

RICARDO BASSINI SILVA

**Chigger mites of Brazilian birds:** morphological studies and investigation of  
the presence of associated pathogens

São Paulo

2021

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the presence of associated pathogens**

Thesis submitted to the Postgraduate Program in Experimental Epidemiology applied to Zoonoses of the School of Veterinary Medicine and Animal Science of the University of São Paulo to obtain the Doctor's degree in Sciences.

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## CERTIFIED

We certify that the Research "Chigger mites from Brazilian birds: morphological studies and investigation of the presence of pathogens", protocol number CEUAX 1124030517 (ID 000843), under the responsibility Darci Moraes Barros Battesti, agree with Ethical Principles in Animal Research adopted by Ethic Committee in the Use of Animals of School of Veterinary Medicine and Animal Science (University of São Paulo), and was approved in the meeting of day September 13, 2017.

Certificamos que o protocolo do Projeto de Pesquisa intitulado "Ácaros trombiculídeos de aves brasileiras: estudos morfológicos e investigação da presença de patógenos associados", protocolado sob o CEUAX nº 1124030517, sob a responsabilidade de Darci Moraes Barros Battesti, está de acordo com os princípios éticos de experimentação animal da Comissão de Ética no Uso de Animais da Faculdade de Medicina Veterinária e Zootecnia da Universidade de São Paulo, e foi aprovado na reunião de 13 de setembro de 2017.

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## EVALUATION FORM

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*This thesis is dedicated to my family  
– Mother, father and brother are  
here represented*

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*“Don't tell me the sky's the limit;  
When there's footprints on the moon”* - Emerson Drive

## RESUMO

BASSINI-SILVA, R. **Ácaros trombiculídeos de aves brasileiras:** estudos morfológicos e investigação da presença de patógenos associados. 2021. 552 p. Tese (Doutorado em Ciências) – Faculdade de Medicina Veterinária e Zootecnia, Universidade de São Paulo, São Paulo, 2021.

O Brasil possui 63 espécies de trombiculídeos parasitando diferentes grupos de animais. E destas, somente 8 espécies foram reportadas para aves, uma pertencente ao gênero *Apolonia*, duas para *Blankaartia*, duas para *Eutrombicula*, uma para *Neoschoengastia* e duas para *Parasecia*. As larvas destes ácaros podem provocar lesões profundas e pruriginosas no local da picada, com reações cutâneas intensas no hospedeiro, causando uma dermatite conhecida popularmente como trombiculíase. Em vários países, os departamentos de saúde pública se depararam com a necessidade de catalogação e conhecimento da biologia desses ácaros, por serem considerados potenciais vetores de patógenos. No Brasil, casos de Febre Maculosa Brasileira (FMB) diagnosticados em São Paulo, foram associados a esses ácaros, no entanto, o seu papel na epidemiologia de patógenos não foi confirmado. Ao final deste estudo, um catálogo de tipos da coleção UNSM foi elaborado contendo 1.026 espécies tipos. Seis espécies foram redescritas e imagens de microscopia foram fornecidas para auxiliar na descrição dessas espécies. Novos registros de localidade e associação com hospedeiros foram fornecidos para as espécies *B. sinnamaryi*, *E. alfreddugesi*, *E. batatas*, *E. goeldii* and *E. tinami*. Cinco espécies novas do gênero *Eutrombicula* foram descritas. A espécie *E. butantanensis* foi reestabelecida como uma espécie válida, e *E. ophidica* está sendo sinonimizada com *E. butantanensis*. Por fim, duas cepas diferentes de *Rickettsia* sp. foram detectadas em *B. sinnamaryi* and *E. tinami* parasitando aves no Brasil.

**Palavras-chave:** Trombiculídeos, taxonomia, Aves, DNA, *Rickettsia*

## ABSTRACT

BASSINI-SILVA, R. **Chigger mites of Brazilian birds:** morphological studies and investigation of the presence of associated pathogens. 2021. 552 p. Tese (Doutorado em Ciências) – Faculdade de Medicina Veterinária e Zootecnia, Universidade de São Paulo, São Paulo, 2021.

