diversity

MDPI

Article

The Crane Flies of Martinique, with the Description of Four New Species (Diptera, Tipuloidea)

Jorge Mederos [1,*], Marc Pollet [2,3] and Pjotr Oosterbroek [4]

[1] Museu de Ciències Naturals de Barcelona (MCNB), Departament d'Artròpodes, Passeig Picasso s/n, 08003 Barcelona, Catalonia, Spain
[2] Research Institute for Nature and Forest (INBO), Herman Teirlinckgebouw, Havenlaan 88 bus 73, B-1000 Brussels, Belgium
[3] Operational Directory Taxonomy and Phylogeny, Entomology, Royal Belgian Institute of Natural Sciences (RBINS), Vautierstraat 29, B-1000 Brussels, Belgium
[4] Naturalis Biodiversity Center, Darwinweg 2, 2333 CR Leiden, The Netherlands
* Correspondence: mederos@gmail.com

Abstract: The results of a first major inventory of the crane flies (Diptera: Tipuloidea) of the Lesser Antillean island of Martinique are presented here, based almost exclusively on pan trap sampling during 2018. A total of 27 species of crane flies were discovered, including four new species, *Teucholabis (Teucholabis) carbetensis* sp. nov., *Atypophthalmus (Atypophthalmus) vanewrighti* sp. nov., *Rhipidia (Rhipidia) martiniquensis* sp. nov. (all three Limoniidae), and *Zelandotipula gelhausi* sp. nov. (Tipulidae). Seven species have been identified till the morphospecies level, due to the exclusive capture of female specimens. In addition, the species *Zelandotipula parviceps* (Speiser, 1909) from Guadeloupe is redescribed, based on the study of the female holotype. A checklist of Limoniidae and Tipulidae of Martinique is provided.

Keywords: Neotropics; Caribbean; Pitons du Carbet; Limoniidae; Tipulidae; *Atypophthalmus*; *Rhipidia*; *Teucholabis*; *Zelandotipula*

Citation: Mederos, J.; Pollet, M.; Oosterbroek, P. The Crane Flies of Martinique, with the Description of Four New Species (Diptera, Tipuloidea). *Diversity* **2023**, *15*, 204. https://doi.org/10.3390/d15020204

Academic Editors: Andrey Przhiboro and Valeria Lencioni

Received: 18 December 2022
Revised: 25 January 2023
Accepted: 26 January 2023
Published: 1 February 2023

1. Introduction

Thus far, no crane flies (Diptera: Tipuloidea) have been recorded from the island of Martinique in the Lesser Antilles, an island arc at the southeastern part of the West Indies. The same holds true for Saint Lucia and Barbados. In contrast, 65 species are known from Dominica, 21 from Saint Vincent, 6 from Grenada, and 2 from Guadeloupe [1]. This is considered the result of a varied sampling effort on these islands, rather than a reflection of their true species diversity.

Martinique is situated between the islands of Dominica in the north and Saint Lucia in the south (Figure 1a). It measures 75 by 30 km and has an area of about 1.080 square km. The north is dominated by the steep volcanic mountain of Mont Pelée (up until 1.397 m a.s.l.) and the Pitons du Carbet (1.197 m a.s.l.). The Réserve Biologique Intégrale (RBI) des Pitons du Carbet (Figure 1a,b) is situated in the central part of northern Martinique and covers 12.400 ha. It comprises a mountain range with 5 peaks ('pitons'), as well as about 10 smaller hills ('mornes'). It is the most extensive montane forest area on the island and ranges in altitude between 174 and 1.197 m a.s.l. The area is strongly cut through by numerous rivers and streams born at higher altitudes. Rainfall is frequent and strong, especially on the summit of the Pitons [2].

Martinique is also known for a major catastrophic event that occurred in recent times, i.e., the explosion of the Mount Pelée volcano in 1902. The island is located at the eastern limit of the Caribbean plate, and is part of a subduction zone. This subduction process has formed a series of volcanic islands, from the Virgin Islands in the north to the islands off the coast of Venezuela in the south, which currently includes 21 active volcanoes. Since

this process is intrinsically associated with devastating cyclical events, the potential natural (partial or total) defaunization of the islands at a certain moment in their history could play an important role in the composition of natural communities.

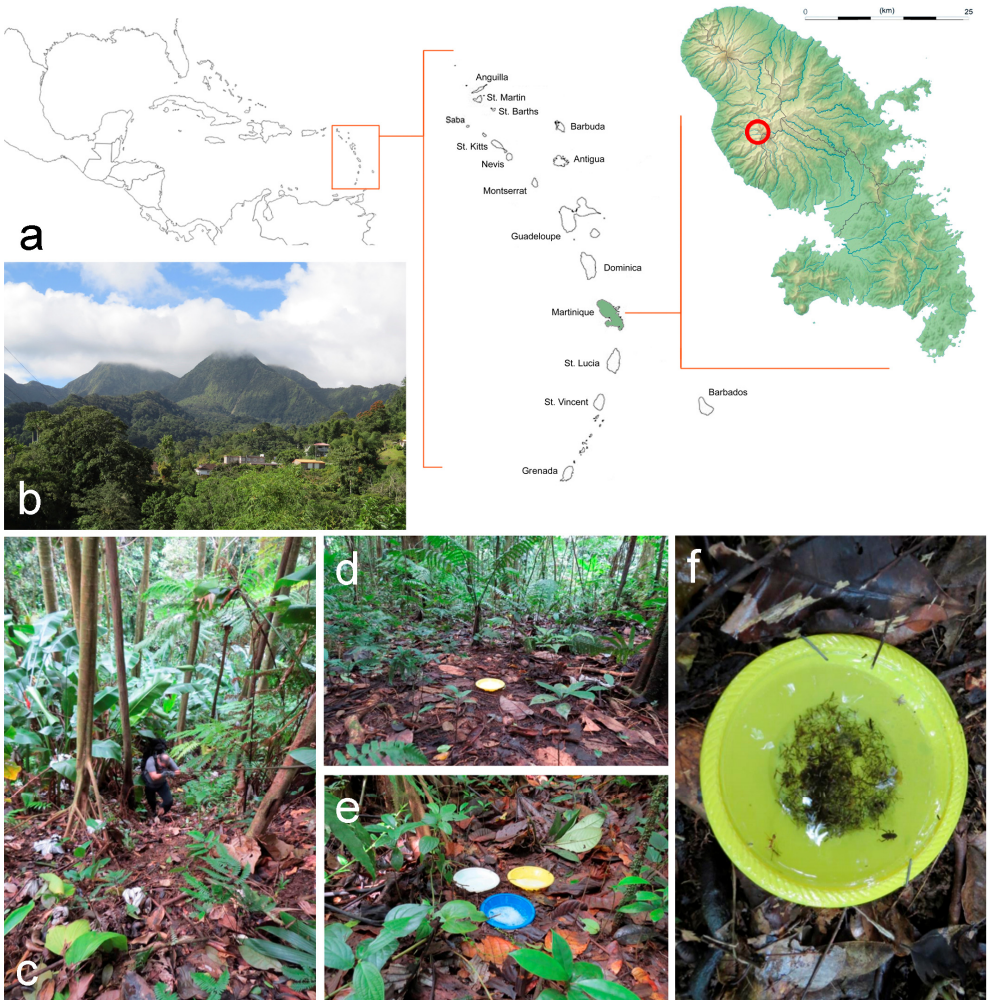

Figure 1. (**a**) Caribbean region and location of Martinique in the Lesser Antilles arc, with physical map of Martinique and location of Pitons du Carbet (red circle) in the Réserve Biologique Intégrale (RBI); (**b**) General view of the Pitons du Carbet; (**c**) Difficult accessibility to some of the prospected areas; (**d**–**f**) Pan traps in two of the eight sites, most of them with great effectiveness for Limoniidae and, in particular, for *Rhipidia (Rhipidia) willistoniana* (Alexander, 1929) (Images, M. Pollet).

During an expedition in the Réserve Biologique Intégrale (RBI) des Pitons du Carbet in January-February 2018, crane flies appeared to be, by far, the most abundant Diptera in the pan traps employed. This survey revealed the presence of 26 species of Limoniidae, including one new species in each of the genera *Teucholabis* Osten Sacken, 1860, *Atypophthalmus* Brunetti, 1911, and *Rhipidia* Meigen, 1818. Specimens of seven other species have not yet been identified at the species level. In addition, the only species of Tipulidae discovered on the island proved to be an undescribed species of *Zelandotipula* that was collected during a preceding survey in 2016–2017. In the present paper, we present the results of the expeditions, provide the description of the four new crane fly species, and add a first checklist of the crane flies of Martinique. The significance of these discoveries and the usefulness of the collecting methods is discussed in view of future surveys.

2. Materials and Methods

The 2018 survey consisted of two consecutive parts: (i) a two-week inventory of the RBI Pitons du Carbet (19/1–4/2/2018) and (ii) a one-week survey of mainly coastal sites in the south of the island (5–13/2/2018). Pollet et al. (2018) [2] provide a detailed description of the sampling methods and areas visited. Seven of the eight locations within the RBI des Pitons du Carbet (Figure 1a: red circles) were selected for sampling and pan traps (Figure 1c–f) were installed during 22–27 January (both sites at Gros-Morne are considered one location). An 8th location (Plateau Boucher) adjacent to the RBI was added on 2 February. In all but one location, one principal and two supplementary sites were in place for pan trapping. In the principal sites, 10 units of 1 blue, yellow, and white trap were in operation (i.e., a total of 30 traps), whereas only 10 yellow pan traps were employed at supplementary sites. All traps in the RBI were operational at soil surface level and fixed with metal pins; formalin solution (5%) with detergent was used as fixative. At each site, sampling lasted for one full week. A total of 389 pan traps were used in and near the RBI des Pitons du Carbet, with another 72 beyond that area. In addition, the set of samples gathered by Eddy Dumbardon-Martial in the RBI des Pitons du Carbet during a preceding survey *Etude de la faune entomologique et d'autres invertébrés de la RBI des Pitons du Carbet Martinique* in 2016–2017 was also examined, resulting in the discovery of *Zelandotipula gelhausi* sp. nov. (Tipulidae).

Specimens were examined with a Motic SMZ-168 Zoom Stereo Microscope and Kyowa Unilux-12 83–483 D, and preserved in 70% alcohol solution. Images were taken by multi-stack with iPhone 11 and subsequently processed with Helicon Focus 8. Measurements were made with an ocular reticle. The number of specimens per species that were used for biometric purposes is indicated between brackets, together with the results of the measurements. When necessary, male genitalia were macerated in a 4% KOH solution, examined, and subsequently preserved in 70% alcohol solution in microvials, together with the respective specimens.

In this paper, we present the descriptions of the species new to science, followed by a checklist that also includes the other species collected. Species records (see species descriptions, checklist) are given in the following format: number of males and/or females, location, locality (biotope description), latitude, longitude, altitude, sampling periode/date (sampling method), collector—sampling code (depository). In addition, occurrence records are published to GBIF, as the following dataset: https://doi.org/10.15468/s8h9pg. The adopted classification follows the Catalogue of the Craneflies of the World (CCW) [1]. The morphological terminology is according to Vane-Wright (1967) [3], Gelhaus (2009) [4], and Cumming and Wood (2009) [5].

Specimens are housed in the following institutions, indicated between square brackets for each specimen (specimens from MCNB, with the former acronym MZB):

MCNB—Museu de Ciències Naturals de Barcelona, Catalonia, Spain;
MNHN—Muséum National d'Histoire Naturelle, Paris, France;
Naturalis—Naturalis Biodiversity Center, Leiden, the Netherlands;
RBINS—Royal Belgian Institute of Natural Sciences, Brussels, Belgium.

Abbreviations. Wing: A_1 and A_2: anal veins; bm-cu: basal medial-cubital crossvein; bt CuA_1: basal transverse section of vein CuA_1; C: costal vein; dm: discal medial cell; M, M_3: medial veins; Rs, R_1, R_2, R_3, R_{2+3}, and R_{4+5}: radial veins; r_3: third radial cell; Sc: subcostal vein; sc-r: subcostal-radial crossvein; sq s: squamal setae. Hypopygium: aed: aedeagus; bvml: basal ventromesal lobe; dvml: dorsal ventromesal lobe; ig: inner gonostylus; og: outer gonostylus; sapl: subapical lobe. Ovipositor: cerc: cercus; hyp vlv: hypogynial valve. Other abbreviations used: BPT: blue pan trap; WPT: white pan trap; YPT: yellow pan trap; SW: collected with sweep net.

3. Results

3.1. New Species

Class Insecta Linnaeus, 1758.
Order Diptera Linnaeus, 1758.
Family Limoniidae Rondani, 1856.

Subfamily Chioneinae, 1861.
Genus *Teucholabis* Osten Sacken, 1860.
As genus. Type-species: *Teucholabis complexa* Osten Sacken, 1860 (monotypic).
Teucholabis (Teucholabis) carbetensis Mederos, Pollet and Oosterbroek sp. nov. (Figure 2).

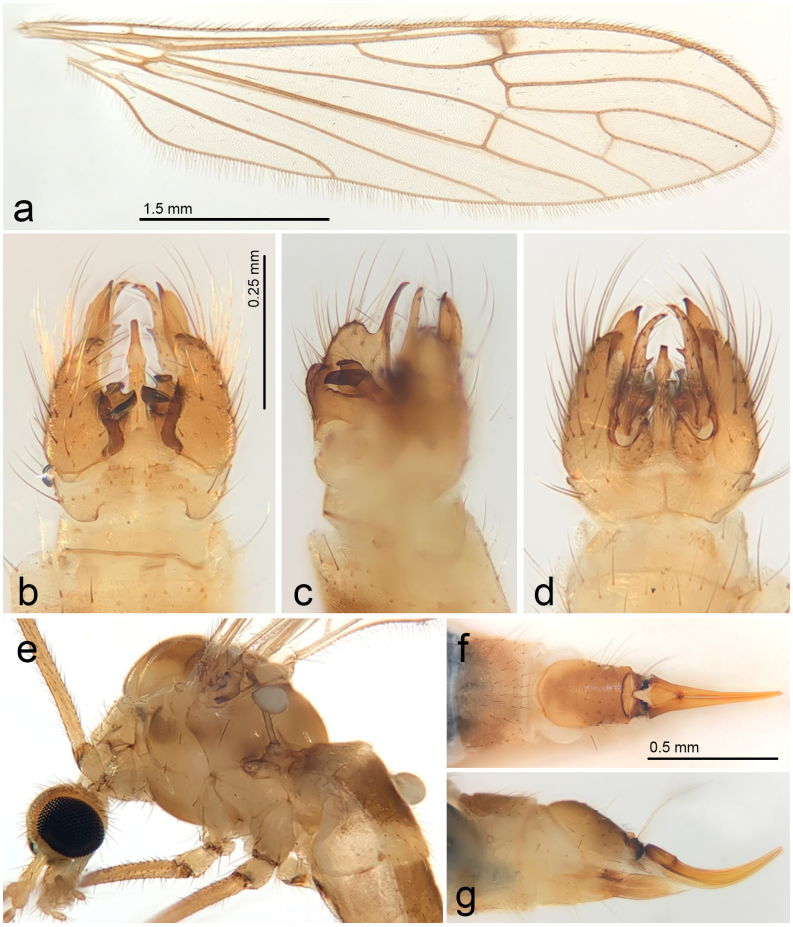

Figure 2. *Teucholabis (Teucholabis) carbetensis* sp. nov., holotype male; (**a**) Right wing; (**b**) Hypopygium in dorsal view; (**c**) *idem* in semi-lateral view; (**d**) *idem* in ventral view; (**e**) Head and thorax, lateral view; (**f**) Paratype female, ovipositor in dorsal view; (**g**) *idem* in lateral view.

Publication LSID: urn:lsid:zoobank.org:pub:B45 BD701-A7 D5–4 EF5–805 B-4 DFFD6087053.

