

Lost between types: a new species of *Chaetotheresia* TOWNSEND, 1931 (Diptera: Tachinidae: Dexiinae) discovered 200 years after collecting

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Abstract

A new species of the Neotropical genus *Chaetotheresia* TOWNSEND, 1931 is herein described from Brazil. It is based on a male paralectotype of *Stomoxys vexans* WIEDEMANN, 1830, a species currently assigned to the genus *Chaetogyne* BRAUER & BERGENSTAMM, 1889; a male paralectotype of *Musca crassa* WIEDEMANN, 1830, a species currently assigned to the genus *Chaetotheresia* TOWNSEND, 1931; and an unstudied additional male specimen. These specimens were collected in the early 19th century and, almost 200 years after being collected and described as part of the type series of different species, are here finally described as a new species, *Chaetotheresia confusa* sp.n. Photographs of the holotype male and a revised key to all species of the genus are given. In addition, we discuss the taxonomic history of *Stomoxys vexans*, in particular its lectotype designation.

Key words. Brazil, Dexiini, Neotropical region, new species, taxonomy.

Zusammenfassung

Eine neue Art der neotropischen Gattung *Chaetotheresia* TOWNSEND, 1931 aus Brasilien wird beschrieben. Sie basiert auf einem männlichen Paralectotypus von *Stomoxys vexans* WIEDEMANN, 1830, einer Art, die derzeit der Gattung *Chaetogyne* BRAUER & BERGENSTAMM, 1889 zugeordnet ist, einem männlichen Paralectotypus von *Musca crassa* WIEDEMANN, 1830, einer Art, die derzeit in die Gattung *Chaetotheresia* TOWNSEND, 1931 gestellt wird, und einem weiteren, bisher unbestimmten, männlichen Exemplar. Diese drei Exemplare, die im frühen 19. Jahrhundert gesammelt wurden, werden nun, fast 200 Jahre nach ihrer Aufsammlung und Beschreibung als Teil der Typenserien verschiedener Arten, hier endlich als neue Art, *Chaetotheresia confusa* sp.n. erkannt und beschrieben. Fotos des männlichen Holotypus und ein überarbeiteter Bestimmungsschlüssel zu allen Arten der Gattung *Chaetotheresia* werden bereitgestellt. Darüber hinaus diskutieren wir die taxonomische Geschichte der Art *Stomoxys vexans*, insbesondere ihre Lectotypus-Designierung.

Introduction

Natural History Museums serve as irreplaceable repositories of the planet's biological heritage, housing vast libraries of living and extinct life on Earth throughout its history. These collections are dynamic research centers where the work of discovery is perpetual. A critical function of these museums lies in their support of taxonomy, the foundational science of describing and classifying biodiversity. Entomological collections, with their millions of specimens, are particularly crucial in this endeavor. While new species are

frequently uncovered from recent field expeditions (KEMP 2017), a significant number are discovered in the old drawers and cabinets of museums themselves. As highlighted by FONTAINE et al. (2012), specimens routinely wait an average of twenty-one years before being examined and described. The process of naming a new species is meticulous and time-consuming, often leading to much longer periods of dormancy. It is not uncommon for specimens to reside in collections for twenty-one, fifty, or even over a hundred years before they can be detected and formally described.

While examining the rich Tachinidae collection of the Natural History Museum Vienna (NHMW), three specimens caught our attention. Two of them belonged to the so-called “Winthem Collection”. Wilhelm von Winthem (1799–1847), a merchant with talents and inclinations for natural history, amassed a huge collection of insects. Material from his collection was used by Christian Rudolph Wilhelm Wiedemann (1770–1840) to describe several species in the two volumes of the “Ausereuropäische zweiflügelige Insekten” (WIEDEMANN 1830). The Wiedemann collection was later purchased by Winthem, and then, in 1852, after his death, it was acquired by the NHMW (PONT 1995).