Brazil has 63 species of chiggers parasitizing different groups of animals. And of these, only 8 species were reported to birds, and one belongs to the genus *Apolonia*, two from *Blankaartia*, two from *Eutrombicula*, one from *Neoschoengastia*, and two from *Parasecia*. These mites' larvae can cause deep and itchy lesions at the bite side, with to intense skin reactions in the host, causing dermatitis popularly known as thrombiculiasis. In several countries, public health departments faced the need for cataloging and knowledge of these mites' biology as they are considered potential vectors of pathogens. In Brazil, cases of Brazilian Spotted Fever (FMB) diagnosed in São Paulo were associated with these mites because they were found in the disease's outbreaks. However, its role in the epidemiology of pathogens has not been confirmed. In this study, a type catalog of the UNSM collection was prepared to contain about 1,026 type species. Six species were redescribed, and microscopy images were provided to assist in the description of these species. New locality records and host associations were provided for species *B. sinnamaryi*, *E. alfreddugesi*, *E. batatas*, *E. goeldii* and *E. tinami*. Five new species of the genus *Eutrombicula* have been described. The species *E. butatantensis* has been re-established as a valid species, and *E. ophidica* is being synonymized with *E. butantanensis*. Finally, two different strains of *Rickettsia* sp. were detected in *B. sinnamaryi* and *E. tinami* parasitizing birds in Brazil.

**Keywords:** Chiggers, taxonomy, Birds, DNA, *Rickettsia*.

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## 1. INTRODUCTION

The chigger mites belonging to the Leeuwenhoekidae, Trombiculidae s.s. and Walchiidae have a worldwide distribution (ZHANG *et al.* 2011) and varied coloration, which can be yellow, red, white, or orange. They are popularly known in Brazil, as “trombículas” (FONSECA, 1935), “micuim amarelo” (ARAGÃO, 1936) and “mucuim” ou “trombiculídeo” (CARNEIRO, 1952). These mites can have seven stages of development: egg, pre-larva or deutovo, larva, protonymph, deutonymph, tritonymph, and adults. Only the larvae, deutonymph, and adult phases are active, the rest being quiescent. The larva has parasitism behavior, occurring in all terrestrial vertebrates, while the other stages are free-living predators of arthropods (MIYAJIMA & OKUMURA, 1917).

During parasitism, the larvae liquefy and suck the host's epithelial tissue through its saliva's enzymatic action. Although blood is not ingested in this process, sometimes blood cells can be found in the mite's stomach (JONES, 1950). A tube, known as stylostoma, is formed on the skin during feeding due to the mite's salivary secretions and host immune reactions. The stylostoma allows reaching the layers of the skin's deepest tissues (SHATROV, 2000), and some chigger species can be enveloped by the host's tissue, remaining in capsules for up to six months (WHARTON & FULLER, 1952).

Larvae can cause deep and itchy lesions at the bite site, also intense skin reactions in the host (HASE *et al.*, 1978). This dermatitis is popularly known as trombiculiasis. There are worldwide reported trombiculiasis cases, Heyne *et al.* (2001) reported to Africa a human trombiculiasis caused by the species *Leptotrombidium subquadratum* (Lawrence, 1951). In Asia and Oceania, *Eutrombicula wichmanni* (Oudemans, 1905) is the main species associated with human bites. The species *Eutrombicula sarcina* (Womersley, 1944), *Neotrombicula nagayoi* (Sasa *et al.*, 1950), and some species of the genera *Odontacarus* and *Schoengastia* have also been found biting humans (TAKAHASHI *et al.*, 2004b; BURNS, 2010). Four species have already been reported for the European continent, *Neotrombicula autumnalis* (Shaw, 1790), *Blankaartia acuscutellaris* (Walch, 1922), *Kepkatrombicula desalerei* (Methlagl, 1928), and *Trombicula toldti* (Winkler, 1953). *Neotrombicula autumnalis* stands out as the most frequent continent (RIPKA & STEKOLNIKOV, 2006; SHATROV & STEKOLNIKOV, 2011). Mullen & O'Connor (2002) reported cases of trombiculiasis in humans by the species *Eutrombicula alfreddugesi* (Oudemans, 1910), *Eutrombicula lipovskyana* (Wolfenbarger, 1952), and *Eutrombicula splendens* (Ewing, 1913) for North America. For tropical countries, such as Bolivia, Brazil, Peru, and Venezuela, these mites

