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New findings of thrips (Thysanoptera: Thripidae) on plants in Brazil

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Most studies on Thysanoptera in Brazil deal with species of agricultural importance (Alves-Silva & Del-Klaro 2010). Because few studies have treated the thrips fauna in this country (Monteiro 2002; Mound 2014), information on distribution and damage, even for native or long-introduced species, is scarce. Here, we report damage caused to 7 crop plants by 6 native or long-introduced thrips species (Thysanoptera: Thripidae) in Brazil. Associations involving *Retithrips syriacus* (Mayet) were previously known, but descriptions of the damage caused by these species are superficial or lacking. All other records presented here represent new plant associations (Table 1).

Thrips were collected occasionally from Jan 2012 to Oct 2014 in several Brazilian states (details in Material Examined), preserved in vials with AGA solution (glacial acetic acid, glycerin, and 60% ethylic alcohol at 1:1:10) or 60% ethylic alcohol, and mounted on permanent microscope slides (Mound & Marullo 1996) for identification. Voucher specimens were deposited at the Thysanoptera collection of the Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ/USP) and at the Coleção de História Natural da Universidade Federal do Piauí (CHNUFPI). Adults and immatures were collected and identified (Speyer & Parr 1941; Heming 1991; Vierbergen et al. 2010) in all surveys, enabling the establishment of host associations.

Caliothrips phaseoli (Hood) and *Dinurothrips hookeri* Hood were observed associated with damage on leaves of mint, *Mentha* sp. (Lamiales: Lamiaceae). Although the 2 species were found together, the few specimens of *C. phaseoli* collected were probably incidental. *Caliothrips phaseoli* is an important pest of common bean and soybean, especially in dry seasons (Monteiro et al. 1999). The injuries on mint caused silvering of leaves, with consequent necrosis (Fig. 1a–c). A high infestation of *D. hookeri* was observed, which led to the death of mint plants. In Brazil, *D. hookeri* is not known as a pest of any crop.

Frankliniella insularis (Franklin) (Fig. 1d) caused puncture marks and light and dark patches of various sizes (Fig. 1e–g) on rose (varieties of *Rosa x grandiflora* Lindl.; Rosales: Rosaceae) flowers. As the appearance is important for consumer acceptance, sales of these ornamentals are compromised by thrips attack. At the collection site, successful releases of *Orius insidiosus* (Say) (Heteroptera: Anthocoridae) were performed to reduce the thrips population. *Frankliniella insularis* has been reported as a minor pest of legumes such as pigeon pea (*Cajanus* species) and yam bean (*Pachyrhizus* species) (Fabales: Fabaceae) in Central America (Hoddle et al. 2012). In Brazil, it has also been reported as a pest of orange (Sapindales: Rutaceae) (Bondar 1929), but in view of the confusion regarding the taxonomy of *Frankliniella* in the beginning of the 20th century and the lack of voucher specimens (Cavalleri & Mound 2012), this record likely represents a misidentification. Since then, *F. insularis* has not been recorded as a pest of any crop plants in the country (Monteiro et al. 1999; Lima 2013).

Heliothrips haemorrhoidalis (Bouché) (Fig. 1h and i) caused the appearance of chlorotic spots on the upper sides and undersides of leaves of *Plumeria* sp. (frangipani) (Gentianales: Apocynaceae). Characteristic and abundant dark spots (fecal material) were observed (Fig. 1j and k). This polyphagous pest thrips is widely recorded in Brazil, where it is associated with more than 20 plant species (Monteiro et al. 1999; Lima et al. 2012).

Associations between *R. syriacus* (Fig. 1l and m) and *Rosa* sp. (rose) (Rosales: Rosaceae) and *Terminalia catappa* L. (tropical almond) (Myrtales: Combretaceae) were previously known, but information on dam-

Table 1. Thrips species and plants attacked.

