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Ceratothripoides brunneus (Thysanoptera: Thripidae) recorded from Florida

Thomas Skarlinsky^{1,*}, Joe Funderburk², and Felipe Soto-Adames³

The African thrips *Ceratothripoides brunneus* Bagnall (Thysanoptera: Thripidae) is widely distributed throughout Sub-Saharan Africa, where it is an important pest of tomatoes, eggplant, peppers, and other Solanaceae (Moritz et al. 2016). Historical specimens from various museum collections examined by Mound & Nickle (2009) suggested that the original range of *C. brunneus* was confined to the Afrotropical region. However, more recent reports include specimens collected from Puerto Rico (Mound & Nickle 2009), Malaysia (Mound & Azidah 2009), Cuba (Suris & Rodriguez-Romero 2011), Indonesia (Sartiami & Mound 2013), and Guadeloupe (Etienne et al. 2015), indicating that *C. brunneus* has moved beyond its native range, presumably transported by the horticultural trade (Mound & Azidah 2009). In North America, *C. brunneus* was intercepted at U.S. ports of entry (Nickle 2003, 2009) but has not been reported outside of quarantine environs. Here we report for the first time the collection of *C. brunneus* from vegetation in North America.

Little is published about the biology of *C. brunneus* (Macharia et al. 2015). The species was identified as a likely pollinator of *Napoleonaea vogelii* Hook. & Planch. (Napoleonaceae) trees in Gabon, Africa (Frame & Durou 2001). Adults of *C. brunneus* were collected from a variety of plant species, including cultivated crops and weeds (Table 1). Macharia et al. (2015) recorded *C. brunneus* as the most abundant thrips species in 4 major tomato production areas in Kenya. There are no reports of larvae collected in association with adults on host plants that would demonstrate a host-plant relationship (sensu Mound 2013: a plant on

which an insect rears its young), but according to Moritz et al. (2016), *C. brunneus* breeds mostly on leaves. Identification of host plants not only provides a quantitative measure of a plant's suitability for completion of the insect's life cycle but also indicates the source of the pest population (Terry 1997). *Ceratothripoides brunneus* is not known to transmit tospoviruses but, given that the congener *C. claratris* (Shumsher) (Thysanoptera: Thripidae) is a vector of *Capsicum chlorosis virus* in tomatoes (Premachandra et al. 2005), the potential of *C. brunneus* as a vector should be investigated in more detail (Macharia et al. 2015).

Mound & Nickle (2009) provided a complete morphological diagnosis of the genus *Ceratothripoides* and the 5 species currently included, all of which previously were confined to the Old World tropics (ThripsWiki 2016). Four Neotropical species originally placed in *Ceratothripoides* were re-assigned to the genus *Retanathrips*, based on 3 synapomorphies not shared with the Old World forms. Other morphologically similar genera include *Pezothrips*, *Megalurothrips*, *Odontothrips*, and *Odontothripella* (Mound & Nickle 2009).

Females and males of *C. brunneus* were collected in Miami-Dade County, Florida (25.63955°N, 80.29462°W), from the flowers of *Asystasia gangetica* (L.) T. Anderson (Acanthaceae) (chinese violet, ganges primrose), an invasive and widely distributed weed in south Florida (Langeland et al. 2008). Specimens were slide prepared, identified using dichotomous keys (Mound & Marullo 1996; Mound & Nickle 2009; Masumoto 2010), and compared with voucher specimens from

Table 1. Plant taxa with collected adults of *Ceratothripoides brunneus* from published reports.