occur throughout the year since the favorable environment is always present. The main species reported for these countries are *E. alfreddugesi* and *Eutrombicula batatas* (Linnaeus, 1758), except for Peru where the species *N. autumnalis* is associated with cases of trombiculiasis (CHACCOUR, 2005; TWEETEN & MUÑOZ-BRAVO, 2008; BELTRÁN *et al.*, 2009; MARTENS *et al.*, 2012). In recent years, case reports are increasing. For Brazil, Martens *et al.* (2012) reported that in the vicinity of the Tapajós River in the Amazon region, there was a case of trombiculiasis caused by *E. alfreddugesi*. A Swedish traveler also had persistent skin reactions after chigger bites on a Mato Grosso State trip (EITREM & JAENSON, 2012). Bronshteyn *et al.* (2016) reported that Russian tourists were bitten by chiggers and presented some dermatitis when they visited some areas in the Brazilian Amazon region. The authors commented that they had contact with parrots and capybaras (*Hydrochoerus hydrochaeris*). Faccini *et al.* (2017) reported trombiculiasis in goats and humans in some areas of Maranhão State.

In addition to these cases of trombiculiasis, Hase *et al.* (1978) stated that the species *Leptotrombidium intermedium* (Nagayo *et al.*, 1920), *Leptotrombidium deliense* (Walch, 1922), *Leptotrombidium fletcheri* (Womersley & Heaslip, 1943), and *Leptotrombidium arenicola* (Traub, 1960) are vectors of *Orientia tsutsugamushi*. This bacterium causes a human rickettsiosis, called tsutsugamushi, in the Asian region. In Japan, Takahashi *et al.* (2004a) described that *Leptotrombidium pallidum* larvae (Nagayo, Mitamura & Tamiya, 1920), were also responsible spreading the *O. tsutsugamushi*. It was only recently that *O. tsutsugamushi* was detected on the American continent. Weitzel *et al.* (2016) reported exanthematic typhus cases by this bacterium in people from the island Chiloé, Chile, suggesting that chigger mites transmitted them. However, to the American continent, no chigger was detected with this bacterium yet. Usually, rodents are natural reservoirs of this bacterium. After feeding the mites on the hosts, the infected larva transmits the pathogen to the following stages and subsequent generations (transovarial transmission and transstadial perpetuation) (RAPMUND *et al.*, 1969; PHASOMKUSOLSIL *et al.*, 2009). Besides that, the public health departments of the United States, after World War II, faced the need for cataloging and knowledge of the biology of these mites as they are considered potential vectors of *Rickettsia* spp. (WHARTON & FULLER, 1952). From that point on, taxonomic studies have intensified around the world, to identify these potential vectors.

