First Record of Heliothrips haemorrhoidalis (Thysanoptera: Thripidae) Causing Damage on Greenhouse Strawberries

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First record of *Heliothrips haemorrhoidalis* (Thysanoptera: Thripidae) causing damage on greenhouse strawberries

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Characteristic silvery patches made by thrips (Thysanoptera) were observed on leaves of semi-hydroponic greenhouse strawberries (*Fragaria × ananassa* Duch.; Rosaceae) 'Camino Real' cultivar, in Curitiba, Paraná, Brazil (25.428888°S; 49.267500°W), in Sep 2017. Forty-nine adult insects were collected and preserved in AGA solution (1:1:10 parts of glycerin, glacial acetic acid, and ethyl alcohol 60%, respectively). Specimens were slide-mounted (Mound & Kibby 1998) and identified as the greenhouse thrips, *Heliothrips haemorrhoidalis* (Bouché) (Thysanoptera: Thripidae), based on specialized taxonomic keys (Mound & Marulo 1998; Nakahara et al. 2015).

All specimens obtained were females (Fig. 1a), with strongly reticulated head sculpture (Fig. 1b); 8-segmented antennae, antennal segments III–V and VII–VIII yellow, VI brown in apical half (Fig. 1c); pronotum poligonally reticulate, without long setae; metanotum with a bold and reticulate triangle, median setae short (Fig. 1d); tergites III–IV strongly reticulated, the median setae long and close to each other (Fig. 1e); wings hyaline, with round apex; and yellowish legs (Fig. 1f). The body color presented variation according to the life stage: recently emerged individuals had the head and thorax dark brown and the abdomen light brown (Fig. 2a), whereas in mature females the abdomen was dark brown, except by the paler segments IX and X (Fig. 2b). According to Bernardo et al. (2005), males are rare in this species, and reproduction is predominately by thelytokous parthenogenesis, where unfertilized eggs produce females (Fig. 2c).

Heliothrips haemorrhoidalis is native from South America, and it is known as highly polyphagous on the leaves of several unrelated plants. It has been reported on several crops, including coffee (*Coffea arabica* L.; Rubiaceae), orange (*Citrus aurantium* L.; Rutaceae), passionfruit (*Passiflora caerulea* Auct.; Passifloraceae) (Suris & González 2008), lime (*Citrus aurantiifolia* (Christm.) Swingle; Rutaceae), rose (*Rosa* sp. L.; Rosaceae), wild strawberry (*Fragaria vesca* L.; Rosaceae) (Etienne et al. 2015), and avocado (*Persea americana* Mill.; Lauraceae) (Larral et al. 2018). A greenhouse bioassay was conducted to confirm the damage caused by *H. haemorrhoidalis* in strawberries. Damage characterization was performed with cage-confined individuals following the methodology described by Nondillo et al. (2010). Each cage was set up with 1 leaf or 1 semi-ripe strawberry fruit, free from arthropod-induced damage, resulting in a total of 20 replicates for each plant part. Larvae (n = 10) and adults (n = 10) were placed in each cage using a fine paintbrush and kept confined for 72 h. A control was set up with an insect-free cage. Feeding damage was found on leaves and sepals. Thrips are piercing-sucking feeders, piercing the plant surface to feed on chlorophyll and other cell contents from plant tissue (Chhagan & Stevens 2007). As a consequence, silver-colored areas and black spots, due to deposition of excrement, appeared around feeding areas (Fig. 2c). Feces may act as a protective barrier against natural enemies (Denmark & Fasulo 2010) since, after oviposition, *H. haemorrhoidalis* were observed depositing excrement over the eggs.

Hyaliodocoris insignis (Stål) (Heteroptera: Miridae) and *Orius insidiosus* (Say) (Hemiptera: Anthocoridae) were observed preying on *H. haemorrhoidalis* adults and immatures, including larvae, prepupae, and pupae (Fig. 2a, b, f, g, and h). This is the first record of *H. insignis* preying *H. haemorrhoidalis*. So far, biological control studies have indicated approximately 10 natural enemies of the greenhouse thrips (CABI 2018). However, a parasitoid, *Thripobius semiluteus* Boucek (Hymenoptera: Eulophidae), has been considered the most efficient natural enemy for the control of *H. haemorrhoidalis* (McMurtry 1992; Bernardo et al. 2005; CABI 2018).

Vouchers specimens were deposited in the Padre Jesus Moure Museum, Federal University of Paraná, Curitiba, Brazil: *H. haemorrhoidalis* (DZUP 519163), *H. insignis* (DZUP 490170), and *O. insidiosus* (DZUP 490169).

This is the first report of *H. haemorrhoidalis* causing damage on strawberry crops in the world. Observations of beneficial agents naturally controlling *H. haemorrhoidalis* populations may provide new perspectives for future biocontrol programs for managing this species.