One of the specimens is a paralectotype male of *Musca crassa* WIEDEMANN, 1830, a species currently assigned to the genus *Chaetotheresia* TOWNSEND, 1931, while the other one is a paralectotype male of *Stomoxys vexans* WIEDEMANN, 1830, a species currently assigned to the genus *Chaetogyne* BRAUER & BERGENSTAMM, 1889. This latter species was problematic for WIEDEMANN (1830: viii), as the following quote (translated by PONT 2004) highlights: “... when I reached the genus *Stomoxys* in the preparation of my manuscript ... having also become aware through my own species *Stomoxys vexans* from Brazil that there are species of *Stomoxys* that resemble the stoutest Tachinids in their form ... The long proboscis suggests *Stomoxys* rather than *Tachina*, but everything else points in the opposite direction.” Therefore, he was unsure about the placement of this species; indeed, later it was transferred to the genus *Chaetogyne* BRAUER & BERGENSTAMM, 1889 (Dexiinae: Dexiini). Moreover, the type series consisted of different species, as one of the paralectotypes is herein recognized as a new species, and one as belonging to *Chaetotheresia crassa* (WIEDEMANN, 1830). The type series of the other species, *M. crassa*, also contains a paralectotype specimen that is herein included in the type material of our new species.

Finally, an additional specimen from Brazil, not studied or described before, labeled “Alte Sammlung” (old collection), completes the three specimens that constitute our newly described species. This label is commonly found in specimens that were already part of the NHMW before the inauguration of the contemporary building in 1889, consequently explaining the term “Alte Sammlung”. However, not all specimens from that period possess such a label, especially those belonging to specific collections (e.g., Winthem, Wiedemann, Natterer). Even so, there are cases where this label appears alongside more specific labels. Nevertheless, they are often attributed to specimens whose specific origin (e.g. collector or collection) is unknown. As a consequence, it is nearly impossible to make inferences about the origin and period during which such specimens were collected.

Therefore, almost 200 years later, we describe a new species based on specimens from different type series of previously described species. This new species belongs to *Chaetotheresia* following the revision and diagnosis of SANTIS & DIOS (2023). It represents the third species of this genus, which already includes the species *C. crassa* (WIEDEMANN, 1830) and *C. insolita* (WALKER, 1853), both from Brazil (SANTIS & DIOS 2023). Additionally, we discuss the taxonomic history of *S. vexans* and its lectotype designation. An updated identification key to the species of *Chaetotheresia* is also provided.

Material and methods

The material studied in this work is deposited in the Natural History Museum Vienna (NHMW), Austria. The description was performed with the aid of a Leica M165C stereomicroscope using a white light ring LED. Images of the holotype were taken using a Canon-EOS R5 with MP-E 65 mm lens coupled to a manual macro-metric rail and using external white light. Stacked images were combined using Helicon Focus (v8.2.2) applying method C, smoothing 3. The image plate was constructed with Adobe Photoshop 2025. Label data are cited in full within quotation marks (""), lines on the same label are separated by a single slash (/) and different labels are separated by a semicolon (;). Terminology applied follows CUMMING & WOOD (2017).

Taxonomy

Chaetogyne BRAUER & BERGENSTAMM, 1889

Chaetogyne BRAUER & BERGENSTAMM, 1889: 125. Type species: *Stomoxys vexans* WIEDEMANN, 1830, by monotypy.

Chaetogyne vexans (WIEDEMANN, 1830)

Stomoxys vexans WIEDEMANN, 1830: 248.