Still, in the bacteria family Rickettsiaceae, Mit'kova *et al.* (2015) found, in Slovakia, *Rickettsia* species in two different chigger species, they detected *Rickettsia monacensis* and *Rickettsia helvetica* in *Hirsutiella zachvatkini* (Schluger, 1948) and *R. monacensis* in

*Kepkatrombicula storkani* (Daniel, 1956). In Brazil, only two studies recorded chiggers naturally infected with different strains of *Rickettsia* spp. The first record was made by Bassini-Silva *et al.* (2018), which detected *Rickettsia felis*-like in *Blankaartia sinnamaryi* (Floch and Fauran, 1956). This species was collected parasitizing birds in Minas Gerais State. The second study, was carried out recently by Jacinavicius *et al.* (2019) that detected “*Ca. Rickettsia colombianensi*” in *Herpetacarus hertigi* (Brennan, 1970), *Quadrasetta trapezoides* (Brennan and Jones, 1964), and *Trombewingia bakeri* (Fonseca, 1955), the three species were collected parasitizing rodents in São Paulo State. It is worth mentioning that these mites' role in the transmission of these rickettsiae has not yet been confirmed.

Outside Brazil, there are records of other bacteria detected in these mites, as in Spain, the species of chigger *N. autumnalis* was found naturally infected by the bacteria *Anaplasma phagocytophilum* (FERNÁNDEZ-SOTO *et al.*, 2006). In Germany, *N. autumnalis* was found infected with *Borrelia burgdorferi* sensu lato (KAMPEN *et al.*, 2004). In the Czech Republic, the species *N. autumnalis*, *Neotrombicula carpathica* Schluger & Vysotzkaya, and *Neotrombicula inopinata* (Oudemans, 1909) collected from birds were infected with *Borrelia garinii* and *Borrelia valaisiana* (LITERAK *et al.*, 2008). Kabeya *et al.* (2010) detected *Bartonella tamiae* in some species of the genus *Leptotrombidium* collected from wild rodents in Thailand. In Panama, Brennan & Yunker (1966) detected *Coxiella burnetii* in *Intercutestrix mondolfi* (Brennan & Yunker, 1969). Later, Yunker *et al.* (1975) managed to isolate this from this chigger that was collected from *Proechimys semispinosus* (Rodentia: Echimyidae), and they also found serological evidence that the species *Tecomatlana sandovali* Hoffmann, 1947 collected from *Saccopteryx bilineata* (Chiroptera: Emballonuridae), was infected with this bacterium. In Brazil, as soon as the first cases of Brazilian Spotted Fever (BSF) were diagnosed in São Paulo, ticks of the species *Amblyomma sculptum* (Berlese) (cited at the time as *Amblyomma cajennense*) and *Amblyomma aureolatum* (Pallas) were identified as vectors of *Rickettsia rickettsii* (Gomes, 1933). In addition to these tick species, there are other species involved in the transmission cycle (LABRUNA, 2009). However, Fonseca (1932) emphasized the importance of hematophagous mites, as potential vectors in this rickettsial disease's epidemiological cycle.

Chigger mites were organized in two main different ways over time, Brennan (1949), Wharton *et al.* (1951), Wharton & Fuller (1952), Hoffmann (1970), Lakshana (1973), Nadchatram & Dohany (1974), Goff *et al.* (1982) and Domrow & Lester (1985) divided the group into two families, Leeuwenhoekiiidae and Trombiculidae, and the latter with four subfamilies: Leeuwenhoekiiinae, Gahrlepiinae, Apoloniinae and Trombiculinae. While, other

taxonomist researchers, such as Radford (1946), Audy (1954), Vercammen-Grandjean (1968), Vercammen-Grandjean & Langston (1976), Welbourn (1991) and Kolebinova (1992), included Leeuwenhoekinae and Apoloniinae in the Leeuwenhoekidae family. However, nowadays, the most current classification was made by Zhang *et al.* (2011), who organized the mites into three families without de subdivision on subfamilies, Leeuwenhoekidae, Trombiculidae s. s. and Walchiidae; the first two occur in the Neotropical region.