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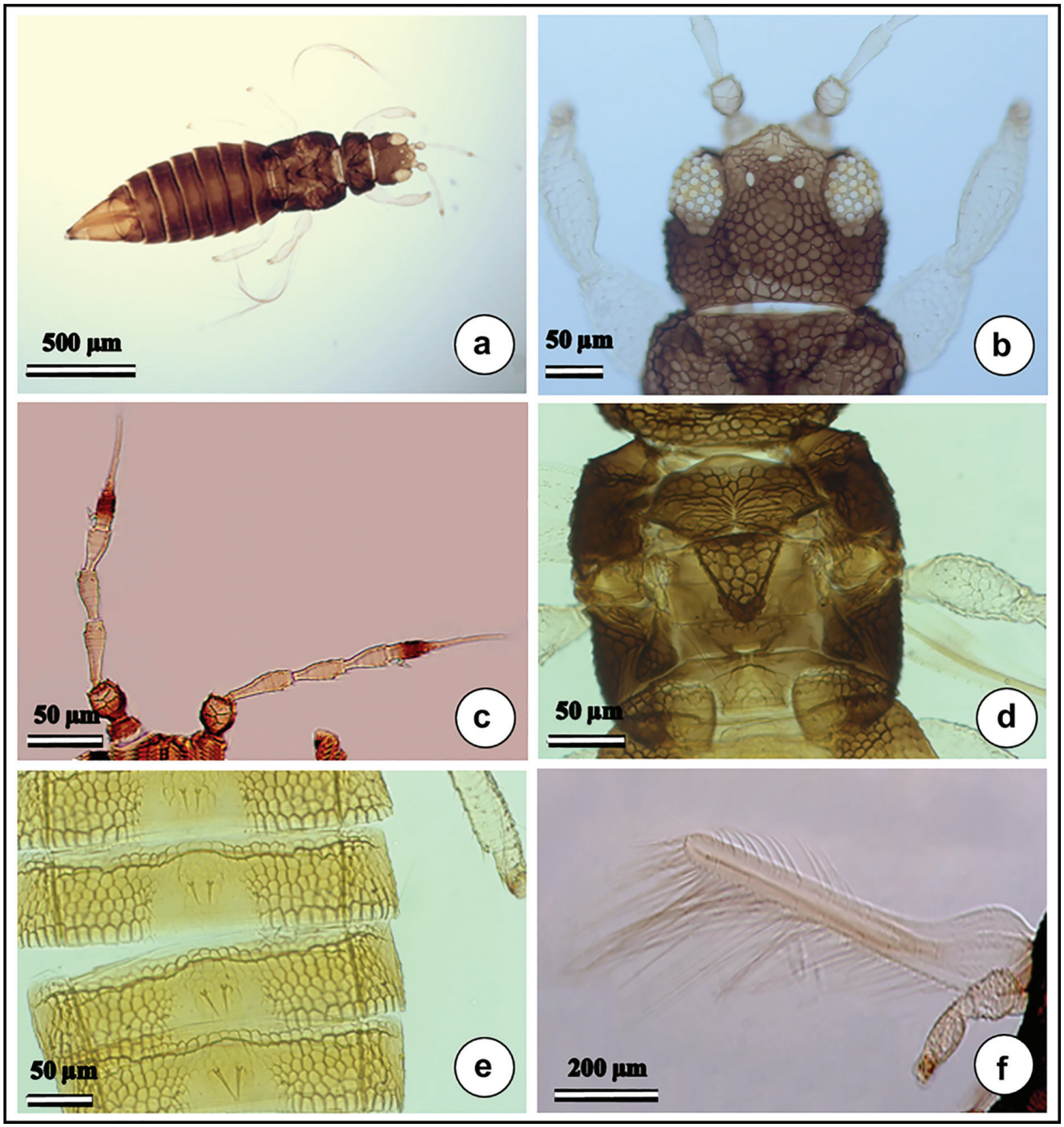

Fig. 1. Morphological characteristics of *Heliothrips haemorrhoidalis*: (a) female, (b) head and pronotum reticulated, (c) antennae, (d) mesonotum, metanotum, and tergite I–II reticulated, (e) tergites III–VI, and (f) forewing and leg.

Summary

Heliothrips haemorrhoidalis (Bouché, 1833) (Thysanoptera: Thripidae), the greenhouse thrips, is reported here for the first time damaging strawberry leaves and sepals (*Fragaria × ananassa* Duch.; Rosaceae) in the world. Two natural enemies were observed preying on the species: *Hyaliodocoris insignis* (Stål, 1860) (Heteroptera: Miridae) and *Orius insidiosus* (Say, 1832) (Hemiptera: Anthocoridae).