Thrips species	First record	Plants associated
Caliothrips phaseoli[N]	Bondar 1930a	*Mentha* sp. (leaves)[a]
Dinurothrips hookeri[N]	Bondar 1930b	*Mentha* sp. (leaves)[a]
Frankliniella insularis[N]	Bondar 1927	*Rosa x grandiflora* (flowers)[a,b]
Heliothrips haemorrhoidalis[N]	Bondar 1925	*Plumeria* sp. (leaves)[a]
Retithrips syriacus[E]	Bondar 1924	*Terminalia catappa* (leaves) *Rosa* sp. (leaves)
Selenothrips rubrocinctus[E]	Lima 1921	*Liquidambar styraciflua* (leaves)[a]

[N]Native; [E]exotic; [a]first record of association in Brazil; [b]varieties Greta, Marlyse, and Hollywood.

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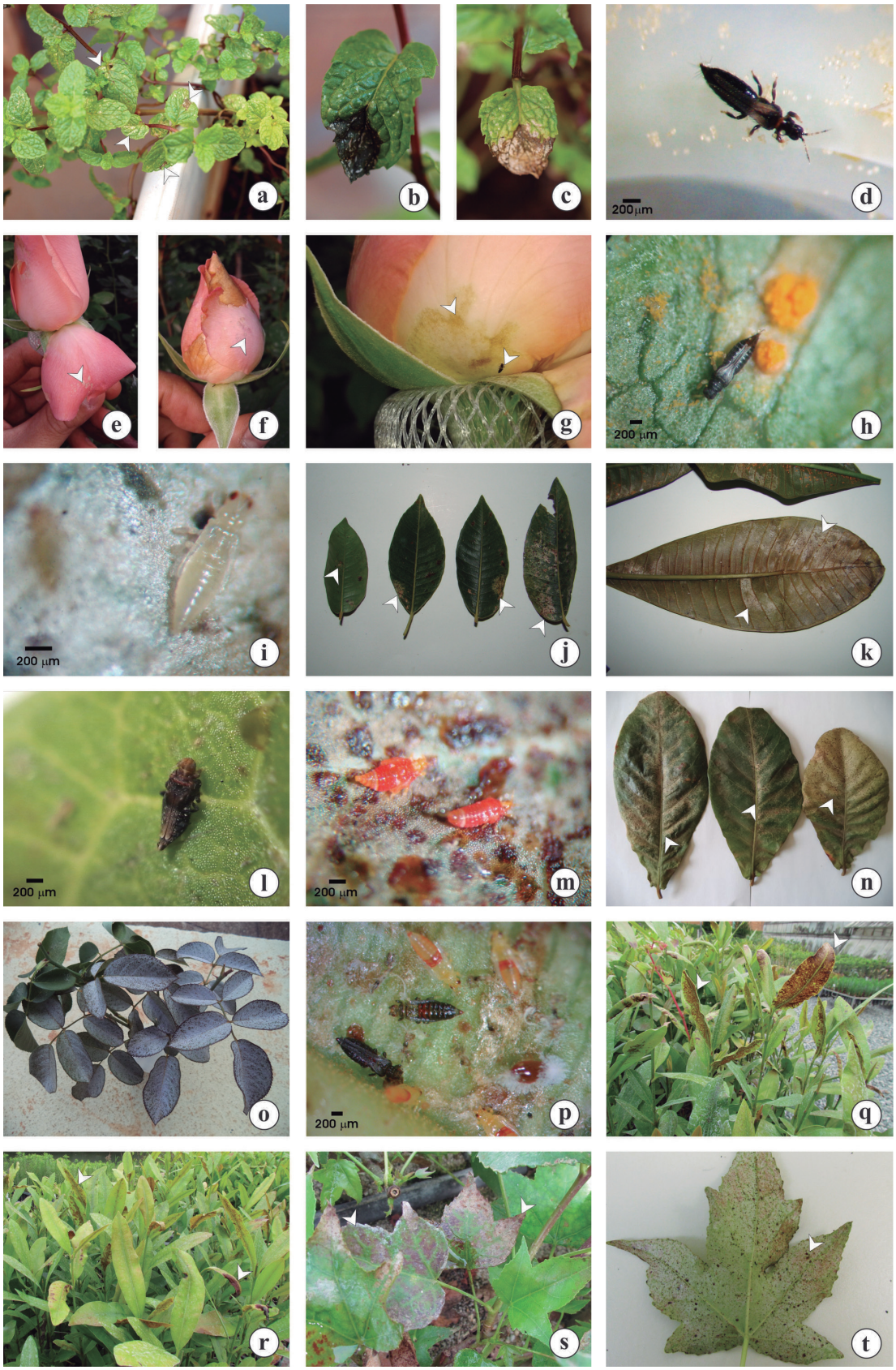