Type material examined. Lectotype (♂) here designated: "Brasilia/ St. Paula"; "vexans W/ Coll. Winthem"; "Chaetogyne/ vexans Wied. Type"; "Syntype/ Stomoxys/ vexans/ examined 1999/ P. Sehnal"; "(2)/ Typenkat./ P. Sehnal 1999"; "NHMW-ZOO-/ DIP-0001828". Paralectotype (♂): "Brasilia St. Paula/ Coll. Winthem"; "vexans W/ det. B.B."; "Whm"; "St. vexans/ St Paolo/ Brasilia/ De Winthem"; "assumed to be lectotype/ Det. D.M. Wood 1969"; "Syntype/ Stomoxys/ vexans/ examined 1999/ P. Sehnal"; "(1)/ Typenkat./ P. Sehnal 1999"; "NHMW-ZOO-/ DIP-0001827". Paralectotype (♀): "Brasilia/ Coll. Wiedem."; "Whm"; "vexans W/ det. B.B."; "? Syntype/ Stomoxys/ vexans/ examined 1999/ P. Sehnal"; "(3)/ Typenkat./ P. Sehnal 1999"; "NHMW-ZOO-/ DIP-0001830".

Taxonomic discussion. The type series available at the NHMW is composed of five type specimens, three males and two females. Three of these type specimens were examined by ALDRICH (1925: 116) in his series on the types of some dipterans at the NHMW. He concluded that one specimen (a male labeled "Brasilien, St. Paula"), with a presumably long proboscis (haustellum broken off just beyond the joint) and without median marginal setae, was conclusively a member of *S. vexans*, being considered by him as the "type" and thereby designated as lectotype. He also mentioned a female (labeled "Brasilien") with "the head partly eaten off, no proboscis remaining at all, but having 9–10 median marginals on second abdominal", being non-conspecific with *S. vexans*. Here, we confirm his hypothesis and conclude that this female belongs to *Chaetotheresia crassa*. Further, he mentioned an additional male specimen (labeled "Brasilien"), that was also considered non-conspecific with *S. vexans* mainly because it bears a short proboscis and four pairs of median marginal setae. Here, we confirm that this male specimen does not belong to *Chaetogyne* but to our new *Chaetotheresia* species.

Aldrich was probably not aware of the existence of two further type specimens (a male and a female) in the type series of *S. vexans* at the NHMW. This male specimen is also labeled "St. Paula" from "Brasilia" – both handwritten by Wiedemann, being conspecific with the "type" examined by Aldrich. In addition, the female not examined by him is also conspecific with *S. vexans*.

Here, we follow O'HARA & CERRETTI (2016: 11) in considering that a valid lectotypification can be regarded by "the mention of a "holotype" or "type" with accompanying details about its labelling, features, damage, etc., that clearly distinguishes that specimen from other syntypes" adhering to the Article 74.5 of the Code (ICZN 1999: 82–83). By considering the mention of "type" by Aldrich as the lectotype for *S. vexans* (specimen NHMW-ZOO-DIP-0001828), we are avoiding multiple definitions in the tachinid literature about the criteria to establish a lectotype and are closely following the Code.

However, it is worth mentioning that the type specimen bearing the handwritten label of Wiedemann (NHMW-ZOO-DIP-0001827) and not examined by Aldrich – with the additional information that Wood assumed this specimen to be lectotype (based on the label data) – would be the closest to what Wiedemann had before him when describing this species and a better choice for a "lectotype". Since Aldrich did not have access to this specimen, and based his assumptions solely on those three type specimens he had access to, with only one truly belonging to *S. vexans*, it is natural that he had selected it as the "type".

***Chaetotheresia* TOWNSEND, 1931**

Chaetotheresia TOWNSEND, 1931: 346. Type species: *Musca crassa* WIEDEMANN, 1830, by original designation.

***Chaetotheresia crassa* (WIEDEMANN, 1830)**

Musca crassa WIEDEMANN, 1830: 387.

Stomoxys vexans WIEDEMANN, 1830: 248 (in part, one female paralectotype).

Material examined. (♀, NHMW): "Brasilien"; "vexans W/ Coll. Winthem"; "Chaetogyne/ vexans Wied. Type"; "NHMW-ZOO-/DIP-0001829". Paralectotype of *Stomoxys vexans* WIEDEMANN, 1830.