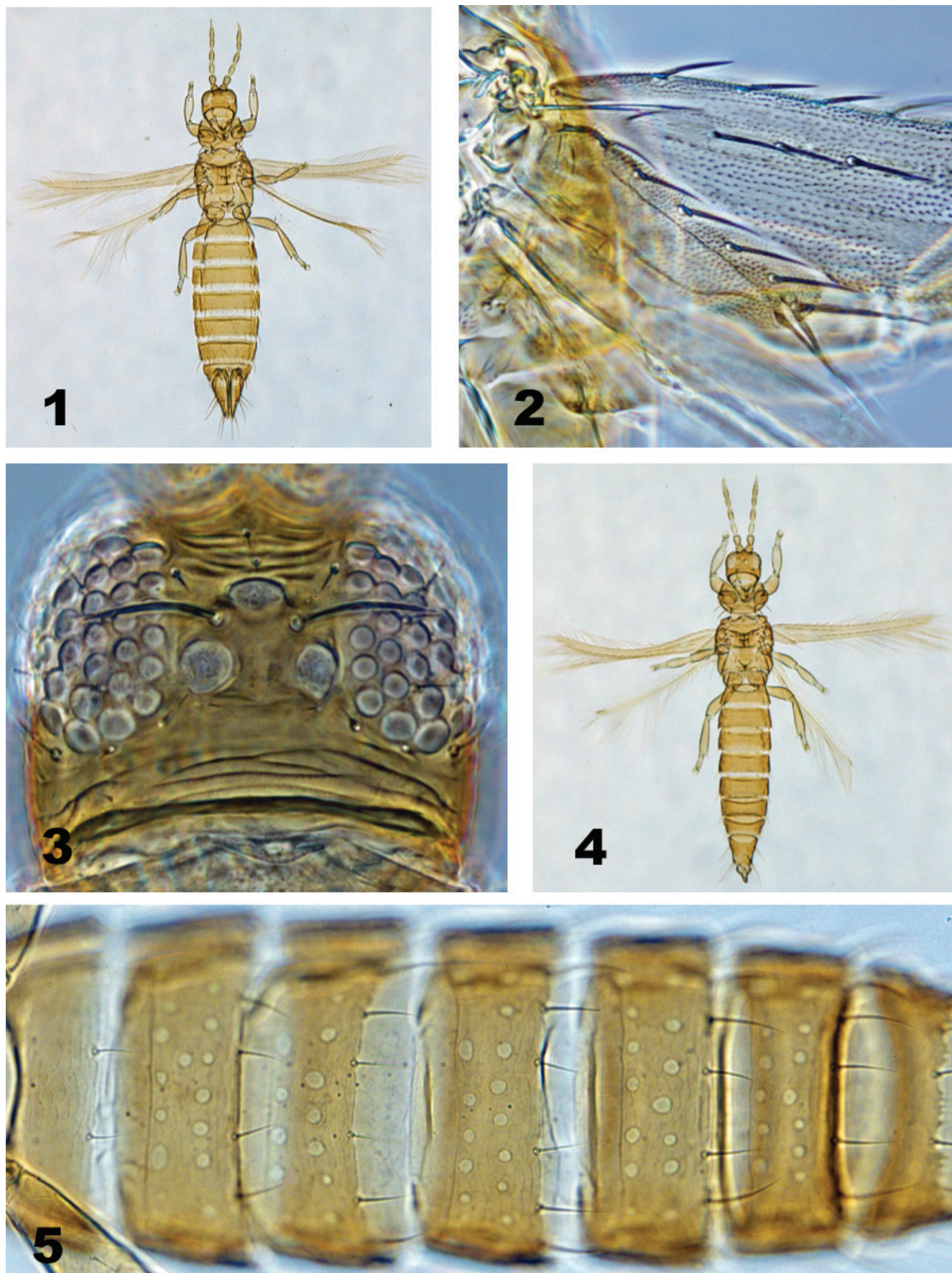
Plant	Reference
<i>Salvia farinacea</i> Benth. (Lamiaceae), <i>Solanum melongena</i> L. (Solanaceae), <i>Tabernaemontana coronaria</i> (L.) Willd. (Apocynaceae), <i>Thunbergia erecta</i> (Benth.) T. Anderson (Acanthaceae), <i>Thunbergia laurifolia</i> Lindl. (Acanthaceae), <i>Vigna unguiculata</i> L. (Fabaceae)	Azidah 2011
<i>Lycopersicon esculentum</i> Miller (Solanaceae)	Etienne et al. 2015
<i>Solanum lycopersicum</i> L. (Solanaceae), <i>Datura stramonium</i> L. (Solanaceae), <i>Tithonia diversifolia</i> (Hemsl.) A. Gray (Asteraceae), <i>Bidens pilosa</i> L. (Asteraceae), <i>Acanthospermum hispidum</i> D. C. (Asteraceae), <i>Galinsoga parviflora</i> Cav. (Asteraceae), <i>Amaranthus hybridus</i> L. (Amaranthaceae), <i>Brassica oleracea</i> var. <i>capitata</i> L. (Brassicaceae), <i>B. oleracea</i> var. <i>acephala</i> D. C. (Brassicaceae), <i>Phaseolus vulgaris</i> L. (Fabaceae), <i>Cleome gynandra</i> L. (Cleomaceae), <i>Zea mays</i> L. (Poaceae)	Macharia et al. 2015
<i>Asystasia</i> sp. (Acanthaceae), <i>Hibiscus</i> sp. (Malvaceae), <i>Impatiens</i> sp. (Balsaminaceae), <i>Ocimum</i> sp. (Lamiaceae), <i>Orthosiphon</i> sp. (Lamiaceae), <i>Rhodomyrtus</i> sp. (Myrtaceae), <i>Salvia</i> sp. (Lamiaceae), <i>Solanum</i> sp. (Solanaceae), <i>Tabernaemontana</i> sp. (Apocynaceae), <i>Thunbergia</i> sp.	Mound & Azidah 2009
<i>Citrus</i> sp. (Rutaceae)	Mound & Nickle 2009
<i>Rosa</i> spp. (Rosaceae)	Sartiami & Mound 2013