Fig. 1. Thrips and damage to cultivated plants. a,b,c: Damage from *Dinurothrips hookeri* to *Mentha* sp. leaves; d: *Frankliniella insularis* (adult); e, f, g: damage from *F. insularis* to rose flowers; h: *Heliothrips haemorrhoidalis* (adult); i: *H. haemorrhoidalis* (pupa); j: damage from *H. haemorrhoidalis* to *Plumeria* sp. leaves (upper side); k: damage from *H. haemorrhoidalis* to *Plumeria* sp. leaf (underside); l: *Retithrips syriacus* (adult); m: *R. syriacus* (immatures); n: damage from *R. syriacus* on *Terminalia catappa* leaves; o: damage from *R. syriacus* on *Rosa* sp. leaf; p: *Selenothrips rubrocinctus* (adult and immatures) on *Calophyllum brasiliense* leaf; q, r: damage from *S. rubrocinctus* on *C. brasiliense*; s, t: damage from *S. rubrocinctus* on *Liquidambar styraciflua*.

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age is scarce and mostly available only from a few papers published in the beginning of the 20th century (Bondar 1924, 1926). The damage to both plant species was similar, i.e., silvering, especially near the veins (Fig. 1n and o). Dark spots (fecal material) could be seen at the sites of insect feeding. In roses, heavier damage than in almond was observed, sometimes on the entire leaf (Fig. 1o). In Brazil, *R. syriacus* is a pest of grapevines (*Vitis* species; Vitales: Vitaceae), eucalyptus (*Eucalyptus* species) (Myrtales: Myrtaceae) (Monteiro et al. 1999) and physic nut (*Jatropha curcas* L.) (Malpighiales: Euphorbiaceae) (Bondar 1926; Silva et al. 2008).

Selenothrips rubrocinctus (Giard) is a key pest of *Theobroma cacao* L. (Malvales: Malvaceae) (cocoa) in Brazil, but it also attacks many other plant species, especially fruit crops (Lima & Zucchi 2015). Here, we report damage to *Calophyllum brasiliense* Cambess (Malpighiales: Calophyllaceae) (guanandi). Adults, all immature instars, and eggs were observed in greenhouses on almost all guanandi plants (Fig. 1p). Adults oviposited and fed on young leaves, especially on the underside. The damage became apparent after the leaves matured, around 2 wk after the emergence of shoots (Fig. 1q and r). As the attack proceeded, the leaves turned silver and bronze and aborted, affecting the development of the plant by reducing the photosynthetic area. *Selenothrips rubrocinctus* is the second species of thrips recorded as damaging guanandi in Brazil, after *Danothrips trifasciatus* Sakimura (Thomazini & Lima 2014), which causes symptoms (curling on the edges of new leaves, which become gnarled and brittle) that are different from those caused by *S. rubrocinctus*. At the same collection site, damage from *S. rubrocinctus* to *Liquidambar styraciflua* L. (Saxifragales: Altingiaceae) (sweetgum) was observed for the first time in Brazil. Specimens were collected in greenhouses and caused discoloration and necrosis of the leaves, with abundant black fecal material (Fig. 1s and t).

Material Examined

Caliothrips phaseoli. BRAZIL. Acre: Rio Branco (9.9772222°S, 67.8408333°W), on mint (*Mentha* sp.) leaves, 15-VIII-2014, 2♀ (R.S. Santos col.).