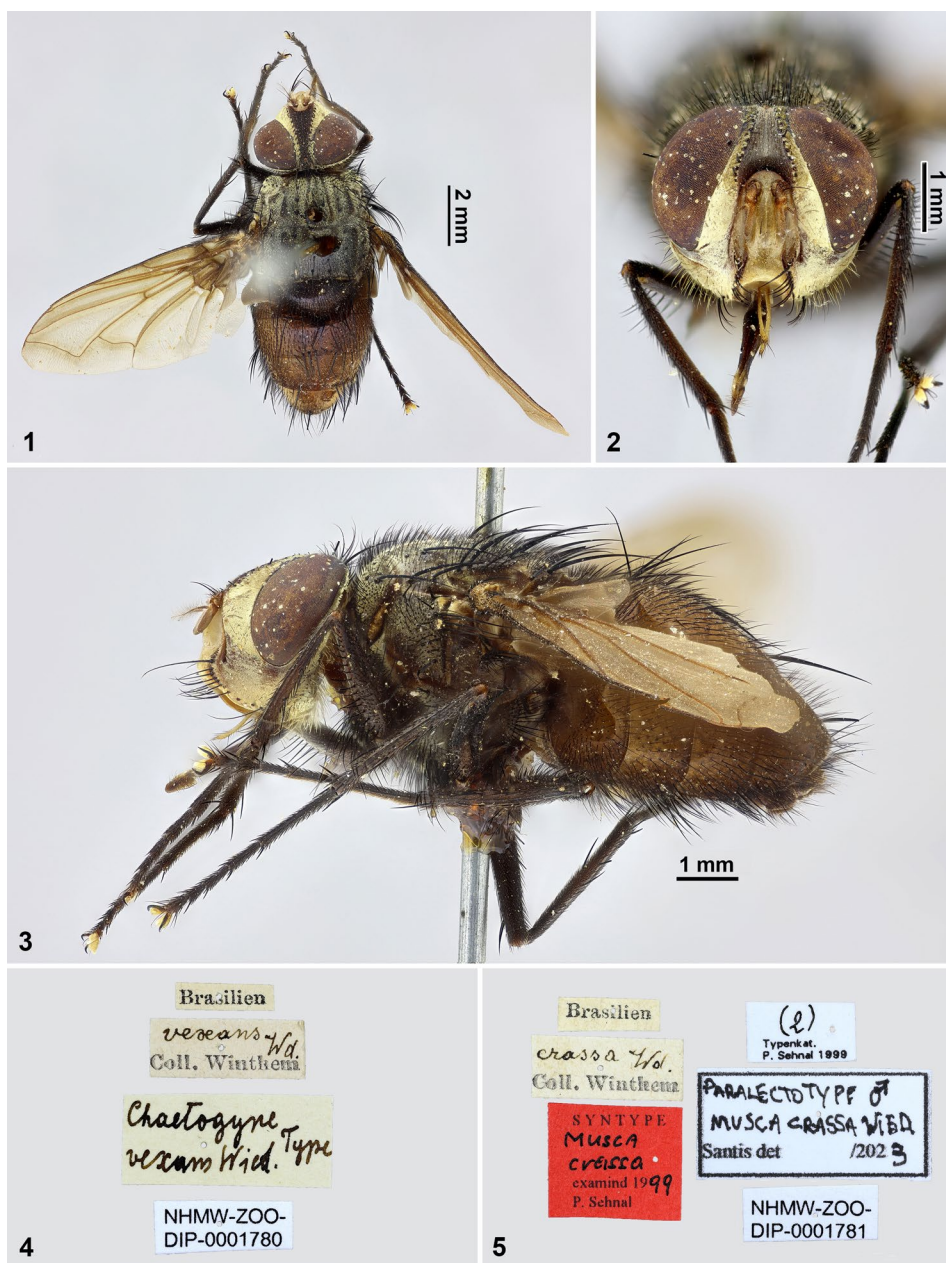
Taxonomic discussion. In a revision of *Chaetotheresia*, SANTIS & DIOS (2023) studied the type material of *C. crassa*, and argued that from the three syntypes, only two belong to *Musca crassa*. The third one being "... an additional male that is not conspecific ..." (SANTIS & DIOS 2023: 290, fig. 6). This is confirmed here, and this male specimen also pertains to our new species of *Chaetotheresia*.