Nomenclature act LSID: urn:lsid:zoobank.org:act:8 B8 BA478–5 C08–4680-BED0–0967835 CF301.

Material examined: Holotype ♂, MARTINIQUE: Pitons du Carbet RBI, Rivière Sylvestre (Le Lorrain) (primary forest, with moderately developed herb layer), 14°46′31.2″N, 61°03′54.8″W, 260 m a.s.l., 27.i–3.ii.2018 (BPT), leg. Marc Pollet—sample code: MQ/2018/PdCo1/RivSylv/PR1/BPT1–10 (MNHN).

Paratypes: MARTINIQUE, Pitons du Carbet RBI: 1♂, same data as holotype, (MZB 2021–2890); 1♂same data as holotype (MNHN); 2♀♀, along route forestière de Calebassier (Gros-Morne) (primary forest, with rather dense herb layer), 14°43′28.2″N, 61°03′51.9″W, 453 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet—sample code: MQ/2018/PdCo5/altRivRoug/

PR1/YPT1–10 (RBINS); 1♀, Plateau Boucher (Font-Saint-Denis) (in humid forest along trail), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet—sample code: MQ/2018/PdCo10/PlaBou/PR1/YPT1–10 (MZB 2021–2891); 2♀♀, Plateau Clarck (Schoelcher) (primary forest along river Clark), 14°41′04.2″N, 61°06′10.9″W, 529 m a.s.l, 24–31.i.2018 (YPT), leg. Marc Pollet—sample code: MQ/2018/PdCo8/PlaClar/SS2/YPT1–10 (MNHN); 1♀, Plateau Concorde (Case-Pilote) (primary forest, with moderately developed herb layer), 14°40′44.9″N, 61°06′22.9″W, 585 m a.s.l., 25.i–1.ii.2018 (YPT), Marc Pollet—sample code: MQ/2018/PdCo9/PlaConc/PR1/YPT1–10 (MZB 2021–2892); 1♀, Plateau Perdrix (Saint-Joseph) (primary forest), 14°41′17.4″N, 61°04′50.1″W, 554 m a.s.l., 22–29.i.2018 (BPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal—sample code: MQ/2018/PdCo7/PlaPerd/PR1/BPT1–10 (MZB 2021–2893); 2♀♀, Plateau Perdrix (Saint-Joseph) (primary forest), 14°41′21.3″N, 61°04′53.6″W, 599 m a.s.l., 22–29.i.2018 (YPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal—sample code: MQ/2018/PdCo7/PlaPerd/SS1/YPT1–10 (MZB 2021–2894); 1♂, Trace des Jésuites (bas) (Le Marigot) (primary forest), 14°44′52.4″N, 61°05′05.8″W, 333 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet—sample code: MQ/2018/PdCo3/TracJes2/PR1/YPT1–10 (MZB 2021–2895); 1♀, Martinique, Trace des Jésuites (haut) (Le Marigot) (primary forest), 14°44′57.4″N, 61°05′06.7″W, 374 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet—sample code: MQ/2018/PdCo3/TracJes1/SS1/YPT1–10 (RBINS).

Diagnosis. General coloration yellowish brown, with bicolored abdomen. Wings pale yellow, with pale brown subtriangular stigma, veins brown to pale brown. Male without external pockets on sternites. Hypopygium in dorsal view with mesal flange wide, curved in its basal third, reaching half the length of gonocoxite; outer gonostylus long and slender, pale yellow, with a small weak marginal spine beyond midlength. Ovipositor brownish yellow to pale brown, with two long divergent setae on tergite 10.

Description. Male (n = 4). Body length 5.0–5.5 mm, wing length 4.5–6.5 mm, antenna length 1.0–1.2 mm. Head. Brown, with rostrum yellow, palpi chestnut brown. Antenna 16-segmented, pale brown; flagellomeres oval, decreasing in length and thickness towards apex of the antenna, shorter or of equal length to their verticils. Thorax (Figure 2e). Pronotum and prescutum yellow. Prescutum with yellowish brown stripe occupying central part and lateral borders yellow. Scutum yellowish brown, slightly intense before transverse suture; lateral borders yellow; yellowish brown after transverse suture, with almost entire posterior part yellow and central stripe pale brown. Scutellum pale yellow. Mediotergite yellowish brown, anterior border darker, central area paler. Pleura light yellow, slightly intense on lower half of katepisternum; a narrow brown longitudinal stripe extending from cervical region, through upper half of anepisternum, central area of anepimeron, anatergite, and katatergite. Legs. Coxae and trochanters light yellow; femora yellow, with dark brown apical ring; tibia of fore leg pale brown, yellow on mid and hind legs, first tarsomeres of all legs pale brown, remainder of tarsi more uniformly brown. Wing (Figure 2a). Membrane pale yellow, stigma pale brown, subtriangular; veins brown, pale brown on CuA_1, and basal section of M_3. Venation: Sc ending in C slightly before half the length of Rs; R_{2+3} about two-thirds length of R_2; cell dm pentagonal, apically wide, two-thirds length of cell m_1; bt CuA_1 reaches proximal end of cell dm. Halteres with stem pale brown, knob clear light yellow. Abdomen. Tergites patterned with brown in the anterior two thirds, yellow in the posterior third; sternites mostly pale yellow, pale brown in anterior half; sternites 5 and 6 without external pockets, nor modified setae; tergites and sternites with moderate to long erect pale setae. Hypopygium (Figure 2b–d). Pale brown, gonocoxite dark brown. Gonocoxite with short and wide, blade-like, outer spine; mesal flange wide, curved in basal third, reaching half the length of gonocoxite. Outer gonostylus pale yellow, long and slender, with small weak marginal spine beyond midlength, apex narrowed into spine, not bidentate, with few small setae throughout. Aedeagus slender, curved, basal enlargement with two long setae.

Female (*n* = 10). Body length 5.2–5.5 mm, wing length 4.4–4.8 mm, antenna length 1.2–1.4 mm. As male in general aspect, color and size. Ovipositor (Figure 2f–g) brownish yellow to pale brown; tergite 10 with two long divergent, caudally directed, setae; hypogynial valve short, not reaching the middle of cercus.

Distribution. Only known from Martinique.

Ecology. A total of 14 specimens were collected in both blue and yellow pan traps distributed over all eight studied locations of the Pitons du Carbet. The species, thus, seems to have a wide distribution range in humid to wet montane forest sites, but occurs in low numbers in this part of the season (January–Febuary). Due to the low numbers, no other reliable conclusions can be drawn from these data.

Etymology. Named after the Réserve Biologique Intégrale (RBI) des Pitons du Carbet, the only area where this species has been collected thus far. An adjective in nominative singular.

Remarks. The only species in the area related to *Teucholabis (Teucholabis) carbetensis* sp. nov. is *Teucholabis (Teucholabis) tenella* Alexander 1970, thus far only known from Dominica. *Teucholabis (T.) tenella* differs from this new species by the paler yellowish coloration (yellowish brown in *T. (T.) carbetensis* sp. nov.), the total absence of an external pocket at the abdomen of the male of *T. (T.) carbetensis* sp. nov., and the form of the outer gonostylus in hypopygium (with small weak marginal spine beyond midlength, absent in *Teucholabis (T.) tenella*).

Subfamily Limoniinae Rondani, 1856.

Genus *Atypophthalmus* Brunetti, 1911.

As genus. Type-species: *Atypophthalmus holopticus* Brunetti, 1911 (monotypic) (= umbratus (de Meijere, 1911)).

Atypophthalmus (Atypophthalmus) vanewrighti Mederos, Pollet, and Oosterbroek sp. nov. (Figures 3 and 4).

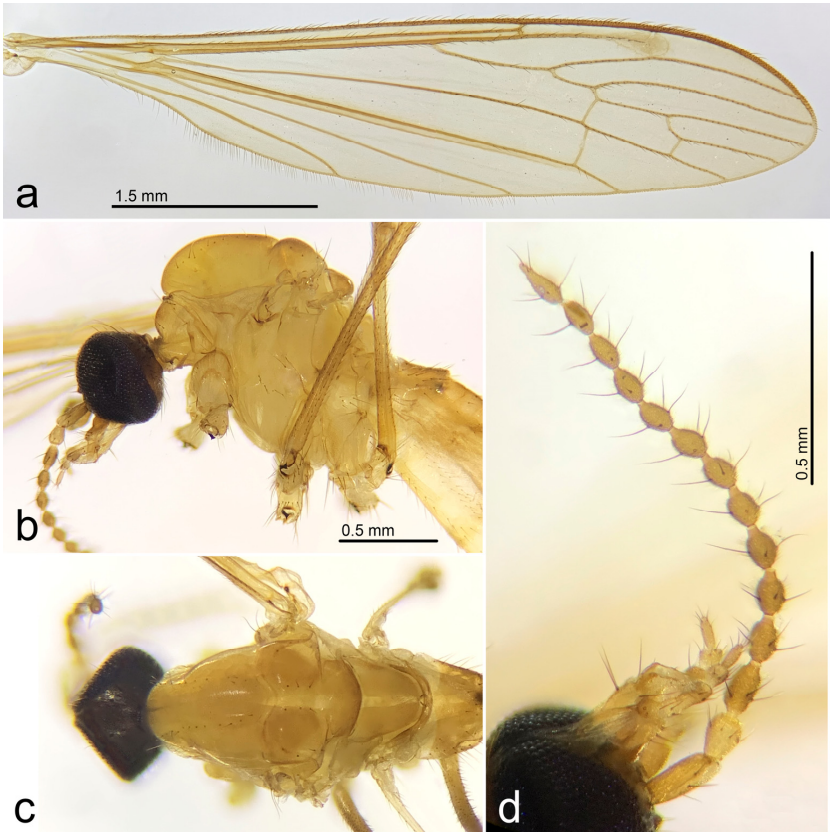

Figure 3. *Atypophthalmus (Atypophthalmus) vanewrighti* sp. nov., holotype male; (**a**) Right wing; (**b**) Head and thorax in lateral view; (**c**) *idem* in dorsal view; (**d**) Antenna.

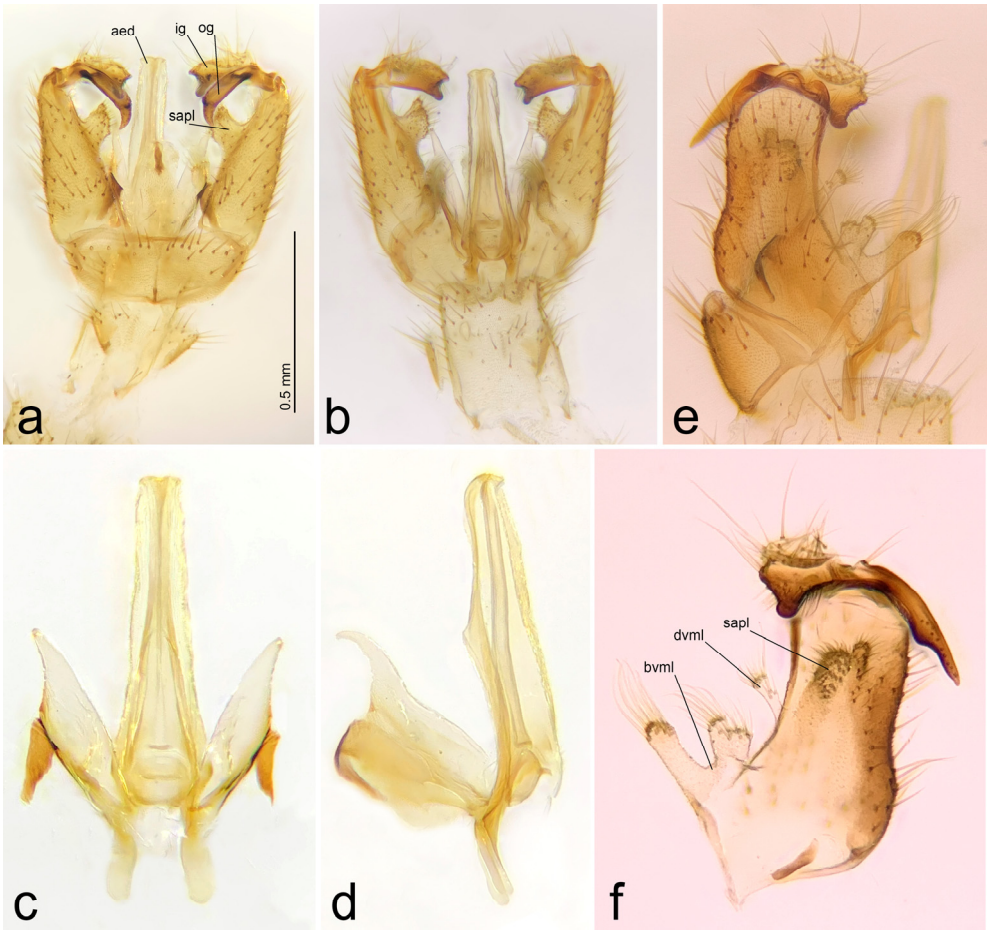

Figure 4. *Atypophthalmus (Atypophthalmus) vanewrighti* sp. nov., holotype male; (**a**) Hypopygium in dorsal view; (**b**) *idem* in ventral view; (**c**) Aedeagal guide and parameres in dorsal view; (**d**) *idem* in lateral view; (**e**) Right gonocoxite in lateral view from outside; (**f**) *idem* from inside.

Nomenclature act LSID: urn:lsid:zoobank.org:act:9810 B0 D9–6 D7 B-4 E5 D-B396-F1 E80 C36 CCD6

Material examined: Holotype ♂, MARTINIQUE: Pitons du Carbet RBI, Trace des Jésuites (bas) (Le Marigot) (primary forest), 14°44′52.4″N, 61°05′05.8″W, 333 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet—sample code: MQ/2018/PdCo3/TracJes2/PR1/YPT1–10 (MNHN).

Diagnosis. General coloration yellow to yellowish brown. Antenna with flagellomeres brown, oval; scape brownish yellow, pedicel yellow. Pleura pale yellow. Wings pale yellow, stigma pale brown, oval; cell dm large, hexagonal. Hypopygium with the outer gonostylus long, stout, curved, hook-shaped, and an acute apex.

Description. Male (n = 1). Body length 5.9 mm, wing length 5.8 mm, antenna length 1.5 mm. Head (Figure 3b–d). Dark brown to black. Antenna 14-segmented, with scape brownish yellow, pedicel yellow, flagellomeres brown, oval, equal in length or slightly shorter than their verticils. Thorax (Figure 3b,c). Pronotum yellowish brown, prescutum and scutum pale brown to yellowish brown, without stripes or marks; scutellum pale brown, slightly darker at distal margin; mediotergite pale brown. Pleuron pale yellow, slightly darker on laterotergite. Legs. Only left mid and left hind leg present; coxae and trochanters pale yellow; femora pale brown in basal half, brown at apical half; tibiae and tarsomeres brown. Wing (Figure 3a). Membrane pale yellow, stigma and veins brown. Venation: Sc long, ending at about two-thirds of Rs; cross-vein sc-r ends at height of apex of Sc; Rs long, almost straight. R_1 and R_2 slightly oblique; R_3 and R_{4+5} slightly arched, parallel to each

other; cell dm long, hexagonal, almost three times as long as it is wide; bt CuA_1 somewhat beyond the branch point of M; A_2 slightly sinuous; anal angle almost absent. Halter with stem pale yellow and knob pale brown. Abdomen. Yellowish brown. Tergites yellowish brown, tergite 7 brown; sternites pale yellow. Hypopygium (Figure 4a–f). Complex. Tergite 9 and gonocoxite yellow. Gonocoxite conical, wider at its base, longer than wide, with three lobes: one subapical setose inner lobe; two ventromesal lobes, with a bigger basal, more anterior, bifurcate lobe, and one small, more dorsal, lobe; all lobes with mid-sized to long hairs. Inner gonostylus yellow to yellowish brown, bilobed at distal part on mesial surface, setose on dorsal surface, shorter than outer gonostylus. Outer gonostylus long, stout, curved, hook-shaped, and dark brown, with acute apex. Paramere long, with acute apex, arched dorsally in lateral view; aedeagus large, wider at its base, slightly bifid at apex.