Ewing (1931) compiled a list of chiggers, and eight species are highlighted in Brazil. Wharton & Fuller (1952) cataloged all the species described up to that time, and eight genera and 18 species have been described to Brazil. Years later, Fonseca (1955) added another record for the country, including the first report of human bites. The genera key made by Brennan & Goff (1977) listed 87 genera of chiggers for the Nearctic and Neotropical regions, of which 18 were reported for Brazil, ten more genera that were reported by Wharton & Fuller (1952). Between the 70s and 90s, new species were described by foreign researchers from specimens collected mainly in the North and Midwest of the country. In the 2000s, Gazeta *et al.* (2006) described another taxon collected from rodents in Rio de Janeiro State. Years later, the species *Trombewingia bakeri* (Fonseca, 1955) was collected after more than half a century of the silence of this species, and with this rediscovery, Jacinavicius *et al.* (2015) conducted a redescription of *T. bakeri*, including the designation of lectotype and paralectotype. Only in 2018, a checklist of species exclusively for Brazil was made. Jacinavicius *et al.* (2018) reported 63 species of chigger mites parasitizing different animal groups to the national territory. Of these, only eight species were collected from birds, one from *Apolonia* (TORRES & BRAGA, 1939), two from *Blankaartia* (BASSINI-SILVA *et al.*, 2017), two from *Eutrombicula* (OUDEMANS, 1910; EWING, 1925), one from *Neoschoengastia* (BRENNAN, 1971) and two from *Parasecia* (BRENNAN, 1969). With the exception of *Apolonia tigipioensis* Torres & Braga, 1938, which was cited for the second time in the country by Ornelas-Almeida *et al.* (2007), and the description of the species *Blankaartia shatrovi* Bassini-Silva & Barros-Battesti, 2017 for the national territory, practically new records of chigger parasitizing birds in Brazil have not been reported.

Given the previous studies and publications that were carried out during the master's degree, focusing on chiggers of birds from southeastern Brazil and their role in the transmission of *Rickettsia*, the proposal for the doctorate included the extension of the study to the national territory. Besides, we continue investigations to detect the pathogen's presence in the collected mites since there was evidence of the finding of new species of chiggers and

the possibility that these mites are vectors or participate somehow in the maintenance or transmission of some pathogens in nature.

## 1.1 CHAPTER PRESENTATION

This thesis is written in eight different chapters. Chapter 1, entitled “Complete type catalog of Trombiculidae *sensu lato* (Acari: Trombidiformes) of the U.S. National Entomology Collection, Smithsonian Institution”, provides a complete list of chigger type species (holotypes, paratypes, lectotypes, paralectotypes, and syntypes) housed at the USNM collection. This chapter is already published as follows: Bassini-Silva, R., Jacinavicius, F. C., Welbourn, C., Barros-Battesti, D. M., Ochoa, R. Complete Type Catalog of Trombiculidae *sensu lato* (Acari: Trombidiformes) of the U.S. National Entomology Collection, Smithsonian Institution. *Smithsonian Contributions to Zoology*, 652: 1-141, 2021. <https://doi.org/10.5479/si.13546616.v1>.

Chapter 2, “Redescription of *Apolonia Tigipioensis* Torres and Braga, 1938 (Trombidiformes: Leeuwenhoekiidae)” provides the redescription of the species *A. tigipioensis*, with drawings and a map of geographic distribution. This chapter is already published as follows: Bassini-Silva, R., Jacinavicius, F. C., Welbourn, C., Ochoa, R., Barros-Battesti, D. M. Redescription of *Apolonia tigipioensis* Torres & Braga, 1938 (Trombidiformes: Leeuwenhoekiidae). *Acarina: Russian Journal of Acarology*, 26: 197-204, 2018. <https://doi.org/10.21684/0132-8077-2018-26-2-197-204>

Chapter 3, “Taxonomic notes on *Neoschoengastia esorhina* Brennan, 1971 (Trombidiformes: Trombiculidae), a chigger species from Brazil”, since *N. esorhina* only have their original record, and the description is incomplete, in this chapter, we provide a redescription, with drawings and microscopy images (phase contrast and DIC). This chapter also is published as follows: Bassini-Silva, R., F. C. Jacinavicius, C. Welbourn, M. Huang-Bastos, R. Ochoa, D. M. Barros-Battesti. Taxonomic notes on *Neoschoengastia esorhina* Brennan, 1971 (Trombidiformes: Trombiculidae), a chigger species from Brazil. Published Online First. <https://doi.org/10.1080/01647954.2021.1879260>