***Chaetotheresia confusa* sp.n. (Figs 1–5)**

Musca crassa WIEDEMANN, 1830: 387 (in part, one male paralectotype); SANTIS & DIOS 2023: 290–292, fig. 6 (revision of *Chaetotheresia*).

Stomoxys vexans WIEDEMANN, 1830: 248 (in part, one male paralectotype).

Type material. Holotype (♂): "Brasilien"; "vexans Wd. [handwritten]/ Coll. Winthem"; "Chaetogyne/ Type/ vexans Wied. [handwritten]"; "NHMW-ZOO-DIP-0001780". Paralectotype of *Stomoxys vexans* WIEDEMANN, 1830. Fair condition, but head and most legs glued to the specimen, missing some setae on the thorax and abdomen (Figs 1–4). – Paratype (♂): "Brasilien"; "crassa Wd. [handwritten]/ Coll. Winthem"; "Syntype/ Musca/ crassa/ examined 1999/ P. Sehnal" ["Musca crassa" handwritten]; "(2)/ Typenkat./ P. Sehnal 1999"; "Paralectotype ♂/ Musca crassa Wied./ Santis det./ 2023"; "NHMW-ZOO-DIP-0001781" (Fig. 5). Paralectotype of *Musca crassa* WIEDEMANN, 1830. Fair condition, missing some setae and abdomen slightly damaged. – Paratype (♂): "Brasilia" [handwritten]; "Alte Sammlung"; "NHMW-ZOO-DIP-0001782". Poor condition, heavily molded.



Figs 1–5. *Chaetotheresia confusa* sp.n., holotype, male. (1–3) Habitus, dorsal (1), frontal (2), and lateral (3). (4) Labels of the holotype (also a paralectotype of *Stomoxys vexans*). (5) Labels of the paratype (also a paralectotype of *Musca crassa*).

Diagnosis. This species closely resembles *C. insolita*. To better differentiate both species, a comparative diagnosis is given as follows. Head with golden pruinosity (*C. insolita* is greyish); abdomen cylindrical (*C. insolita* is globose) and yellowish, to light brown, with greyish pruinosity (*C. insolita* with goldish pruinosity only on tergite 5); abdomen with median vitta on tergites 1+2, sometimes on 3; syntergite 1+2 without median marginal setae (*C. insolita* with one pair of short median marginal setae).

Description. Coloration (Figs 1–3): occiput golden, with long yellowish hairs. Head yellow, with light golden pruinosity. Antenna brownish. Arista dark brown. Palpus light yellow. Labellum and prementum brownish-black. Scutum with golden pruinosity, but presutural region with three median vittae brownish-black, and one pair of lateral vittae, narrow anteriorly and broad posteriorly, extending through postsutural region, but ending midway to it. Scutellum light brown. Pleura brownish with golden pruinosity. Wing smoky, more darkened in proximal area and along the veins. Tegula yellowish, basicosta tawny. Halter darkened. Posterior spiracle tawny to yellowish-brown. Legs brownish-black, but anterior surfaces of fore, mid, and hind femur light brown. Pulvilli yellow; claws light brown with darker tips. Upper and lower calypters dark brown. Abdomen light brown with brownish-greyish pruinosity, viewed dorso-posteriorly.