Female. Unknown.

Distribution. Only known from Martinique.

Etymology. We named this species after Dr. Richard ("Dick") Irwin Vane-Wright, in honor of his long career in the study of the Neotropical fauna, including crane flies. A noun in genitive singular.

Remarks. From the West Indies, and throughout the Neotropical region, only one species of this genus has been reported: *Atypophthalmus (Atypophthalmus) umbratus* (de Meijere, 1911), a species originally described from Jakarta (Indonesia) and now with a worldwide distribution. The morphologically closest species to *A. (A.) vanewrighti* sp. nov. is a recently discovered species in Dominica, pending description (Mederos, unpubl. data). In addition to the marked differences in the structure of the male genitalia between *A. (A.) umbratus* and *A. (A.) vanewrighti* sp. nov., both species can be easily separated by the presence of a dark longitudinal stripe crossing the pleura in *A. (A.) umbratus* (absent in *A. (A.) vanewrighti* sp. nov.). *Atypophthalmus (A.) vanewrighti* sp. nov. is the first species of the genus described from the Neotropics.

Genus *Rhipidia* Meigen, 1818.

As genus. Type-species: *Rhipidia maculata* Meigen, 1818 (monotypic).

Rhipidia (Rhipidia) martiniquensis Mederos, Pollet and Oosterbroek sp. nov. (Figures 5 and 6).

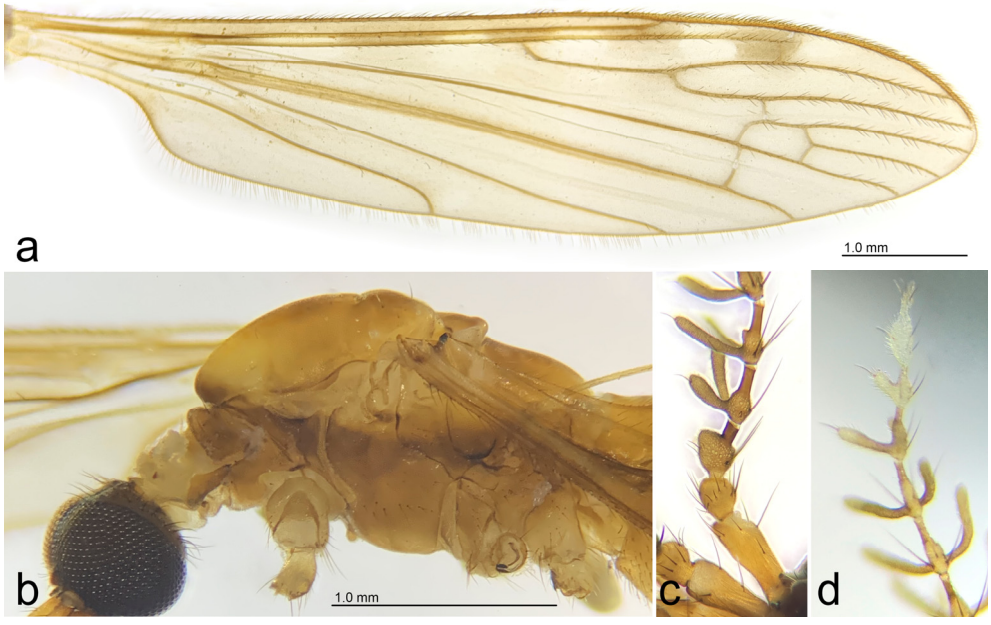

Figure 5. *Rhipidia (Rhipidia) martiniquensis* sp. nov., holotype male; (**a**) Right wing; (**b**) Head and thorax, lateral view; (**c**) Antenna, basal segments; (**d**) *idem*, apical segments.

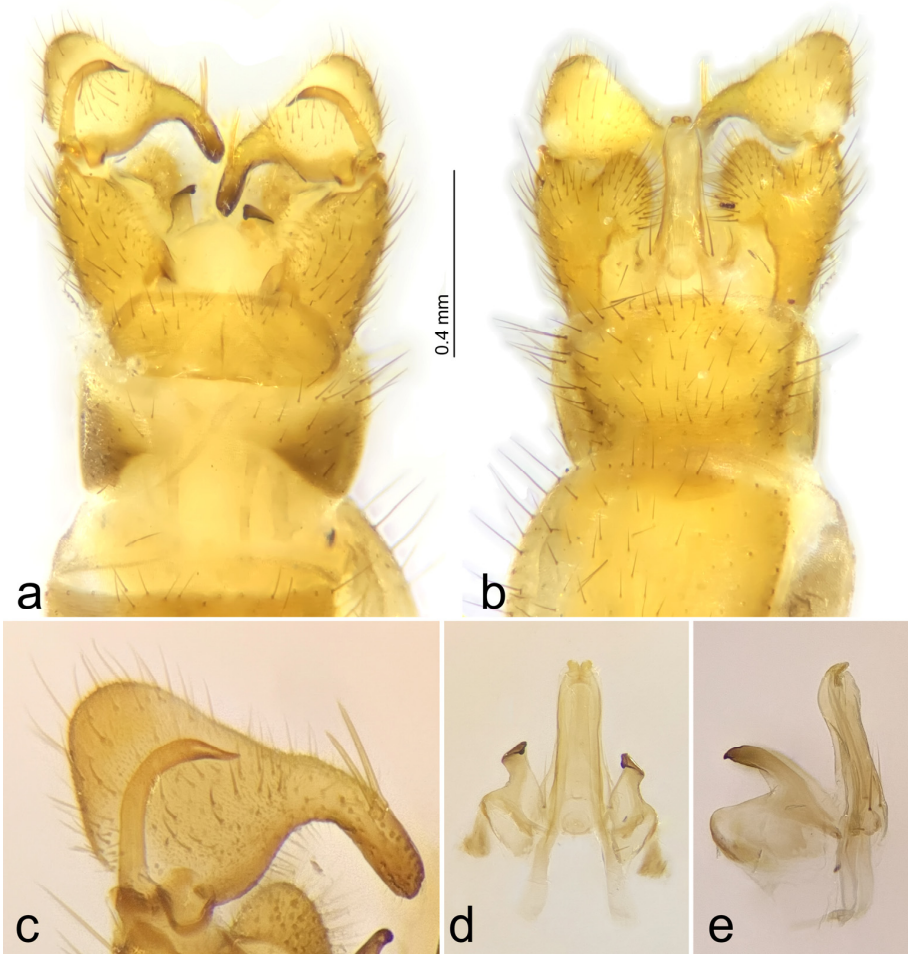

Figure 6. *Rhipidia (Rhipidia) martiniquensis* sp. nov., holotype male; (**a**) Hypopygium in dorsal view; (**b**) *idem* in ventral view; (**c**) Outer and inner gonostyli in lateral view; (**d**) Aedeagal guide and parameres in dorsal view; (**e**) *idem* in lateral view.

Nomenclature act LSID: urn:lsid:zoobank.org:act:99 E4290 A-98 AA-4331-BA75-D3 CA435 FB548.

Material examined: Holotype ♂, MARTINIQUE: Pitons du Carbet RBI, Plateau Clarck (Schoelcher) (primary forest along river Clark), 14°41′04.2″N, 61°06′10.9″W, 529 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet—sample code: MQ/2018/PdCo8/PlaClar/SS2/YPT1–10 (MNHN).

Diagnosis. General coloration brown. Male with the antenna brown to pale brown, flagellomeres 2 to 10 bipectinate; last two flagellomeres white. Pleura dark brown with pale to yellowish brown prescutum, scutum, and scutellum, producing a contrasting bicolorous appearance. Wing pale yellowish, with a hardly distinguishable pattern of pale brown spots, brown stigma, and relatively small cell dm. Hypopygium: outer gonostylus with elongated rostrum, two long rostral spines approximately halfway along its length, starting from a common point, and embedded in a shallow sulcus.

Description. Male (n = 1). Body length 7.4 mm, wing length 7.5 mm, antenna length 2.1 mm. Head brown. Antenna (Figure 5c–f), 14 segmented, pale brown, flagellomeres equal in length or slightly shorter than their verticils; flagellomeres 2 to 10 bipectinate; last two flagellomeres white. Thorax (Figure 5b). Pronotum brown, prescutum and scutum pale brown to yellowish brown, without stripes or marks; proximal edge of prescutum brown; scutellum pale brown to yellowish brown; mediotergite pale brown, slightly darker than prescutum and scutum. Pleura dark brown, offering a contrasting bicolorous appearance,

due to the pale to yellowish brown colored prescutum, scutum, and scutellum; the area that frames the brown pleura begins at the proximal edge of the pronotum and surrounds the basal edge of the anterior spiracle, the dorsal edge of the anepisternum, and the midline of the anepimeron and laterotergite. Legs. Coxae and trochanters pale brown to yellowish brown; remainder of legs lacking. Wing (Figure 5a). Membrane pale yellowish, with hardly distinguishable pale brown pattern of spots between Sc and R, particularly on midlength, the apex of Sc, and the origin of R and of Rs; stigma brown, subcircular; veins brown. Venation: Sc long, ending slightly before the fork of R_{2+3} and R_{4+5}; cell dm, relatively small, hexagonal, bt CuA_1, slightly beyond branch joint of M. Halteres with stem yellowish brown, and knob pale brown to yellowish brown. Abdomen. Tergites pale brown and sternites yellowish brown, both with short erect black setae. Hypopygium (Figure 6a–e). Yellowish brown. Gonocoxite yellowish brown, conical, wider at base, longer than inner gonostylus, and ventromesal lobe large. Inner gonostylus yellowish brown, with elongated rostrum, obtuse and brown at tip, with two long rostral spines close together, approximately halfway along the length of the rostrum and embedded in a shallow sulcus; rostral spines straight, subequal in size. Outer gonostylus curved and rod-shaped, yellowish brown, darkened at acute apex. Aedeagus stout, slightly bifid at apex, flanked by two setae, one on each side of base.

Female. Unknown.

Distribution. Only known from Martinique.

Etymology. The specific epithet is derived from Martinique, the island where the single specimen of this species was found. An adjective in nominative singular.

Remarks. In the West Indies, only *Rhipidia (Rhipidia) bipectinata* Williston, 1896, known from Dominica and St. Vincent, is morphologically similar to *Rhipidia (Rhipidia) martiniquensis* sp. nov., with a great resemblance in the male genitalia and by having bipectinate flagellomeres in the male antennae. Males of both species can be easily separated by the male of *R. (R.) bipectinata* having flagellomeres 2 to 11 bipectinate (2 to 10 in *R. (R.) martiniquensis* sp. nov.) and by the last flagellomere being white (two last flagellomeres white in *R. (R.) martiniquensis* sp. nov.). Alexander [6] remarks that "*Particular attention is called . . . to the approach to a tripectinate condition of the flagellar segments*", referring to *R. (R.) bipectinata*, due to " . . . *a further small spur placed slightly more distally, directed obliquely outwardly . . .* ", a feature absent in *R. (R.) martiniquensis* sp. nov. In addition, *R. (R.) bipectinata* has the two rostral spines of the inner gonostylus located more apically than in *R. (R.) martiniquensis* sp. nov (see Alexander [6], figure 25). Another species related to *R. (R.) martiniquensis* sp. nov. seems to be *Rhipidia (Rhipidia) brevipetalia* (Alexander, 1950), recorded from Venezuela, based on its general appearance, antennal morphology, wings, and male genitalia (Alexander [7], figures 4 and 7). The males of both species have the antennae bipectinate, with the last two flagellomeres white. *Rhipidia (R.) martiniquensis* sp. nov., however, is easily distinguished by: flagellomere 1 not bipectinate (bipectinate in *R. (R.) brevipetalia*); ramifications in flagellomeres 4 and 5 between 1.5 to 2.0 times the length of the respective segments (only slightly longer than the flagellomeres themselves in *R. (R.) brevipetalia);* wing pale yellowish, with hardly any distinguishable spot pattern, with the exception of the brown stigma (wing with abundant and well-distinguishable spot pattern in *R. (R.) brevipetalia*); Sc ending in C almost at the level of the bifurcation of Rs (in *R. (R.) brevipetalia*, Sc ends at half or just over the length of Rs). Finally, in the hypopygium, *R. (R.) martiniquensis* sp. nov. presents a distinctly elongated and robust rostrum in the inner gonostylus, with a very blunt apex and the two rostral spines starting from a common point (in *R. (R.) brevipetalia*, the rostrum thins as it reaches the apex, with the base of the two rostral spines separated).

Family Tipulidae Latreille, 1802.

Subfamily Tipulinae Latreille, 1802.

Genus *Zelandotipula* Alexander, 1922.

As subgenus of *Holorusia*. Type-species: *Tipula novarae* Schiner, 1868 (original designation).

Zelandotipula gelhausi Mederos, Pollet, and Oosterbroek sp. nov. (Figures 7–10a–c and 13b,d).

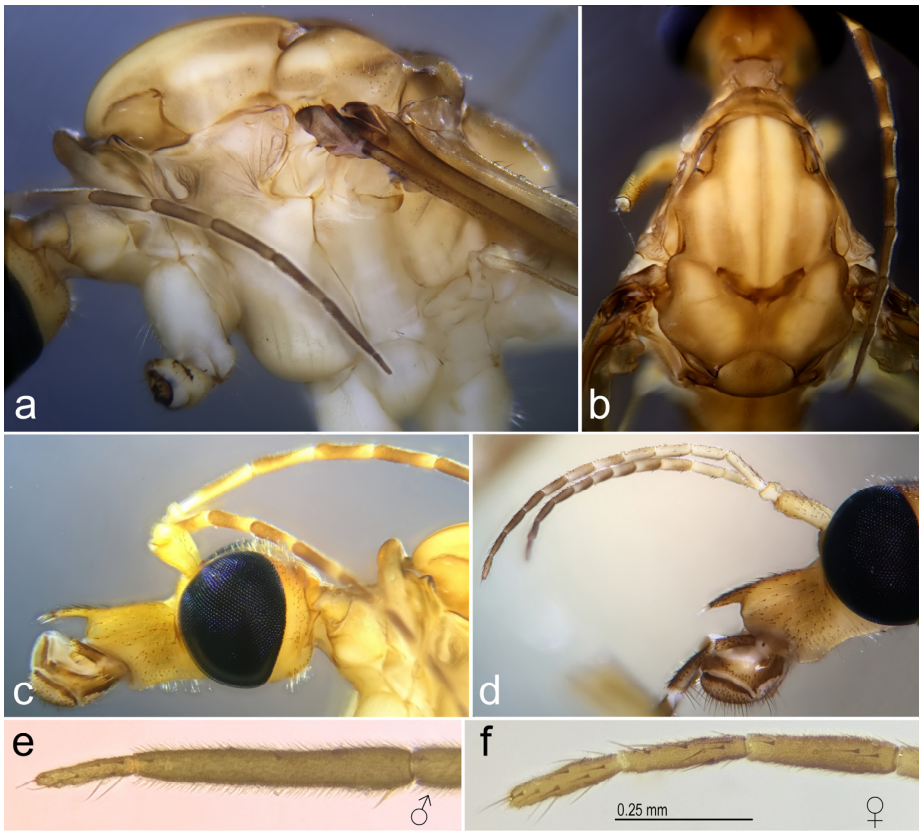

Figure 7. *Zelandotipula gelhausi* sp. nov., holotype male; (**a**) Thorax and antenna, lateral view; (**b**) *idem*, dorsal view; (**c**) Head and antennae, lateral view; (**d**) *idem* paratype female, lateral view; (**e**) Terminal flagellomeres of holotype male; (**f**) *idem* of paratype female.