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Figs. 1–5. *Ceratothripoides brunneus*: 1. female habitus; 2. female forewing scale; 3. female head; 4. male habitus; 5. male abdominal sternites II–VIII.

quarantine inspections of the United States Department of Agriculture-Animal and Plant Health Inspection Service-Plant Protection and Quarantine. Voucher specimens were deposited in the Florida State Collection of Arthropods (FSCA), Gainesville, Florida. An abbreviated morphological description and diagnosis relative to co-occurring species in Florida is provided.

A combination of characters and states distinguish females of *C. brunneus* from those of other common flower-inhabiting Thripidae in Florida. Body brown, forewings and scale shaded brown (Fig. 1). Forewing scale with 6–8 marginal setae and discal setae absent (Fig. 2). Antenna 8-segmented. Head with 3 pairs of ocellar setae. Ocellar setae pair I usually arranged longitudinally (Fig. 3). Metanotal campaniform sensilla absent. Abdominal tergal ctenidia absent, but tergite VIII possesses scattered microtrichia sublaterally that may be interpreted as ctenidia. Posteromarginal comb tergite VIII complete and composed of long, evenly spaced microtrichia.

The male, similar in color to the female (Fig. 4), is differentiated from other Thripidae males encountered in Florida by the presence of irregular transverse rows of round to oval pore plates on sternites III–VII (Fig. 5). The pore plates are visible on alcohol preserved specimens under the dissecting microscope.

Summary

The African thrips *Ceratothripoides brunneus* Bagnall (Thysanoptera: Thripidae) is reported for the first time from North America, collected from flowers of *Asystasia gangetica* (L.) T. Anderson (Acanthaceae) in Miami-Dade County, Florida. The affinity of *C. brunneus* for solanaceous plants in other regions of the world suggests that future detection in Florida commercial tomato, pepper, and eggplant production areas is possible. A literature summary of geographic distribution and biology and a morphological description of adults are provided.

Key Words: African thrips; description; distribution; Solanaceae; Miami-Dade County; first record

Sumario

Se reporta por primera vez el trips africano *Ceratothripoides brunneus* Bagnall (Thysanoptera: Thripidae) en América del Norte, recolectados sobre flores de *Asystasia gangetica* (L.) T. Anderson (Acanthaceae) en el condado de Miami-Dade, Florida. La afinidad de *C. brunneus* por las plantas solanáceas en otras regiones del mundo sugiere la posible detección de esta especie sobre las áreas comerciales de tomate, pimiento y berenjena de la Florida en el futuro. Se provee un resumen de la literatura de su distribución geográfica y biología y una descripción morfológica de los adultos.

Palabras Clave: trips de africanos; descripción; distribución; Solanaceae; Condado de Miami-Dade; primer registro

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