Head (Figs 1–3). Ocellar setae long, divergent and proclinate. Inner vertical seta decussate and reclinate, outer vertical seta decussate. Width of parafacial, measured at distance between inner margin of eye and antennal insertion, $1.5\times$ height of gena. Arista long plumose. Fronto-orbital plate with lowermost frontal seta not reaching antennal insertion. Postpedicel about $1.5\times$ the combined lengths of scape and pedicel. Fronto-orbital plate with setulae throughout its length, parafacial bare. Frontal vitta narrowed dorsally. Lower facial margin protruding, visible in profile. Vibrissa arising above lower facial margin. Gena about $0.3\times$ eye height. Prementum about $0.5\times$ head height. Labellum developed, about $0.4\times$ as long as prementum.

Thorax (Figs 1, 3). Acrostichal setae 4+4. Dorsocentral setae 3+4. Intra-alar setae 1+3. Intra-postalar seta absent. Supra-alar setae 2+4? (likely to have 4 setae, but the region is damaged by the pin). Postpronotal lobe with 5–6 setae. Notopleuron with two equal-sized setae. Postalar callus with three setae, the outer one weak. Propleuron setulose and prosternum bare. Anepimeron with numerous long setae. Katepisternal setae 2+2–3. Scutellum at least with four pairs of basal, one pair of long and divergent subapical, and one pair of strong, straight apical setae; numerous erect discal setae. Postmetacoxal area membranous. Anatergite bare. Posterior spiracle with posterior lappet larger than anterior. Katepimeron setulose.

Wing (Fig. 1). Costal spine undeveloped. Cell r_{4+5} open at wing margin; length of opening subequal to crossvein r-m. Crossvein dm-cu sinuous. Vein R_{4+5} with setulae ventrally and dorsally at base; with numerous erect setae.

Legs. Fore femur with posteroventral rows of setae; fore tibia with 6 median anterodorsal, 2 posteroventral in apical third, 4 preapical, 1 dorsal, 2 anterodorsal and 1 posteroventral setae. Mid femur with 6 anteroventral, 3 anterodorsal, and 6 preapical; mid tibia with 3 medial anteroventral and 1 posteroventral setae. Hind femur with posterodorsal and posteroventral rows of setae; hind tibia with rows of anterodorsal (5) and posterodorsal setae (6), 4 preapical, 2 anterodorsal, and 2 posteroventral setae. Claws and pulvilli elongate, fore claws and pulvilli longer than 5th tarsomere.

Abdomen (Figs 1, 3). Syntergite 1+2 with mid-dorsal longitudinal depression extending to posterior margin. Syntergite 1+2 with at least 2 pairs of lateral marginal setae; tergite 3 with marginal setae along the posterior margin (4–5 pairs); tergite 4 and 5 with marginal setae along the posterior margin. Abdomen fully covered with long setulae.

Distribution. Brazil (without precise location).

Etymology. The specific epithet *confusa* is derived from the Latin word “confusio”, meaning mixture or disorder. The name is a reference to the fact that the type specimens are part of a mixture of type specimens from the type series of two other species, viz., *Musca crassa* (currently in *Chaetotheresia*) and *Stomoxys vexans* (currently in *Chaetogyne*).

Revised key to species of *Chaetotheresia* TOWNSEND, 1931

based on SANTIS & DIOS (2023)

- 1 Thorax with goldish pruinosity dorsally; abdomen blackish. *C. crassa* (WIEDEMANN, 1830)
- Thorax with greyish to brownish pruinosity dorsally; abdomen mostly light brown. 2
- 2 Abdomen without pruinosity, except tergite 5 with golden-greyish pruinosity, viewed dorsally; syntergite 1+2 with 1 pair of short median marginal setae.
..... *C. insolita* (WALKER, 1853)
- Abdomen with brownish-greyish pruinosity, viewed dorso-posteriorly; syntergite 1+2 without median marginal setae. *C. confusa* sp.n.

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