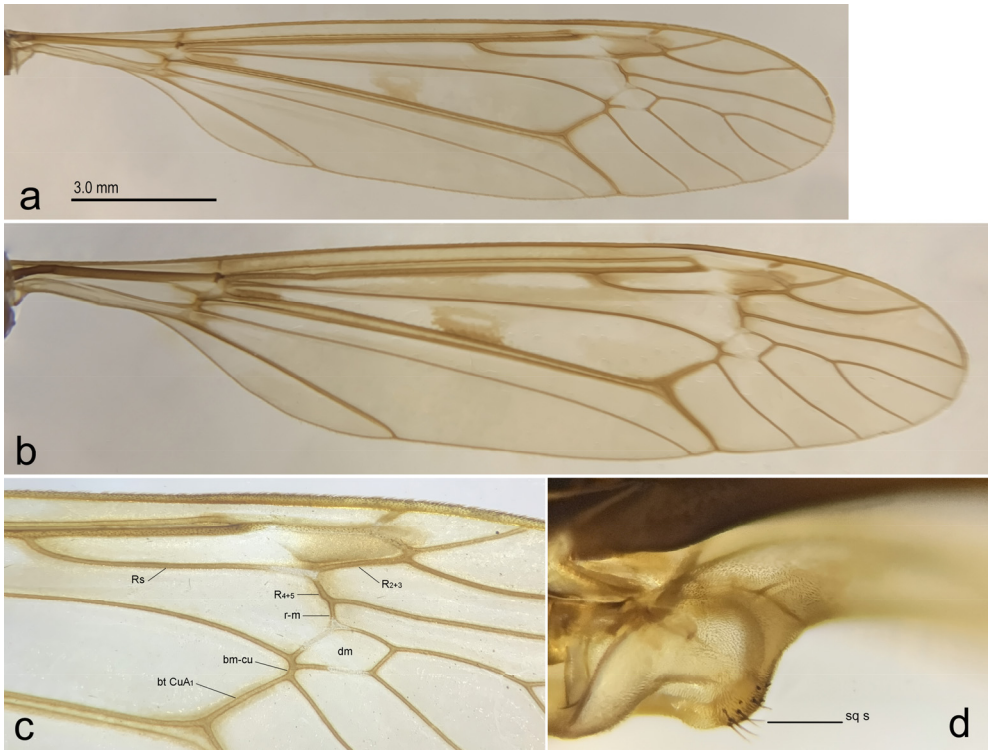

Figure 8. *Zelandotipula gelhausi* sp. nov.; (**a**) Right wing, holotype male; (**b**) *idem*, paratype female; (**c**) Detail of wing venation, holotype male; (**d**) Setae on squama.

Figure 9. *Zelandotipula gelhausi* sp. nov., holotype male; (**a**) Terminalia, lateral view; (**b**) Tergite 9, dorsal view; (**c**) Outer and inner gonostyli, lateral view; (**d**) Detail of the blackened nodules on the inner gonostylus.

Nomenclature act LSID: urn:lsid:zoobank.org:act:FF5 F4297-E848–43 EA-BB0 C-D397464 EC283.

Material examined. Holotype ♂, MARTINIQUE: Pitons du Carbet RBI, Morne Platine (Le Lorrain) (humid forest, "fôret hygrophile"), 14°45′29.6″N, 61°04′2.5″W, 494 m a.s.l., 26.x.2016, leg. Eddy Dumbardon-Martial—sample code: MQ/2018/293 (MNHN). Paratype: 1♀, same data as holotype (MNHN).

Diagnosis. Species overall brown to yellowish brown; antenna yellowish brown to yellow, filiform. Legs without tibial spurs (tibial spur formula 0:0:0). Wings pale brown, infuscate with irregular brown spots or clouds in the fusion point (origin) of R, M, and CuA at origin of Rs, the stigma area, and midway of cell bm. Abdomen brown to pale brown. Hypopygium yellow, with outer gonostylus broad at its center and tapering towards the apex; inner gonostylus with a broad and middle part covered with scattered black nodules. Ovipositor yellow to golden, with hypogynial valve short, slightly concave ventrally, reaching just until half of the cercus.

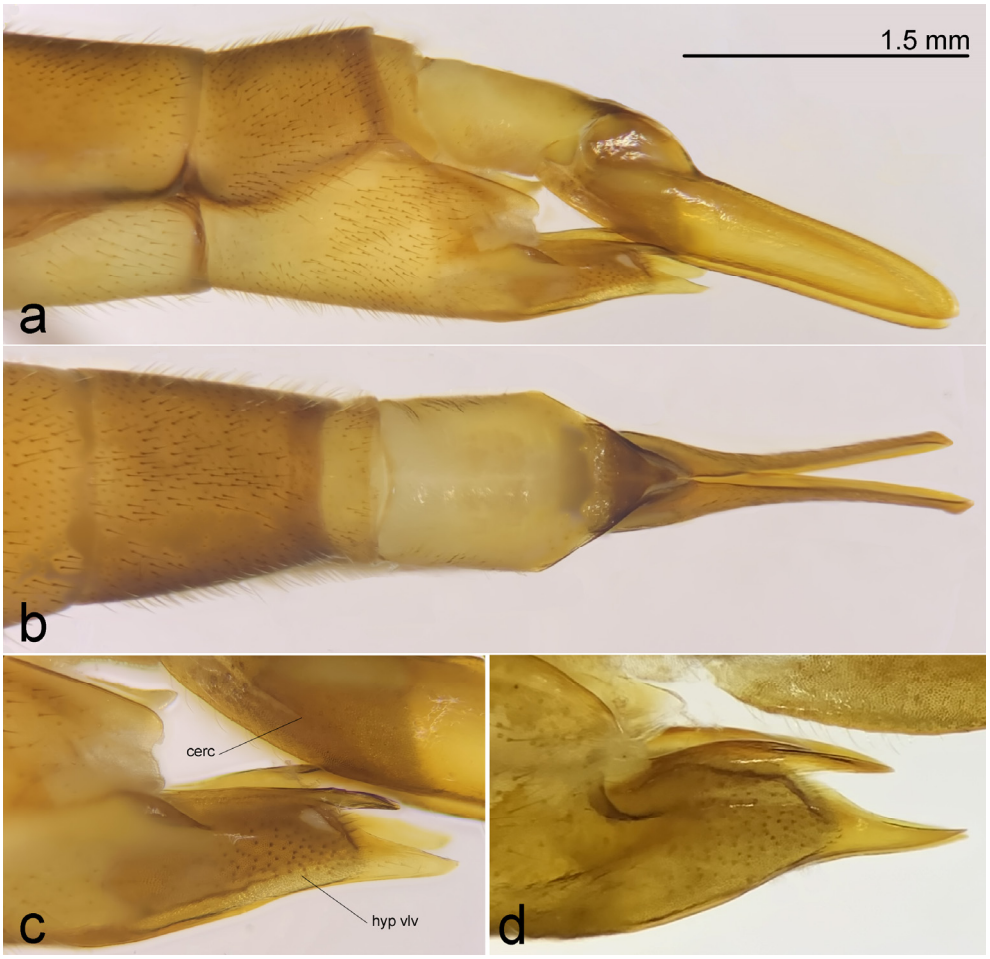

Figure 10. *Zelandotipula gelhausi* sp. nov., paratype female; (**a**) Ovipositor, lateral view; (**b**) *idem*, dorsal view; (**c**) Detail of hypogynial valve, lateral view; (**d**) *Zelandotipula parviceps*, holotype female, detail of hypogynial valve in lateral view.

Description. Male (n = 1). Body length (without antennae) 14.2 mm, antennal length 5.9 mm, wing length 16.7 mm. Head (Figure 7c). Pale brown to yellowish brown, dark brown dorsally on vertex; rostrum and nasus yellow ventrally; palpus almost completely lost, except palp I, brown. Antenna 13-segmented (Figure 7c,e), flagellomeres filiform, not produced and with few short (scarce) setae throughout. Pedicel and scape yellow; flagellomere 1 yellowish brown, flagellomeres 2 to 7 brown with yellowish apex, flagellomeres 8 to 11 brown throughout, last flagellomere short, almost 1/3 to 1/4 the length of the previous flagellomere (Figure 7e). Thorax (Figure 7a,b). Pale brown to yellowish; pronotum brown, paler laterally; prescutum pale brown, with four pale yellowish stripes, with the two central stripes well-defined and the two lateral stripes less evident; scutum pale brown with poorly defined, brown, central band; transverse suture brown, well-marked; scutellum brown; mediotergite brown to pale brown and, similar to scutellum, covered with fine, short pale hairs. Pleura pale brown to yellowish; area around anterior spiracle brown, as well as anterolateral area of the prescutum and anterior of anepisternum and katepisternum, highlighting on the paler color of the pleura; anepisternum and katepisternum pale yellow in posterior half; anepimeron pale yellow, with a small pale brown area at the anterosuperior border; meron and katepimeron pale yellow; posterior spiracle, metanepisternum, metepimeron and metakatepisternum pale yellow; laterotergite pale brown, with posterior half brown, latter better defined in its lower half. Legs. Only right mid and hind legs present, covered with short, dark brown setae. Coxae pale yellow, almost white; fore coxa brown with thin pale hairs on the anterior border; mid coxa with fine, pale hairs on anterior

border and with small pale brown spot in center of lower border; hind coxa also with very thin and pale hairs on posterior edge; trochanters pale yellow; femora yellow to very pale brown, with dark brown apical tip; tibiae yellow to indistinct pale brown with brown apex; tarsomeres 1 to 4 yellow, with apex pale brown, tarsomere 5 pale brown, ventrally with small tuft of bristles at base; claw ventrally with small acute ventral protuberance at basis and another, hook-shaped process, midway, directed towards the apex. Wing (Figure 8a–d). Membrane pale brown, infuscate, paler than in female (Figure 8b); irregular brown spots or clouds in the fusion point (origin) of R, M, and CuA, at origin of Rs, the stigma area and midway of cell bm, the last with a small clear area in center of spot (also present in female); cells c and br with a slightly brown tinge, the last with a clear, long, and narrow area just below R and before origin of Rs. Veins dark brown, clearly visible on the pale brown background; bifurcation of CuA with adjacent brown areas. Venation: Sc ending in R at two-third of Rs; Rs almost three times the length of bt CuA_1, progressively curved; cell r_3 constricted at midlength; cell dm small, shorter than stem of cell m_1; cell m_1 1.5 times the length of its stem; bm-cu present. Squama with fine and short setae, all being directed towards the wing tip and some originating at the dorsal crest of the squama (Figure 8d). Halteres pale brown, slightly yellowish on the stem, with pale brown knob. Abdomen. Overall brown to pale brown, without any apparent color pattern; tergites 7–9 slightly darker than sternites, with tergite 9 yellowish. Most sternites pale yellow, almost white, only sternites 7 and 8 brown. Hypopygium (Figure 9a–d) yellow. Tergite 9 with deeply emarginated posterior border, with robust black bristles; both sides of the emargination protruding, as lateral extensions, very prominent beyond posterior border of tergite; the emargination center also protruding, not as prominent as lateral extensions, and devoid of bristles midline. Outer gonostylus broad at center, tapering towards apex, covered with fine bristles; inner gonostylus with broad beak slightly undulate at upper edge before rising slightly towards "sagittal crest", so with typical shape of the genus; middle part of inner gonostylus covered with scattered black nodules, as usual in the genus, arranged in a characteristic distribution, more concentrated in lower rear area of beak, forming a thin black mass.

Female (n = 1). Body length (without antennae) 21.3 mm, antennal length 3.2 mm, wing length 20.0 mm, abdomen 16.5 mm, ovipositor 3.0 mm. Head. As in male (Figure 7d); segments I–III of palpus brown, IV brown at base and pale in remainder, segment IV 1.5 to 2 times longer than I–III combined. Antenna as in male (Figure 7d,f), except last flagellomere longer than in male, slightly shorter than penultimate flagellomere (Figure 7f). Thorax and legs as in male. Wing. Overall, as in male (Figure 8b), squama with fine and short setae as in male (Figure 8d). Abdomen. Tergites 1 and 2 brown; tergites 3–7 light brown with anterior border yellowish, with longitudinal brown central line, poorly defined, also present on both sides of each tergite; tergite 8 brown; tergite 9 yellow; tergite 10 pale yellow, almost white. Sternites yellow. Ovipositor (Figure 10a–c). Yellow to golden. Upper margin of sternite 8 distinctly convex just before reaching hypogynial valve. Cercus broad, progressively narrow to apex, obtuse at apex. Hypogynial valve ending in sharp upper tooth and triangular lower part; lower part reaching halfway the cercus.

Distribution. Only known from Martinique.

Etymology. We are pleased to name this species after Dr. Jon Gelhaus, a well-known, highly esteemed crane fly specialist, who has trained more than one generation of researchers in this exciting group of Diptera. A noun in genitive singular.

Remarks. The tipulid genus *Zelandotipula* Alexander is a predominantly Neotropical taxon with 66 species in tropical and subtropical South America, but also with three species in New Zealand [1]. As such, it is one of the prime examples of crane fly taxa linking South America with Australasia, as discussed in Ribeiro and Eterovic [8]. *Zelandotipula* was proposed by Alexander [9] as subgenus of *Holorusia*, based on the presence of a remarkable spur or stump on vein M, present in the wing of the three New Zealand species (in some specimens present as a more or less completely cross-vein in cell m). Alexander [9] discovered that the New Zealand species "*exhibit certain characters that seem to warrant their*

removal from typical Holorusia in some degree" and was convinced that the spur on vein M had some phylogenetic significance. Alexander [10] later suggested a close relationship with *Ischnotoma*, as well. Vane-Wright [3] revised *Holorusia*, *Ischnotoma*, and *Zelandotipula* and their relationships and concluded that *Zelandotipula* is apparently not closely related to *Holorusia* nor *Ischnotoma*: " . . . *the structure of the terminalia in both sexes, the universal occurrence of the squamal tuft, the type of wing pattern, the reduced axillary area, and other features, setting Zelandotipula apart.*" The above-mentioned spur on vein M is not present in any of the Neotropical species of *Zelandotipula* and it is not mentioned in Vane-Wright's [3] review of the group.

Among the 22,000 plus examined crane flies from Martinique, only one male and one female of *Zelandotipula gelhausi* sp. nov. were detected. The first author compared these specimens with descriptions of the 15 species of *Zelandotipula* known from Venezuela, Colombia, Honduras, Costa Rica, Brazil, Guyana, and Guadeloupe (a summary of differences between *Z. gelhausi* sp. nov. and these species is given in Appendix A). No clear match was found. In this respect, the only species from the West Indies, i.e., *Zelandotipula parviceps* (Speiser, 1909), known from Guadeloupe, deserves special attention. The examination of the female holotype of *Tipula microcephala* (van der Wulp 1881) (synonym of *Z. parviceps*) enabled us to make a detailed comparison between *Z. gelhausi* sp. nov. and *Z. parviceps*, as presented below.

Zelandotipula parviceps (Speiser, 1909).
Tipula microcephala van der Wulp (1881): Holotype ♀, GUADELOUPE: Delauney (RBINS). (Figures 11–13a,c).

Figure 11. *Zelandotipula parviceps* (Speiser, 1909), holotype female; (**a**) Habitus; (**b**) Type labels; (**c**) Ovipositor, lateral view; (**d**) Thorax, dorsal view.