Key Words: *Fragaria × ananassa*; greenhouse thrips; leaf damage; natural enemies

Sumário

Heliothrips haemorrhoidalis (Bouché, 1833) (Thysanoptera: Thripidae), o tripes-das-casas-de-vegetação, é relatado pela primeira vez danificando folhas e sépalas de morangueiro (*Fragaria × ananassa*

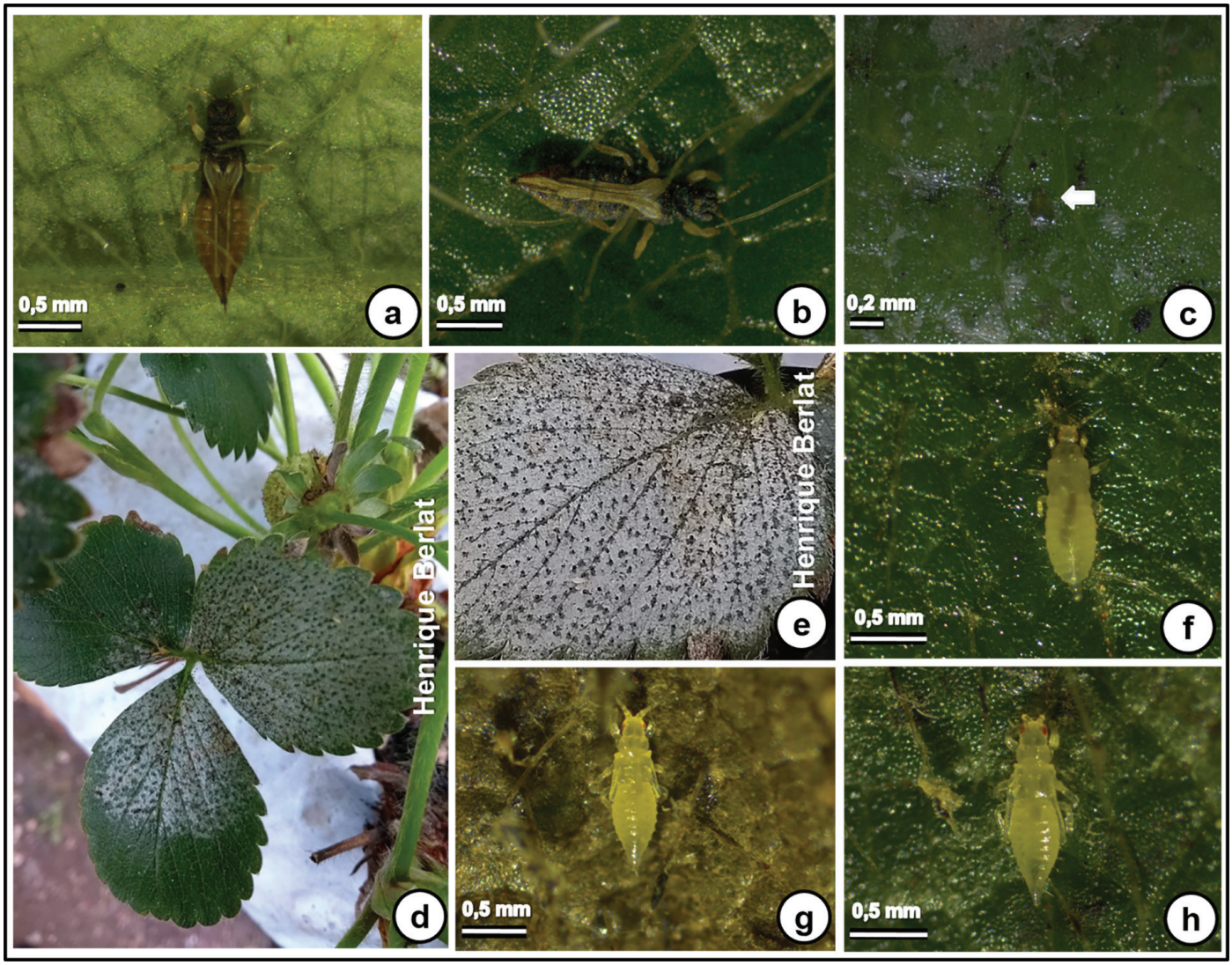

Fig. 2. *Heliothrips haemorrhoidalis* and its damage in strawberry plants: (a) teneral female, (b) mature female, (c) egg, (d) damage on leaves, (e) leaf chlorosis and fecal specks, (f) larva, (g) pre-pupa, and (h) pupa.

Duch.; Rosaceae) no mundo. Dois inimigos naturais foram observados predando a espécie: *Hyaliodocoris insignis* (Stål, 1860) (Heteroptera: Miridae) e *Orius insidiosus* (Say, 1832) (Hemiptera: Anthocoridae).

Palavras Chave: *Fragaria × ananassa*; tripes-das-casas de-vegetação; dano foliar; inimigos naturais

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