; IX and X with no microtrichia, X with longitudinal split.
Type species: *Heliothrips sylvanus* Faure.

Comments. Although generally similar in appearance, this new genus differs from *Heliothrips* in having the fore wing first vein distinct from, and parallel to, the costal vein (Fig. 12), there are no cilia on the costal vein, tergites II–VI median setae are small and much shorter than the distance between their bases (Fig. 11), tergite IX does not have a small band of microtrichia near the posterior margin, and antennal segment III has a pronounced basal flange (Fig. 7). The genus is erected for a single polyphagous species from South Africa. These character states suggest that *Neoheliothrips* is not sister-group to *Heliothrips*. However, data provided by Mound *et al*. (2001) indicate that it is sister-group to four genera that include *Heliothrips* and *Australothrips*. Molecular data is required to further examine these relationships, but the data provided by Buckman *et al*. (2013) indicate that within the Panchaetothripinae *Australothrips* is also well separate from *Heliothrips*.

***Neoheliothrips sylvanus* (Faure) comb.n.**
(Figs 7, 10–12)

Described in 1933 as a species of *Heliothrips*, the legs of both sexes are uniformly dark brown, and the fore wing and scale are dark at the base. The males have pore plates on sternites III–VII decreasing in size from broadly oval and about 80 microns wide on III, to narrowly oval and 60 microns on VII. This thrips is considered a pest on several fruit crops in South Africa, including table grapes and persimmons (Allsopp 2009), and the illustrations presented here are based on specimens from these crops. The species is recorded by zur Strassen (2006) from the following Provinces of South Africa-Limpopo, KwaZulu-Natal, East Cape and West Cape.

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