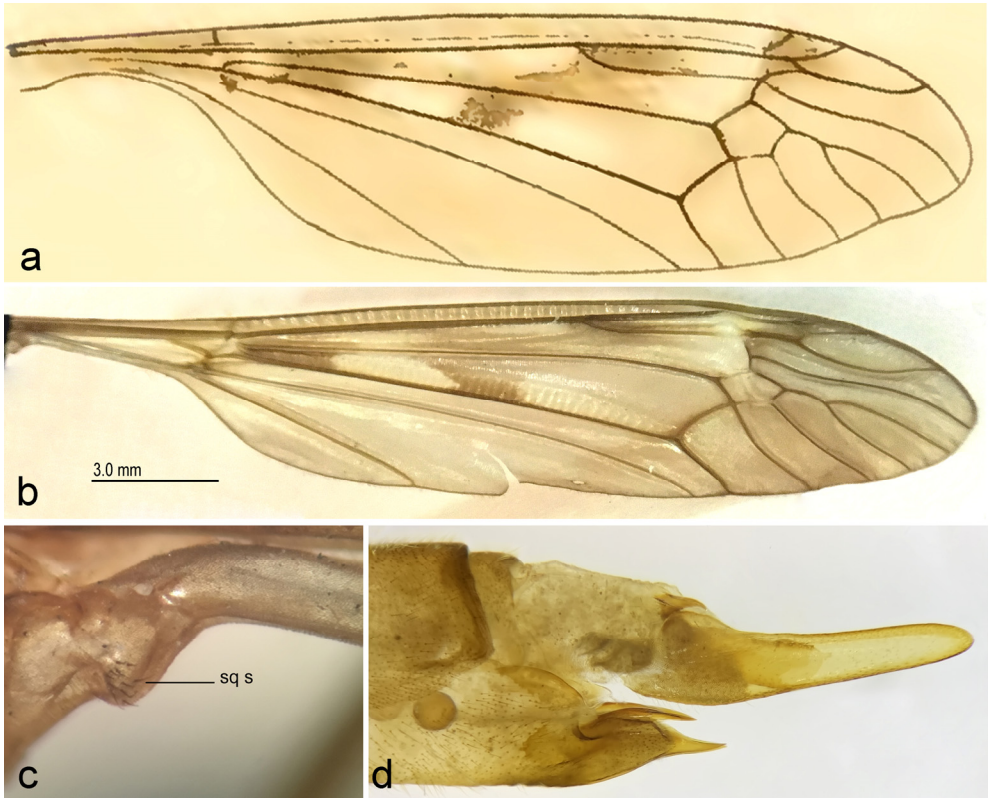

Figure 12. *Zelandotipula parviceps* (Speiser, 1909); (**a**) Drawing of wing from original description of *T. microcephala*; (**b**) Holotype female, right wing; (**c**) *idem*, setae on squama; (**d**) *idem*, ovipositor (as in Figure 11c, after maceration in a 4% KOH).

Original description by van der Wulp [11], translated from Dutch: "*Unicolorous reddish brown; thorax with hardly any indication of dark longitudinal stripes; pleura and rear back slightly lighter. Head small and rounded, with the rostrum only slightly elongate. Antennae not longer than head, bright rusty brown; the apical segments at the base, and the apicalmost ones completely dark. Palps blackish brown. Ovipositor short and straight, shiny rusty. Legs dark brown; coxae and femora brownish yellow, except for apex of femora. Halteres dirty yellow with dark knob. Wings (Figure 12a,b) brownish yellow, cloudy, with about four dark spots, two of which are situated in the second root cell (one at the base, the other in the middle); the third at the basis of the radial vein and the fourth as border spot at the end of the subcostal vein*".

Redescription. Female. In poor condition, with head, left front leg, and both hind legs missing (Figure 11). Body length 20.5 mm (as given by van der Wulp [11]), thorax 6.0 mm, wing 23.0 mm, and abdomen 16.5 mm. The ovipositor has been macerated in 4% KOH and is stored in glycerol, with the female holotype on the same pin. Given the condition of the female holotype, we cannot present a reliable redescription of this species without fresh material and male specimens, in particular. However, we considered some morphological details relevant to the comparison with the female of *Z. gelhausi* sp. nov., as provided here.

Thorax. Prescutum dark brown, with four very subtle cream-colored to light brown stripes, two longer stripes running through central part and two short ones laterally, all reaching transverse suture; scutum dark brown, with two small lateral light brown spots on anterior margin, very blurred; scutellum and mediotergite brown, covered with very fine, golden hairs (presumably, the scutum and prescutum were originally also covered with these very fine golden hairs). Legs. No tibial spurs on front and mid legs (tibial spur formula 0:0:?). Wing (Figure 12b,c). Compared to the wing of the female holotype (Figure 12b), the original description van der Wulp (1881) depicts a figure with some differences (Figure 12a). Cell c overall light brown to yellowish brown. Strong bend in R_1 at joint with Sc vein. From here, a pale yellow mark runs down across Rs, in front of the

cord and into cell dm, where the mark becomes somewhat darker. Cell r constricted at midlength; cell dm pentagonal, longer than the stem of cell m_1; bm-cu absent; cell m_1 more than 2.5 times the length of its stem; squama with fine and short setae, all being directed towards the wing tip as usual in *Zelandotipula*. Ovipositor (Figures 12d and 13c). Brownish yellow. Upper margin of sternite 8 very high, abruptly bending down before making a round loop towards the hypogynial valve. Cercus broad, with almost parallel margins in posterior half, obtuse at tip. Hypogynial valve ending in sharp upper tooth and sharply triangular lower part; lower part relatively short, not reaching halfway the cercus.

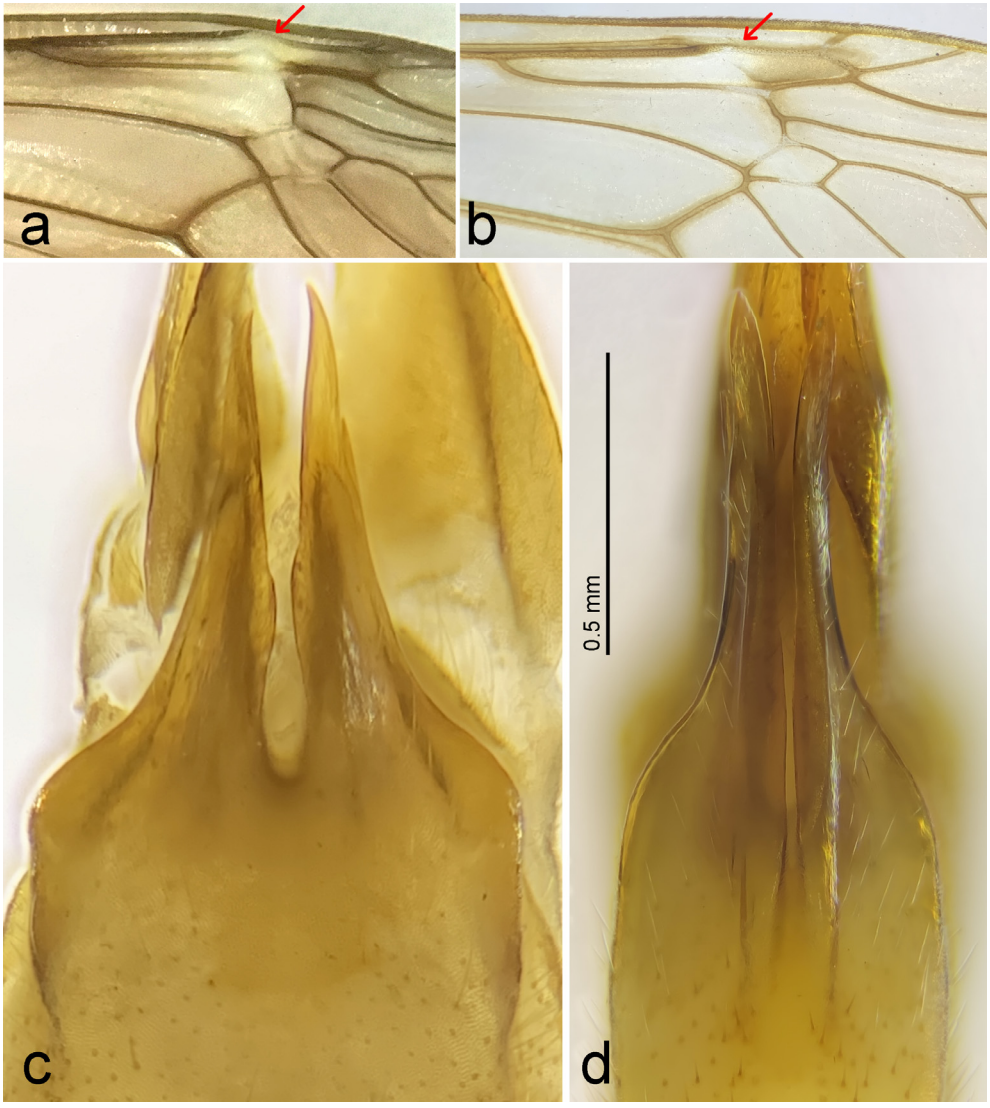

Figure 13. (**a**) Detail of wing of *Zelandotipula parviceps*; (**b**) *idem*, *Zelandotipula gelhausi* sp. nov.; (**c**) Detail of hypogynial valves, ventral view, of *Zelandotipula parviceps*; (**d**) *idem*, *Zelandotipula gelhausi* sp. nov.

Remarks. The species was described by van der Wulp [11] as *Tipula microcephala* after a female specimen from the island of Guadeloupe. This name proved preoccupied and was later replaced by *Tipula parviceps* (Speiser, 1909). Alexander [12] stated that the "*species described as microcephala van der Wulp from Guadeloupe remains unrecognized . . . It seems certain that the locality as given is erroneous since no member of the genus is known from the West Indies*". The examination of the female holotype and its labels seems to reveal that Guadeloupe is correct as the type locality and also that this species is different from the one described here as *Z. gelhausi* sp. nov. Decisive differences between the females of both species are found in the wing and the hypogynial valves. In *Z. parviceps*, the vein R_1 bends strongly just before

the stigma (Figure 13a, red arrow), whereas in *Z. gelhausi* sp. nov., there is only a slight indication of such bend (Figure 13b, red arrow). Furthermore, in *Z. parviceps* the cross-vein bm-cu is absent and bt CuA_1 is situated in the middle of cell dm; in *Z. gelhausi* sp. nov., on the contrary, the cross-vein bm-cu is present, and bt CuA_1 is situated at the beginning of cell dm. There are also obvious differences in the hypogynial valves (Figure 10c for *Z. gelhausi* sp. nov., Figure 10d for *Z. parviceps*, Figure 13a–d). In ventral view, sternite 8 is much broader, and the valves are less deeply separated in *T. parviceps* (Figure 13c), as compared to *Z. gelhausi* sp. nov. (Figure 13d). It seems likely that *Zelandotipula gelhausi* sp. nov. and *Z. parviceps* share the tibial spur formula 0:0:?, despite the poor preservation of the type of the latter species. This formula is found in the *Z. laevis* and *Z. sinuosa* groups *sensu* Vane-Wright [3] in, as far as he examined, the members of these groups. These species groups are not defined by Vane-Wright [3], but their tibial spur formula might be an indication that the two species discussed here belong to either of these groups. The species mentioned in the Appendies A and B also belong to one of these two groups.

3.2. Checklist of Tipuloidea of Martinique

This checklist includes information on species and specimens collected during two expeditions in Martinique conducted between 2016 and 2018. The associated dataset is available in GBIF, as https://doi.org/10.15468/s8h9pg. Some species (e.g., *Geranomyia* sp.) have been collected as female specimens only; they remain unidentified, due to the lack of males. Distribution follow [1].

Limoniidae, Chioneinae.

Erioptera (Mesocyphona) caliptera caliptera Say, 1823.

Material examined: 1♂, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.94″N, 61°06′52.1″W, 630 m a.s.l., 1.ii.2018 (SW), leg. Marc Pollet.

Distribution: Nearctic (Canada, USA) and Neotropic realm (Cuba, Bolivia, Dominica, Dominican Republic, St Vincent, Puerto Rico). New to Martinique.

Erioptera (Mesocyphona) gagneana Alexander, 1970.

Material examined: 1♀, Pitons du Carbet, along route forestière de Calebassier (Gros-Morne), 14°43′28.2″N, 61°03′51.9″W, 453 m a.s.l., 26.i–2.ii.2018 (WPT), leg. Marc Pollet; 1♂, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′16.3″N, 61°04′06.0″W, 497 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet; 9♂♂, 1♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.9″N, 61°06′00.4″W, 657 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet (MZB 2021–3753); 1♂, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′09.9″N, 61°05′58.9″W, 660 m a.s.l., 2.ii.2018 (SW), leg. Anja De Braekeleer (MZB 2021–3763); 1♂, 1♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′55.5″N, 61°06′13.2″W, 524 m a.s.l., 24–31.i.2018 (BPT), leg. Marc Pollet; 1♂, same data (WPT), leg. Marc Pollet; 1♂, same data (YPT), leg. Marc Pollet; 2♂♂, 3♀♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°41′04.2″N, 61°06′10.9″W, 529 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 2♂♂, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.6″N, 61°06′20.0″W, 592 m a.s.l., 25.i–1.ii.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.9″N, 61°06′22.9″W, 585 m a.s.l., 25.i-1.ii.2018 (WPT), leg. Marc Pollet; 1♂, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′17.4″N, 61°04′50.1″W, 554 m a.s.l., 22–29.i.2018 (BPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 1♂, same data (WPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal.

Distribution: Neotropics (Dominica). New to Martinique.

Remarks: *Erioptera gagneana* was collected in the five southernmost locations of the Pitons du Carbet RBI and was absent at Rivière Sylvestre and Trace des Jésuites (bas/haut). The species was most abundant in a rainforest edge at Plateau Boucher and was not found

in the adjacent grassland. No significant differences were observed between the different pan trap types, due to the small yields.

Eriopterodes celestis dominicanus Alexander, 1970.

Material examined: 1♂, Pitons du Carbet, along route forestière de Calebassier (Gros-Morne), 14°43′28.2″N, 61°03′51.9″W, 453 m a.s.l., 26.i–2.ii.2018 (WPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′15.3″N, 61°03′58.8″W, 486 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet (MZB 2021–3748); 1♂, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (BPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (WPT), leg. Marc Pollet; 5♂♂, 3♀♀, same data (YPT), leg. Marc Pollet; 1♂, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.9″N, 61°06′00.4″W, 657 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet (MZB 2021–3750); 1♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′21.3″N, 61°04′53.6″W, 599 m a.s.l., 22–29.i.2018 (YPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal.

Distribution: Neotropics (Dominica). New to Martinique.

Remarks: *Eriopterodes celestis dominicanus* was collected at only three RBI locations, with 3/4 of the 16 specimens gathered in the rainforest site at Plateau Boucher, 1 specimen in the forest edge, and none in the adjacent grassland at the same location. The species was found in largest numbers in yellow pan traps.

Gonomyia (*Leiponeura*) *subterminalis* Alexander, 1927.