Dinurothrips hookeri. BRAZIL. Acre: Rio Branco (9.9772222°S, 67.8408333°W), on mint (*Mentha* sp.) leaves, 15-VIII-2014, 30♀, 4♂, 5 immatures (R.S. Santos col.).

Frankliniella insularis. BRAZIL. São Paulo: Atibaia (23.0163889°S, 46.5733333°W), on rose (*Rosa x grandiflora* 'Greta', 'Marlyse', and 'Hollywood') flowers, V-2012 to VII-2012, 49♀, 4♂, 12 immatures (L. Saito col.).

Heliothrips haemorrhoidalis. BRAZIL. Piauí: Teresina (5.0891667°S, 42.8019444°W), on frangipani (*Plumeria* sp.) leaves, 26-VII-2012, 12♀, 5 immatures (E.F.B. Lima col.).

Retithrips syriacus. BRAZIL. São Paulo: Piracicaba (22.7183333°S, 47.6341667°W), on rose (*Rosa* sp.) leaves, 7-XI-2013, 8♀, 14 immatures (E.N. Lopes col.); São Paulo: Piracicaba (22.7125000°S, 47.6286111°W), on tropical almond (*Terminalia catappa*) leaves, 5-XII-2013, 11♀, 19 immatures (E.N. Lopes col.).

Selenothrips rubrocinctus. BRAZIL. Paraná: Colombo (25.3205556°S, 49.1586111°W), on guanandi (*Calophyllum brasiliense*) and sweetgum (*Liquidambar styraciflua*) leaves, 14-X-2014, 46♀, 36 immatures (M. Thomazini col.).

Summary

Damage caused by thrips (Thysanoptera: Thripidae) to several plant species in Brazil is described and illustrated for the first time, namely: *Caliothrips phaseoli* (Hood) and *Dinurothrips hookeri* Hood to *Mentha* sp. (Lamiales: Lamiaceae); *Frankliniella insularis* (Franklin) to varieties of *Rosa x grandiflora* Lindl. (Rosales: Rosaceae); *Heliothrips haemorrhoidalis* (Bouché) to *Plumeria* sp. (Gentianales: Apocynaceae); *Retithrips syriacus* (Mayet) to *Terminalia catappa* L. (Myrtales: Combretaceae) and *Rosa* sp.; and *Selenothrips rubrocinctus* (Giard) to *Calophyllum brasiliense* Cambess (Malpighiales: Calophyllaceae) and *Liquidambar styraciflua* L. (Saxifragales: Altingiaceae). The associations between *R. syriacus* and plants have been reported previously, but information on damage caused by this species is sparse or nonexistent. All other plant associations herein mentioned are first records.

Key Words: pest; damage; record; host association

Sumário

Danos causados por tripes (Thysanoptera: Thripidae) em várias plantas são descritos e ilustrados pela primeira vez no Brasil, a saber: *Caliothrips phaseoli* (Hood) e *Dinurothrips hookeri* Hood em *Mentha* sp. (Lamiales: Lamiaceae); *Frankliniella insularis* (Franklin) em *Rosa x grandiflora* Lindl. (Rosales: Rosaceae); *Heliothrips haemorrhoidalis* (Bouché) em *Plumeria* sp. (Gentianales: Apocynaceae); *Retithrips syriacus* (Mayet) em *Terminalia catappa* L. (Myrtales: Combretaceae) e *Rosa* sp.; *Selenothrips rubrocinctus* (Giard) em *Calophyllum brasiliense* Cambess (Malpighiales: Calophyllaceae) e *Liquidambar styraciflua* L. (Saxifragales: Altingiaceae). As associações entre *R. syriacus* e as respectivas plantas são registradas, mas informações sobre os danos causados por essa espécie são escassas ou desconhecidas. Todas as outras associações com as plantas, mencionadas neste trabalho, são primeiros registros.

Palavras Chave: pragas; danos; registros; associação hospedeira

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