Material examined: 1♂, 1♀, Pitons du Carbet, along route forestière de Calebassier (Gros-Morne), 14°43′28.2″N, 61°03′51.9″W, 453 m a.s.l., 26.i–2.ii.2018 (BPT), leg. Marc Pollet; 4♂♂, 3♀♀, same data (WPT), leg. Marc Pollet; 1♂, 3♀♀, same data (YPT), leg. Marc Pollet; 3♂♂, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′15.3″N, 61°03′58.8″W, 486 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet; 2♂♂, 2♀♀, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′16.3″N, 61°04′06.0″W, 497 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet; 7♂♂, 4♀♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet; 1♂, 5♀♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′55.5″N, 61°06′13.2″W, 524 m a.s.l., 24–31.i.2018 (BPT), leg. Marc Pollet; 7♂♂, 4♀♀, same data (WPT), leg. Marc Pollet; 14♂♂, 15♀♀, same data (YPT), leg. Marc Pollet; 25♂♂, 34♀♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′58.6″N, 61°06′13.3″W, 533 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 9♂♂, 11♀♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°41′04.2″N, 61°06′10.9″W, 529 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 5♂♂, 3♀♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.6″N, 61°06′20.0″W, 592 m a.s.l., 25.i–1.ii.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.9″N, 61°06′22.9″W, 585 m a.s.l., 25.i –1.ii.2018 (BPT), leg. Marc Pollet; 2♂♂, 4♀♀, same data (WPT), leg. Marc Pollet; 2♂♂, 3♀♀, same data (YPT), leg. Marc Pollet; 3♀♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′55.1″N, 61°06′41.4″W, 609 m a.s.l., 25.i–1.ii.2018 (YPT), leg. Marc Pollet; 3♂♂, 15♀♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′17.4″N, 61°04′50.1″W, 554 m a.s.l., 22–29.i.2018 (BPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 11♂♂, 25♀♀, same data (WPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 7♂♂, 10♀♀, same data (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′21.3″N, 61°04′53.6″W, 599 m a.s.l., 22–29.i.2018 (YPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 4♂♂, 3♀♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′29.4″N, 61°03′51.3″W, 260 m a.s.l., 27.i–3.ii.2018 (YPT), leg. Marc Pollet; 3♂♂, 7♀♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′31.2″N, 61°03′54.8″W, 260 m a.s.l., 27.i–3.ii.2018 (BPT), leg. Marc Pollet; 10♂♂, 12♀♀, same data (WPT), leg. Marc Pollet; 14♂♂, 10♀♀, same data (YPT), leg. Marc Pollet; 1♂, 3♀♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′51.7″N, 61°05′06.5″W, 337 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet; 3♂♂, 2♀♀,

Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′52.3″N, 61°05′08.2″W, 354 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet; 1♂, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′52.4″N, 61°05′05.8″W, 333 m a.s.l., 23–30.i.2018 (WPT), leg. Marc Pollet; 1♀, same data (YPT), leg. Marc Pollet; 4♂♂, 4♀♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′56.4″N, 61°05′04.3″W, 357 m a.s.l., 23–30.i.2018 (BPT), leg. Marc Pollet; 7♂♂, 6♀♀, same data (WPT), leg. Marc Pollet (MZB 2021–3742); 13♂♂, 21♀♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′57.3″N, 61°05′08.4″W, 389 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet (4♂♂4♀♀MZB 2021–3736; 6♂♂8♀♀MZB 2021–3737); 5♂♂, 7♀♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′57.4″N, 61°05′06.7″W, 374 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet.

Distribution: Neotropics (Cuba, Puerto Rico). New to Martinique.

Remarks: With 393 or about 1.8% of the tipulid specimens collected, *G. subterminalis* ranked as second most abundant species of the 2018 expedition in the Pitons du Carbet RBI. It was encountered in each of the eight investigated locations, with the highest numbers (n = 125) at Plateau Clark. Similar to *Rhipidia* (*R.*) *willistoniana*, this species seems to avoid more open and drier habitats and proved absent in the forest edge and grassland site at Plateau Boucher and an open, exposed rainforest site at Rivière Sylvestre. Overall, yields of *G. subterminalis* in yellow and white pan traps were nearly 2x as high as those in blue pan traps.

Gonomyia (*Paralipophleps*) *dikopis* Alexander, 1970.

Material examined: 2♀♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.94″N, 61°06′52.1″W, 630 m a.s.l., 1.ii.2018 (SW), leg. Marc Pollet; 1♂, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′55.1″N, 61°06′41.4″W, 609 m a.s.l., 25–1.ii.2018 (YPT), leg. Marc Pollet (MZB 2021–3762).

Distribution: Neotropics (Dominica). New to Martinique.

Teucholabis (*Teucholabis*) *annulata* Williston, 1896.

Material examined: 1♂, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′29.4″N, 61°03′51.3″W, 260 m a.s.l., 27.i–3.ii.2018 (YPT), leg. Marc Pollet.

Distribution: Neotropics (Dominica, St Vincent, Guyana). New to Martinique.

Teucholabis (*Teucholabis*) *carbetensis* Mederos, Pollet and Oosterbroek sp. nov.

Material examined: See species description.

Distribution: Martinique.

Remarks: *Teucholabis carbetensis* sp. nov. was collected at all Pitons du Carbet RBI locations, though always in very low numbers. Yields of blue and yellow pan traps were equal, but the species proved absent in white pan traps.

Limoniidae, Limnophilinae.

Polymera (*Polymera*) *albitarsis dominicae* Alexander, 1939.

Material examined: 1♂, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′16.3″N, 61°04′06.0″W, 497 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet; 1♂, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (BPT), leg. Marc Pollet; 2♂♂, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.9″N, 61°06′00.4″W, 657 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet (MZB 2021–3752); 1♂, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′55.5″N, 61°06′13.2″W, 524 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 3♂♂, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′58.6″N, 61°06′13.3″W, 533 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 1♂, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′55.1″N, 61°06′41.4″W, 609 m a.s.l., 25.i–1.ii.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′21.3″N, 61°04′53.6″W, 599 m a.s.l., 22–29.i.2018 (YPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal.

Distribution: Neotropics (Dominica). New to Martinique.

Remarks: *Polymera albitarsis dominicae* was collected in the five southernmost locations of the Pitons du Carbet RBI, always in low numbers.

Polymera (*Polymerodes*) *conjuncta* Alexander, 1913.

Material examined: 1♀, Pitons du Carbet, along route forestière de Calebassier (Gros-Morne), 14°43′28.2″N, 61°03′51.9″W, 453 m a.s.l., 26.i–2.ii.2018 (WPT), leg. Marc Pollet; 2♂♂, same data (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′15.3″N, 61°03′58.8″W, 486 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′16.3″N, 61°04′06.0″W, 497 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet; 2♂♂, 3♀♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2.ii.2018–9.ii.2018 (BPT), leg. Marc Pollet; 1♀, same data (WPT), leg. Marc Pollet; 4♂♂, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet; 3♂♂, 1♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.9″N, 61°06′00.4″W, 657 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet (MZB 2021–3751); 1♂, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′09.6″N, 62°05′59.6″W, 656 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′55.5″N, 61°06′13.2″W, 524 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 1♂, 1♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.9″N, 61°06′22.9″W, 585 m a.s.l., 25.i–1.ii.2018 (YPT), leg. Marc Pollet; 1♂, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.94″N, 61°06′52.1″W, 630 m a.s.l., 1.ii.2018 (SW), leg. Marc Pollet (MZB 2021–3759); 1♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′55.1″N, 61°06′41.4″W, 609 m a.s.l., 25.i–1.ii.2018 (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′17.4″N, 61°04′50.1″W, 554 m a.s.l., 22–29.i.2018 (BPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 1♂, 1♀, same data (WPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 2♀♀, same data (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′21.3″N, 61°04′53.6″W, 599 m a.s.l., 22–29.i.2018 (YPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 1♂, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′29.4″N, 61°03′51.3″W, 260 m a.s.l., 27.i–3.ii.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′31.2″N, 61°03′54.8″W, 260 m a.s.l., 27.i–3.ii.2018 (BPT), leg. Marc Pollet; 1♀, same data (WPT), leg. Marc Pollet; 1♂, 1♀, same data (YPT), leg. Marc Pollet; 1♂, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′52.4″N, 61°05′05.8″W, 333 m a.s.l., 30.i.2018 (SW), leg. Marc Pollet (MZB 2021–3761); 1♂, same data (BPT), leg. Marc Pollet; 1♂, same data, 23–30.i.2018 (WPT), leg. Marc Pollet; 1♂, 1♀, same data (YPT), leg. Marc Pollet; 7♂♂, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′56.4″N, 61°05′04.3″W, 357 m a.s.l., 23–30.i.2018 (BPT), leg. Marc Pollet; 4♂♂, 1♀, same data (WPT), leg. Marc Pollet (MZB 2021–3741); 1♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′57.4″N, 61°05′06.7″W, 374 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet.

Distribution: Neotropics (Brazil, Guyana, Panama, Dominica). New to Martinique.

Remarks: *Polymera conjuncta* occurred at each of the eight investigated locations of the Pitons du Carbet RBI, with 15 and 13 of the 55 specimens collected at Plateau Boucher and Trace des Jésuites (haut), respectively. This species was gathered in comparable numbers in blue, white, and yellow pan traps.

Limoniidae, Limoniinae.

Atypophthalmus (*Atypophthalmus*) *vanewrighti* Mederos, Pollet and Oosterbroek sp. nov.

Material examined: see species description.

Distribution: Martinique.

Dicranomyia (*Dicranomyia*) *alfaroi* Alexander, 1922.

Material examined: 2♀♀, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′16.3″N, 61°04′06.0″W, 497 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet (MZB 2021–3746); 1♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (WPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′55.5″N, 61°06′13.2″W, 524 m a.s.l., 24–31.i.2018 (YPT), leg. Marc

Pollet; 1♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′58.6″N, 61°06′13.3″W, 533 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°41′04.2″N, 61°06′10.9″W, 529 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.9″N, 61°06′22.9″W, 585 m a.s.l., 25.i–1.ii.2018 (BPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′55.1″N, 61°06′41.4″W, 609 m a.s.l., 25.i–1.ii.2018 (YPT), leg. Marc Pollet; 3♀♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′17.4″N, 61°04′50.1″W, 554 m a.s.l., 22–29.i.2018 (BPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 1♀, same data (WPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 1♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′21.3″N, 61°04′53.6″W, 599 m a.s.l., 22–29.i.2018 (YPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 2♀♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′51.7″N, 61°05′06.5″W, 337 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′52.4″N, 61°05′05.8″W, 333 m a.s.l., 23–30.i.2018 (BPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′56.4″N, 61°05′04.3″W, 357 m a.s.l., 23–30.i.2018 (BPT), leg. Marc Pollet (MZB 2021–3745); 1♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′57.4″N, 61°05′06.7″W, 374 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet.

Distribution: Neotropics (Bolivia, Brazil, Venezuela, Ecuador, Costa Rica, Mexico, Dominica). New to Martinique.

Remarks: *Dicranomyia alfaroi* was encountered in all RBI Pitons du Carbet locations, except for the northernmost one (Rivière Sylvestre), and always in low numbers. The species seemed to be most attracted by blue pan traps (2/3 of the yields).

Elephantomyia (*Elephantomyia*) *pertenuis* Alexander, 1970.

Material examined: 1♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′55.5″N, 61°06′13.2″W, 524 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet.

Distribution. Neotropics (Dominica). New to Martinique.

Geranomyia sp. 1

Material examined: 1♀, Domaine de Bellevue, Fort-de-France, 14°37′34.6″N, 61°04′14.5″W, 90 m a.s.l., 26–28.i.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′16.2″N, 61°04′06.0″W, 502 m a.s.l., 2.ii.2018 (SW), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′09.6″N, 62°05′59.6″W, 656 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet.

Geranomyia sp. 2

Material examined: 1♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′56.4″N, 61°06′14.2″W, 527 m a.s.l., 24.i.2018 (SW), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′17.4″N, 61°04′50.1″W, 554 m a.s.l., 22–29.i.2018 (BPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal.

Geranomyia sp. 3.

Material examined: 1♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′51.7″N, 61°05′06.5″W, 337 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet.

Geranomyia sp. 4.

Material examined: 1♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet.

Geranomyia sp. 5.

Material examined: 1♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.9″N, 61°06′00.4″W, 657 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet.

Helius (*Helius*) *albitarsis* (Osten Sacken, 1888).

Material examined: 1♂, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′55.5″N, 61°06′13.2″W, 524 m a.s.l., 24–31.i.2018 (BPT), leg. Marc Pollet (MZB 2021–3764); 1♂, same data (WPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′51.1″N, 61°05′07.0″W, 336 m a.s.l., 30.i.2018 (SW), leg. Marc Pollet (MZB 2021–3760).

Distribution: Neotropics (Peru, Colombia, Venezuela, Guyana, Cuba, Jamaica, Puerto Rico, St. Vincent, Dominica). New to Martinique.

Rhipidia (*Rhipidia*) *domestica* Osten Sacken, 1860.

Material examined: 1♂, l'Anse (Morne Jacqueline), Petite Anse (Les Anses d'Arlet), 14°28′29.8″N, 61°04′34.3″W, 111 m a.s.l., 7–13.ii.2018 (WPT), leg. Marc Pollet (MZB 2021–3733).

Distribution: Nearctic (USA) and Neotropic realm (Bolivia, Brazil, Venezuela, Guyana, Bermuda, Costa Rica, Nicaragua, Mexico, Bermuda, Cuba, Dominican Republic, Haiti, Jamaica, Puerto Rico, Trinidad, Dominica). New to Martinique.

Rhipidia (*Rhipidia*) *eremnocera* (Alexander, 1970).

Material examined: 5♀♀, Pitons du Carbet, along route forestière de Calebassier (Gros-Morne), 14°43′28.2″N, 61°03′51.9″W, 453 m a.s.l., 26.i–2.ii.2018 (BPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′15.3″N, 61°03′58.8″W, 486 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′16.3″N, 61°04′06.0″W, 497 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet (MZB 2021–3747); 5♀♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (BPT), leg. Marc Pollet; 5♀♀, same data (WPT), leg. Marc Pollet; 2♀♀, same data (YPT), leg. Marc Pollet; 6♀♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.9″N, 61°06′00.4″W, 657 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet; 3♀♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′55.5″N, 61°06′13.2″W, 524 m a.s.l., 24–31.i.2018 (WPT), leg. Marc Pollet; 9♀♀, same data (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′58.6″N, 61°06′13.3″W, 533 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 12♀♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°41′04.2″N, 61°06′10.9″W, 529 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 10♀♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.9″N, 61°06′22.9″W, 585 m a.s.l., 25.i–1.ii.2018 (BPT), leg. Marc Pollet; 3♀♀, same data (WPT), leg. Marc Pollet; 16♀♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.9″N, 61°06′22.9″W, 585 m a.s.l., 25.i–1.ii.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′55.1″N, 61°06′41.4″W, 609 m a.s.l., 25.i–1.ii.2018 (YPT), leg. Marc Pollet; 10♀♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′17.4″N, 61°04′50.1″W, 554 m a.s.l., 22–29.i.2018 (BPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 12♀♀, same data (WPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 9♀♀, same data (YPT), leg. Marc Pollet; 3♀♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′21.3″N, 61°04′53.6″W, 599 m a.s.l., 22–29.i.2018 (YPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 1♂, 8♀♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′29.4″N, 61°03′51.3″W, 260 m a.s.l., 27.i–3.ii.2018 (YPT), leg. Marc Pollet (MZB 2021–3756); 18♀♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′31.2″N, 61°03′54.8″W, 260 m a.s.l., 27.i–3.ii.2018 (BPT), leg. Marc Pollet; 10♀♀, same data (WPT), leg. Marc Pollet; 3♀♀, same data (YPT), leg. Marc Pollet; 9♀♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′51.7″N, 61°05′06.5″W, 337 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′52.4″N, 61°05′05.8″W, 333 m a.s.l., 30.i.2018 (SW), leg. Marc Pollet (MZB 2021–3734); 14♀♀, same data, 23–30.i.2018 (BPT), leg. Marc Pollet; 7♀♀, same data (WPT), leg. Marc Pollet; 10♀♀, same data (YPT), leg. Marc Pollet; 13♀♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′56.4″N, 61°05′04.3″W, 357 m a.s.l., 23–30.i.2018 (BPT), leg. Marc Pollet (MZB 2021–3744); 4♀♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′57.3″N, 61°05′08.4″W, 389 m a.s.l., 23–30.i.2018 (YPT),

leg. Marc Pollet (3♀♀MZB 2021–3738); 12♀♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′57.4″N, 61°05′06.7″W, 374 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet.

Distribution: Neotropics (Dominica). New to Martinique.

Remarks: With 226 specimens, *R.* (*R.*) *eremnocera* accounted for 1% of the total tipulid yields of the Pitons du Carbet RBI expedition in 2018 and was encountered in all eight locations. The species was collected in largest numbers in blue pan traps (average number/10 traps: 11 specimens), as compared to yellow (8.2) and white traps (6.7).

Rhipidia (*Rhipidia*) *martiniquensis* Mederos, Pollet, and Oosterbroek sp. nov.

Material examined: See species description.

Distribution: Martinique.

Rhipidia (*Rhipidia*) *subcostalis* Alexander, 1922.

Material examined: 1♀, Pitons du Carbet, along route forestière de Calebassier (Gros-Morne), 14°43′28.2″N, 61°03′51.9″W, 453 m a.s.l., 26.i–2.ii.2018 (BPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′15.3″N, 61°03′58.8″W, 486 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet (MZB 2021–3749); 1♀, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′16.3″N, 61°04′06.0″W, 497 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (BPT), leg. Marc Pollet; 4♀♀, same data (WPT), leg. Marc Pollet; 4♀♀, same data (YPT), leg. Marc Pollet; 6♀♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.9″N, 61°06′00.4″W, 657 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′09.6″N, 62°05′59.6″W, 656 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′55.5″N, 61°06′13.2″W, 524 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°41′04.2″N, 61°06′10.9″W, 529 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.9″N, 61°06′22.9″W, 585 m a.s.l., 25.i–1.ii.2018 (BPT), leg. Marc Pollet; 2♀♀, same data (YPT), leg. Marc Pollet; 1♂, 2♀♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′17.4″N, 61°04′50.1″W, 554 m a.s.l., 22–29.i.2018 (WPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal (MZB 2021–3730, MZB 2021–3735); 1♀, same data (YPT), leg. Marc Pollet; 4♀♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′21.3″N, 61°04′53.6″W, 599 m a.s.l., 22–29.i.2018 (YPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 1♂, 5♀♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′29.4″N, 61°03′51.3″W, 260 m a.s.l., 27.i–3.ii.2018 (YPT), leg. Marc Pollet (MZB 2021–3755); 1♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′31.2″N, 61°03′54.8″W, 260 m a.s.l., 27.i–3.ii.2018 (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′51.7″N, 61°05′06.5″W, 337 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′52.3″N, 61°05′08.2″W, 354 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′52.4″N, 61°05′05.8″W, 333 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′56.4″N, 61°05′04.3″W, 357 m a.s.l., 23–30.i.2018 (WPT), leg. Marc Pollet (MZB 2021–3743); 1♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′57.3″N, 61°05′08.4″W, 389 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet (MZB 2021–3740); 1♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′57.4″N, 61°05′06.7″W, 374 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet.

Distribution: Neotropics (Costa Rica, Cuba, Jamaica, Dominica). New to Martinique.

Remarks: *Rhipidia* (*R.*) *subcostalis* occurred in all eight locations of the Pitons du Carbet RBI. Yields in white traps were 2 x as high as those in blue and yellow traps.

Rhipidia (*Rhipidia*) *subpectinata* Williston, 1896.

Material examined: 1♀, Pitons du Carbet, along route forestière de Calebassier (Gros-Morne), 14°43′28.2″N, 61°03′51.9″W, 453 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet;

1♀, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′15.3″N, 61°03′58.8″W, 486 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet; 1♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet; 12♀♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′55.5″N, 61°06′13.2″W, 524 m a.s.l., 24–31.i.2018 (BPT), leg. Marc Pollet (MZB 2021–3765); 1♀, same data (WPT), leg. Marc Pollet; 9♀♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′17.4″N, 61°04′50.1″W, 554 m a.s.l., 22–29.i.2018 (BPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 1♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′21.3″N, 61°04′53.6″W, 599 m a.s.l., 22–29.i.2018 (YPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 1♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′29.4″N, 61°03′51.3″W, 260 m a.s.l., 27.i–3.ii.2018 (YPT), leg. Marc Pollet (MZB 2021–3754); 1♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′31.2″N, 61°03′54.8″W, 260 m a.s.l., 27.i–3.ii.2018 (WPT), leg. Marc Pollet; 10♀♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′31.2″N, 61°03′54.8″W, 260 m a.s.l., 27.i–3.ii.2018 (YPT), leg. Marc Pollet; 2♀♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′52.4″N, 61°05′05.8″W, 333 m a.s.l., 23.i–30.i.2018 (WPT), leg. Marc Pollet; 4♀♀, same data (YPT), leg. Marc Pollet.

Distribution: Neotropics (Grenada, St. Vincent, Dominica). New to Martinique.

Remarks: *Rhipidia* (*R.*) *subpectinata* was found in six locations of the Pitons du Carbet RBI (absent at Plateau Concorde and Trace des Jésuites (haut)). The species was collected in largest numbers in blue pan traps (average number/10 traps: 11 specimens), as compared to yellow (4.0) and white traps (1.3).

Rhipidia (*Rhipidia*) *willistoniana* (Alexander, 1929).

Material examined: 469♂♂, 165♀♀, Pitons du Carbet, along route forestière de Calebassier (Gros-Morne), 14°43′28.2″N, 61°03′51.9″W, 453 m a.s.l., 26.i–2.ii.2018 (BPT), leg. Marc Pollet; 732 unsexed specimens, same data (WPT), leg. Marc Pollet; 743 unsexed specimens, same data (YPT), leg. Marc Pollet; 883 unsexed specimens, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′15.3″N, 61°03′58.8″W, 486 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet; 141♂♂, 43♀♀, 384 unsexed specimens, Pitons du Carbet, along route forestière de Palourde (Gros-Morne), 14°43′16.3″N, 61°04′06.0″W, 497 m a.s.l., 26.i–2.ii.2018 (YPT), leg. Marc Pollet; 241 unsexed specimens, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.7″N, 61°06′00.6″W, 658 m a.s.l., 2–9.ii.2018 (BPT), leg. Marc Pollet; 138 unsexed specimens, same data (WPT), leg. Marc Pollet; 433♂♂, 157♀♀, same data (YPT), leg. Marc Pollet; 178♂♂, 37♀♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′08.9″N, 61°06′00.4″W, 657 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet; 47♂♂, 11♀♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′09.6″N, 62°05′59.6″W, 656 m a.s.l., 2–9.ii.2018 (YPT), leg. Marc Pollet; 188♂♂, 102♀♀, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′55.5″N, 61°06′13.2″W, 524 m a.s.l., 24–31.i.2018 (BPT), leg. Marc Pollet; 313 unsexed specimens, same data (WPT), leg. Marc Pollet; 330♂♂, 166♀♀, same data (YPT), leg. Marc Pollet; 588 unsexed specimens, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°40′58.6″N, 61°06′13.3″W, 533 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 423 unsexed specimens, Pitons du Carbet, Plateau Clarck (Schoelcher), 14°41′04.2″N, 61°06′10.9″W, 529 m a.s.l., 24–31.i.2018 (YPT), leg. Marc Pollet; 584 unsexed specimens, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.6″N, 61°06′20.0″W, 592 m a.s.l., 25.i–1.ii.2018 (YPT), leg. Marc Pollet; 496 unsexed specimens, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.9″N, 61°06′22.9″W, 585 m a.s.l., 25.i–1.ii.2018 (BPT), leg. Marc Pollet; 391 unsexed specimens, same data (WPT), leg. Marc Pollet; 376♂♂, 183♀♀, same data (YPT), leg. Marc Pollet; 1♂, 1♀, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′44.94″N, 61°06′52.1″W, 630 m a.s.l., 1.ii.2018 (SW), leg. Marc Pollet (MZB 2021–3758); 810 unsexed specimens, Pitons du Carbet, Plateau Concorde (Case-Pilote), 14°40′55.1″N, 61°06′41.4″W, 609 m a.s.l., 25.i–1.ii.2018 (YPT), leg. Marc Pollet (6♂♂3♀♀MZB 2021–3731); 478♂♂, 259♀♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′17.4″N, 61°04′50.1″W, 554 m a.s.l., 22–29.i.2018 (BPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 228♂♂, 161♀♀, 469 unsexed speci-

mens, same data (WPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 135♂♂, 104♀♀, 526 unsexed specimens, same data (YPT), leg. Marc Pollet; 546♂♂, 161♀♀, Pitons du Carbet, Plateau Perdrix (Saint-Joseph), 14°41′21.3″N, 61°04′53.6″W, 599 m a.s.l., 22–29.i.2018 (YPT), leg. Marc Pollet, Anja De Braekeleer, and Patrick Maréchal; 726♂♂, 352♀♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′29.4″N, 61°03′51.3″W, 260 m a.s.l., 27.i–3.ii.2018 (YPT), leg. Marc Pollet; 103♂♂, 53♀♀, 400 unsexed specimens, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′31.2″N, 61°03′54.8″W, 260 m a.s.l., 27.i–3.ii.2018 (BPT), leg. Marc Pollet; 139♂♂, 74♀♀, 413 unsexed specimens, same data (WPT), leg. Marc Pollet; 413♂♂, 234♀♀, same data (YPT), leg. Marc Pollet; 323♂♂, 192♀♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′39.3″N, 61°03′34.8″W, 211 m a.s.l., 27.i–3.ii.2018 (YPT), leg. Marc Pollet; 280♂♂, 84♀♀, 435 unsexed specimens, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′51.7″N, 61°05′06.5″W, 337 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet; 140♂♂, 27♀♀, 300 unsexed specimens, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′52.3″N, 61°05′08.2″W, 354 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet; 220♂♂, 97♀♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′52.4″N, 61°05′05.8″W, 333 m a.s.l., 23–30.i.2018 (BPT), leg. Marc Pollet; 277♂♂, 123♀♀, same data (WPT), leg. Marc Pollet; 307♂♂, 132♀♀, same data (YPT), leg. Marc Pollet; 284♂♂, 91♀♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′56.4″N, 61°05′04.3″W, 357 m a.s.l., 23–30.i.2018 (BPT), leg. Marc Pollet; 328♂♂, 89♀♀, same data (WPT), leg. Marc Pollet; 935♂♂, 348♀♀, same data (YPT), leg. Marc Pollet (1♀MZB 2021–3739); 415♂♂, 120♀♀, Pitons du Carbet, Trace des Jésuites (haut) (Le Marigot), 14°44′57.4″N, 61°05′06.7″W, 374 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet (4♂♂, 5♀♀MZB 2021–3732).

Distribution: Neotropics (Costa Rica, St. Vincent, Dominica). New to Martinique.

Remarks. With 21.275 or 96% of the collected tipulid specimens, *R.* (*R.*) *willistoniana* is by far the most abundant limoniid species encountered in the Pitons du Carbet RBI. The species clearly prefers humid and dense rainforest. Overall, the number of specimens in 10 yellow pan traps per site varied from 423 to 1.078, but at Plateau Boucher (Font-Saint-Denis), yields at the forest edge and an adjacent grassland were 2.6x and 10x lower than in the nearby rainforest (n = 625). Moreover, *R.* (*R.*) *willistoniana* was neither observed nor collected in the drier south of the island. In Pitons du Carbet RBI, it was collected in large numbers in all three pan trap types, though yields were 1.3 x higher in the yellow pan traps, as compared to the blue and white ones.

Toxorhina (*Toxorhina*) sp. 1

Material examined: 1♀, Pitons du Carbet, Plateau Boucher (Font-Saint-Denis), 14°43′09.9″N, 61°05′58.9″W, 660 m a.s.l., 2.ii.2018 (SW), leg. Marc Pollet; 1♀, Pitons du Carbet, Rivière Sylvestre (Le Lorrain), 14°46′31.2″N, 61°03′54.8″W, 260 m a.s.l., 27.i–3.ii.2018 (YPT), leg. Marc Pollet.

Toxorhina (*Toxorhina*) sp. 2

Material examined: 1♀, Pitons du Carbet, Trace des Jésuites (bas) (Le Marigot), 14°44′52.3″N, 61°05′08.2″W, 354 m a.s.l., 23–30.i.2018 (YPT), leg. Marc Pollet.

Tipulidae, Tipulinae.

Zelandotipula gelhausi Mederos, Pollet and Oosterbroek sp. nov.

Material examined: See species description.

Distribution: Martinique.

4. Discussion

For the first time in history, Tipuloidea of Martinique were collected and examined. Two expeditions, with a focus on the mountainous Réserve Biologique Intégrale (RBI) des Pitons du Carbet, revealed the occurrence of 27 species, including 4 new to science and 7 that retain a doubtful identity, due to the lack of males. The discovery of four new species

is not a real surprise, considering the fact that the island had not been explored before. Moreover, due to its isolation, endemic species are likely to be found, as is the case for other islands of the West Indies [6,13–15]. One fifth (4/20) of the identified species proved new to science. These four species might also be endemic to Martinique, though the very low numbers might also be related to the sampling method, period, and sites. Future surveys on Dominica applying the very same approach could confirm the above assumption.

It is fair to state that limoniid species diversity on Martinique is substantially higher in montane rainforests than in lowland forests. Of the 22.162 specimens collected, only 2 specimens were retrieved from 95 pan traps in 7 sampling sites at two lowland localities (Fort-de-France, Petite Anse (Les Anses d'Arlet)), against 390 pan traps in the Pitons du Carbet rainforests (8 localities, 22 sampling sites). Factors such as the light intensity, soil and aerial humidity, and litter layer development might explain these differences. Species that prefer low light intensity, high humidity, and well-developed litter layer might thrive in the montane rainforests, while being absent in the lowland forests. It must be taken into account that lowland areas have been severely altered since the arrival of mankind. As such, some of these areas might have presented suitable conditions for species that are lacking there now (Gelhaus, pers. comm.). Conditions in dry forests in the southern part of the island are currently very different from those in the RBI Pitons du Carbet. The huge abundances in the latter region proved unprecedented, from both an absolute and relative perspective. Additionally, though the dominance of *Rhipidia* (*R.*) *willistoniana* explains the very high numbers to a great extent, on average, each pan trap yielded 54 limoniid specimens over a period of one week, regardless of the color and at least in the principal sampling sites (i.e., sites where 10 blue, 10 white, and 10 yellow pan traps were operational). We have never witnessed that phenomenon during any preceding expedition in the Neotropics, despite multiple collecting trips in Chile, Costa Rica, Ecuador, and French Guiana (Pollet, unpublished data). In addition, it has been observed during field work that limoniid species often formed small swarms close to the ground (Pollet, pers. comm.), which might also have an effect on the pan trap yields.

Although with an abundance of results that are not as biased as those offered by *R.* (*R.*) *willistoniana* in this work, Gelhaus et al. [16] found that in Puerto Rico, *Geranomyia virescens* (Loew, 1851) alone comprised 47% of the emergence abundance, and four species of Limoninae comprised 75% of the abundance of a total community of 20 species from a mountain stream. The low abundance of the four new species described in the present study is surprising, three of which were described from one or two specimens. As mentioned in the introduction, the significant impact of catastrophic events, such as volcanoes, on the demographic processes that shape natural populations could be potentially devastating when they are framed in small territories, as is the case of the islands of the Lesser Antilles volcanic arc. However, the impact of these events on flora and fauna is often difficult to assess, due to the lack of detailed data prior to the event itself [17]. Although the Réserve Biologique Intégrale des Pitons du Carbet might not have been directly affected by the recent eruptions of Mount Pelée in 1902 and 1932, presumably a long history of catastrophic events could be one of the causes of the high abundance of species with a wide range of distribution on naturally defaunated islands (to the detriment of populations of supposedly endemic species), especially in inaccessible natural areas, where low, or almost zero, anthropic activity has been demonstrated (Gelhaus, pers. comm.).

In 6 of the 10 most abundant species (i.e., species with more than 10 specimens collected), females contributed for more than 50% of the pan trap yields. In fact, *Rhipidia* (*R.*) *subpectinata* (n = 44) and *Dicranomyia* (*D.*) *alfaroi* (n = 19) were only represented by females, the sex that accounted for 99.1% of the 227 specimens of *Rhipidia* (*R.*) *eremnocera* and 96.1% of the 51 specimens of *Rhipidia* (*R.*) *subcostalis*. No unequivocal explanation can be given for this pattern, as multiple factors may play a role, such as the phenology of the species. Males often appear first in the season, which implies that sampling late in the season will produce relatively more females. Unfortunately, information on the seasonal activity patterns of Tipuloidea in Martinique is lacking at this moment.

Six species are widespread in the Pitons du Carbet RBI and were discovered in all eight investigated localities. *Gonomyia* (*L.*) *subterminalis*, *Polymera* (*P.*) *conjuncta*, *Rhipidia* (*R.*) *eremnocera*, *Rhipidia* (*R.*) *subcostalis*, and *Rhipidia* (*R.*) *willistoniana* all belong to the most abundant species observed. *Teucholabis* (*T.*) *carbetensis* sp. nov. proved much rarer (14 specimens), but equally widespread in the RBI. The five first species were collected in all 22 (*R.* (*R.*) *willistoniana*) to 15 sampling sites (*Polymera* (*P.*) *conjuncta*), and *Teucholabis* (*T.*) *carbetensis* sp. nov. only in 7. Based on the data from the principal sampling sites of the Pitons du Carbet, yellow pan traps gathered 15 species against 13 species in blue and 10 species in white pan traps. Four species were only collected with yellow pan traps (as singletons): *Atypophthalmus* (*A.*) *vanewrighti* sp. nov., *Elephantomyia* (*E.*) *pertenuis*, *Geranomyia* sp. 4 and *Toxorhina* (*T.*) sp.1. Two species were retrieved from blue and white pan traps only: *Dicranomyia* (*D.*) *alfaroi* and *Helius* (*H.*) *albitarsis*. Among the other species, no distinct preferences for one specific (pan trap) color was observed (mostly due to the low numbers), except for *Rhipidia* (*R.*) *willistoniana* for yellow. On the other hand, *Gonomyia* (*L.*) *subterminalis* and *Rhipidia* (*R.*) *subcostalis* were found in distinctly higher numbers in the yellow and white pan traps, and *Rhipidia* (*R.*) *subpectinata* in blue and yellow types. Based on these observations, and in the case that resources for sampling and processing would be limited, we would recommend the use of only blue and yellow pan traps in future tipulid inventories. However, if these surveys aim at uncovering a broader taxonomic Diptera and Hymenoptera diversity, adding white pan traps remains very useful.

The number of species found in Martinique is less than half the species richness documented on nearby Dominica, an island 2/3 the size of Martinique. Based on the fact that half of the Martinique species were represented by singletons (n = 11) or doubletons (n = 2), it is very likely that, in reality, the tipulid diversity on the island is considerably higher, as might be true for most islands of the West Indies.

Author Contributions: Conceptualization, J.M. and P.O.; methodology, M.P.; sampling design and sample collection, M.P.; identification and description of the new taxa, J.M. and P.O.; photography and figures design, J.M.; data curation, M.P.; writing—original draft preparation, J.M.; writing—review and editing, M.P. and P.O.; project administration, M.P.; funding acquisition, M.P. All authors have read and agreed to the published version of the manuscript.

Funding: DEAL Martinique: ONF Martinique, Collectivité territoriale de Martinique and Parc naturel de Martinique funded the program "Etude de la faune entomologique et d'autres invertébrés de la RBI des Pitons du Carbet (Martinique)". This expedition was organized during 2014–2018 by Dr Patrick Maréchal of the Institut Carabéen pour la Nature et la Culture (ICNC, Martinique). The second author was financially supported by the ICNC and the Leopold III Fund (Brussels, Belgium) during his "Dipterological survey of Martinique" during January-February 2018.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study i.e., detailed distribution records of the collected species including habitat descriptions, are openly available as dataset in GBIF at https://doi.org/10.15468/s8h9pg.

Acknowledgments: The major part of the material presented here was collected during the 2018 "Dipterological survey of Martinique", as part of the larger "Etude de la faune entomologique et d'autres invertébrés de la RBI des Pitons du Carbet (Martinique)", organized by the ICNC. A few specimens were retrieved from the latter inventory during 2016–2017. Sincere thanks are due to Patrick Maréchal, Eddy Dumbardon- Martial, Chloé Pierre, and Anja De Braekeleer for their assistance and companionship during fieldwork in 2018. The second author thanks Charly and Joy Vigilant and Clarisse Moscou, owners of the lodges at Fort-de-France, and Corinne Arlabosse and her husband Laurent, owners of the lodge at Petite Anse, for allowing him to employ pan traps on their properties. We are grateful to Régis Delannoye for his much appreciated and enjoyable assistance during fieldwork. Together with Régis, the second author is greatly indebted to the respective wives or girlfriends, Anja, Chloé, Emiko, and Yvonne, who not only offered the participants to the expedition the time needed to do the research, but firmly supported them while doing so. The first author is indebted

to Glòria Masó and Berta Caballero, curators of the Arthropods department at MCNB, and also to Neus Brañas and Sergi Gago for their kind and constant support during the study of the material presented here. We are also grateful to Wouter Dekoninck (RBINS) for the loan of the type specimen of *Z. parviceps*, Herman de Jong (Naturalis Biodiversity Center, Leiden, Netherlands) for his great support and guidance during the study of this type specimen, and Jéssica Gouvêa (Museu Nacional, Rio de Janeiro, Brazil) for her kind support in providing images of *Zelandotipula* species from the Neotropics. Jon Gelhaus (Academy of Natural Sciences of Drexel University, Philadelphia) provided valuable comments on, and contributions to an early draft of the manuscript and Dimitri Brosens (INBO, Brussels, Belgium) supervised and guided the publication of the GBIF dataset behind this paper. The authors also thank two anonymous referees for their contributions and comments.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

List of the *Zelandotipula* species used for the verification of the identity of *Z. gelhausi* sp. nov., with information on their diagnostic characters. The selection of species is based on the *Z. laevis* and *Z. sinuosa* species groups *sensu* Vane-Wright (1967) and species described after 1967. The comparison was based on the original descriptions incl. illustrations, not the examination of type specimens.

Z. associans (Walker, 1861) (Guatemala, Mexico): Wing pattern and hypopygium different (figures 12 and 31 in Vane-Wright [3]).

Z. austrofurcifera Alexander, 1969 (Colombia, Ecuador): Hypopygium different (figure in original description).

Z. azuayensis Alexander, 1980 (Peru): Hypopygium different (figure in original description).

Z. corynostyla Alexander, 1969 (Colombia): Hypopygium different (figure in original description).

Z. exserrata Alexander, 1981 (Venezuela): Wing pattern and hypopygium different (hypopygium figure in original description).

Z. flavicornis (Alexander, 1914) (Venezuela): Wing pattern different (figure in original description).

Z. furcifera (Alexander, 1944) (Costa Rica): Wing venation and body color pattern different (no figures published).

Z. gracilipes (Walker, 1836) (Brazil): Tergite 9 different (figure 35 in Vane-Wright [3]).

Z. horni (Alexander, 1926) (Brazil): Wing pattern different (no figures published).

Z. infernalis (Alexander, 1947) (Venezuela): Antenna, wing pattern and venation different (no figures published).

Z. laevis (Alexander, 1914) (Brazil, Paraguay): Wing and outer gonostylus different (figures in original description; figure 3 in Vane-Wright [3]).

Z. longitarsis (Macquart, 1846) (Venezuela, Colombia): Short original description, might fit but not enough information to rely on (no figures published).

Z. orophila (Alexander, 1914) (Colombia): Antenna and body color pattern different (figure in original description).

Z. parvimacula (Alexander, 1945) (Brazil): Wing pattern different (no figures published).

Z. plagifera (Alexander, 1943) (Venezuela): Darker species, wing venation different (no figures published).

Z. retrorsa Alexander, 1969 (Colombia): Hypopygium different (figure in original description).

Z. ringens (Alexander, 1935) (Paraguay, Brazil): Body coloration and wing match, tergite 9 and inner gonostylus apparently different, male holotype much smaller than *Z. gelhausi* (no figures published).

Z. schineri (Alexander, 1934), as new name for *Z. eluta* (Schiner, 1868) (Brazil): Wing pattern different (no figures published).

Z. serratimargo Alexander, 1970 (Guatemala): Hypopygium different (figure in original description).

Z. strangalia (Alexander, 1927) (Venezuela): Coloration of wing and abdomen, and wing venation different (figure in Alexander [12]).

Z. subfurcifer (Alexander, 1945) (Honduras): Wing venation and body color pattern different (no figures published).

Z. sublaevis (Alexander, 1938) (Brazil): Wing pattern different (no figures published).

Z. tarda (Alexander, 1935) (Brazil, Paraguay): Hypopygium different (no figures published).

Z. vulpes (Alexander, 1945) (Brazil): Wing pattern different (no figures published).

Z. wardiana Alexander, 1981 (Colombia): Antenna and wing venation different (figures in original description).

Appendix B

Distribution of species of Tipuloidea (Limoniidae) over eight sampling sites in the Réserve Biologique Intégrale Pitons du Carbet (Martinique), expressed as the number of specimens collected with pan traps in January-February 2018. Specimens and species (*Rhipidia (R.) domestica* and *Zelandotipula gelhausi* sp. nov.) collected in Martinique beyond this survey are not included. PR: primary site, S: supplementary site.

Sampling locations of the RBI Pitons du Carbet	Gros-Morne	Plateau Boucher	Plateau Clarck	Plateau Concorde	Plateau Perdrix	Rivière Sylvestre	Trace des Jésuites (bas)	Trace des Jésuites (haut)	Total no.	%
No. sampling sites	1 PR + 2 S	1 PR + 2 S	1 PR + 2 S	1 PR + 2 S	1 PR + 1 S	1 PR + 2 S	1 PR + 2 S	1 PR + 2 S	26	
No. of pan traps	50	50	50	50	40	50	50	50	390	
Atypophthalmus (A.) vanewrighti sp. nov.							1		1	0.005
Dicranomyia (D.) alfaroi	2	1	3	3	5		3	2	19	0.086
Elephantomyia (E.) pertenuis			1						1	0.005
Erioptera (M.) caliptera caliptera				1					1	0.005
Erioptera (M.) gagneana	2	13	9	3	2				29	0.131
Eriopterodes celestis dominicanus	3	12			1				16	0.072
Geranomyia sp.1	1	1							2	0.009
Geranomyia sp.2		1	1		1				3	0.014
Geranomyia sp.3							1		1	0.005
Geranomyia sp.4		1							1	0.005
Geranomyia sp.5		1							1	0.005
Gonomyia (L.) subterminalis	20	11	125	23	73	63	11	67	393	1.774
Gonomyia (P.) dikopis				3					3	0.014
Helius (H.) albitarsis			2				1		3	0.014
Polymera (P.) albitarsis dominicae	1	3	4	1	1				10	0.045
Polymera (P.) conjuncta	6	15	2	4	7	5	5	13	57	0.257
Rhipidia (R.) eremnocera	9	18	26	30	34	40	41	29	227	1.024
Rhipidia (R.) martiniquensis sp. nov.			1						1	0.005
Rhipidia (R.) subcostalis	4	17	3	3	8	7	5	4	51	0.230
Rhipidia (R.) subpectinata	2	1	13		10	12	6		44	0.199
Rhipidia (R.) willistoniana	3560	1242	2110	2842	3067	3422	2422	2610	21,275	96.015
Teucholabis (T.) carbetensis sp. nov.	2	1	2	1	3	4	1	1	15	0.068
Teucholabis (T.) annulata						1			1	0.005
Toxorhina (T.) sp.1		1				1			2	0.009
Toxorhina (T.) sp.2							1		1	0.005
Total no. of species	12	16	14	11	12	9	12	7	25	
Total no. of specimens	3612	1339	2302	2914	3212	3555	2498	2726	22,158	100

References

1. Oosterbroek, P. Catalogue of the Craneflies of the World (CCW). 2022. Available online: http://ccw.naturalis.nl/ (accessed on 15 October 2022).
2. Pollet, M.; Dumbardon-Martial, E.; Maréchal, P. Dolichopodid survey of Martinique (Diptera: Dolichopodidae). *Fly Times* **2018**, *60*, 4–12.
3. Vane-Wright, R.I. A re-assessment of the genera *Holorusia* Loew (*Ctenacroscelis* Enderlein), *Ischnotoma* Skuse and *Zelandotipula* Alexander (Diptera, Tipulidae), with notes on their phylogeny and zoogeography. *J. Nat. Hist.* **1967**, *1*, 511–549. [CrossRef]
4. Gelhaus, J.K. Tipulidae (Crane Flies, Tipúlidos). In *Manual of Central American Diptera*; Brown, B.V., Borkent, A., Cumming, J.M., Wood, D.M., Woodley, N.E., Zumbado, M.A., Eds.; NRC Research Press: Ottawa, ON, Canada, 2009; Volume 1, pp. 193–236.

5. Cumming, J.M.; Wood, D.M. Adult morphology and terminology. In *Manual of Central American Diptera*; Brown, B.V., Borkent, A., Cumming, J.M., Wood, D.M., Woodley, N.E., Zumbado, M.A., Eds.; NRC Research Press: Ottawa, ON, Canada, 2009; Volume 1, pp. 9–50.
6. Alexander, C.P. Bredin-Archbold-Smithsonian biological survey of Dominica. The crane flies (Diptera: Tipulidae). *Smithson. Contrib. Zool.* **1970**, *45*, 1–59. [CrossRef]
7. Alexander, C.P. The Tipulidae (Order Diptera) of Rancho Grande, north-central Venezuela. *Zool. Sci. Contrib. N. Y. Zool. Soc.* **1950**, *35*, 33–56. [CrossRef]
8. Ribeiro, G.C.; Eterovic, A. Neat and clear: 700 species of crane flies (Diptera: Tipulomorpha) link southern South America and Australasia. *Syst. Entomol.* **2011**, *36*, 754–767. [CrossRef]
9. Alexander, C.P. New or little-known Tipulidae (Diptera). X. Australasian species. *Ann. Mag. Nat. Hist.* **1922**, *9*, 505–524. [CrossRef]
10. Alexander, C.P. A comparison of the systems of nomenclature that have been applied to the radial field of the wing in the Diptera. *Proc. 4th Int. Cong. Ent.* **1930**, *2*, 700–707.
11. Wulp, F.M. van der. Amerikaansche Diptera. *Tijdschr. Entomol.* **1881**, *24*, 141–168.
12. Alexander, C.P. Notes on the tropical American species of Tipulidae (Diptera). VIII. Subfamily Tipulinae. *Stud. Entomol. (N.S.)* **1969**, *12*, 161–244.
13. Alexander, C.P. The crane-flies of Puerto Rico (Diptera). *J. Agric. Univ. P. R.* **1933**, *16*, 347–387. [CrossRef]
14. Alexander, C.P. New or little-known species of West Indian Tipulidae (Diptera). III. *J. Agric. Univ. P. R.* **1937**, *21*, 523–534. [CrossRef]
15. Alexander, C.P. The crane-flies of Jamaica (Diptera, Tipulidae). *Bull. Inst. Jam. Sci. Ser.* **1964**, *14*, 1–86.
16. Gelhaus, J.K.; Masteller, E.C.; Buzby, K.M. Emergence Composition and Phenology of Tipulidae (Diptera) from a Tropical Rainforest Stream at El Verde, Puerto Rico. *J. Kans. Entomol. Soc.* **1993**, *66*, 160–166.
17. Lacey, E.A.; Takenaka, R.; LaBarbera, K.; Tammone, M.N. Ecological and demographic impacts of a recent volcanic eruption on two endemic patagonian rodents. *PLoS ONE* **2019**, *14*, e0213311. [CrossRef] [PubMed]