Chapters 4, 5, and 6 are dedicated to species of the genus *Eutrombicula*. Chapter 4, “A new species of the genus *Eutrombicula* Ewing, 1938 (Trombidiformes: Trombiculidae) and new records for the species *Eutrombicula batatas* (Linnaeus, 1758) in Brazil” describes a new species for the genus *Eutrombicula*, and add new records for *E. batatas* in the national territory. This chapter is already published as follows: Bassini-Silva, R., Jacinavicius, F. C.,

Muñoz-Leal, S., Maturano, R., Welbourn, C., Ochoa, R., Bauchan, G., Barros-Battesti, D. M. A new species of the genus *Eutrombicula* Ewing, 1938 (Trombidiformes: Trombiculidae) and new records for the species *Eutrombicula batatas* (Linnaeus, 1758) in Brazil. *Acarologia*, 58: 976-986, 2018. [https://doi.org/ 10.24349/acarologia/20184304](https://doi.org/10.24349/acarologia/20184304).

The chapter 5, “*Eutrombicula tinami* (Oudemans, 1910) (Trombidiformes: Trombiculidae) in Brazil: a neglected ectoparasite of several animals including humans” emphasizes the importance of the chigger taxonomy, redescribing the species *E. tinami* and case reporting for the first time some bites in humans by this species of *Eutrombicula*. In addition, there are some SEM images of the species and photographs of the bites. This chapter is already published as follows: Bassini-Silva, R., Jacinavicius, F. C., Pinter, A., Fournier, G. F. S. R., Lugarini, C., Ferreira, A., Moreira-Lima, L., Hingst-Zaher, E., Welbourn, C., Ochoa, R., Barros-Battesti, D. M. *Eutrombicula tinami* (Oudemans, 1910) (Trombidiformes: Trombiculidae) in Brazil: a neglected ectoparasite of several animals including humans. *Acarologia*, 59(4): 412-423, 2019. <https://doi.org/10.24349/acarologia/20194343>.

And in Chapter 6, “The genus *Eutrombicula* Ewing, 1938 (Trombidiformes: Trombiculidae) in Brazil”, we finished the studies with the *Eutrombicula* species in Brazil, providing a review of the species recorded for national territory. We provide new records for several species, describe four new species, and make a key for genus species recorded in Brazil. This chapter is *in prep* yet.

Chapter 7, “First record of *Blankaartia sinnamaryi* (Floch & Fauran, 1956) (Trombidiformes: Trombiculidae) parasitizing the striped owl in Northeastern Brazil” records the species *B. sinnamaryi* for the first time in the northeastern region of the country, as well as records signs of trombiculiasis caused by this species in its host. This chapter is submitted to *Revista Brasileira de Parasitologia Veterinária* as follows: Bassini-Silva, R., F. C. Jacinavicius, M. Huang-Bastos, A. I. V. Batista, N. C. S. Silva, T. F. L. Nery, J. S. Pereira, C. Welbourn, R. Ochoa, D. M. Barros-Battesti. First record of *Blankaartia sinnamaryi* (Floch & Fauran, 1956) (Trombidiformes: Trombiculidae) parasitizing the striped owl in Northeastern Brazil.

The last chapter of the thesis, Chapter 8, “Molecular detection of *Rickettsia* spp. in chiggers (Trombidiformes: Trombiculidae) collected parasitizing birds in Brazil”, brings together all the species studied in this project, which were subjected to DNA extraction (the alcohol’s material), and pathogen detection. In this study, three strains of *Rickettsia* were detected in three different chiggers in Brazil. Also, this chapter is *in prep* yet.



## 1.2 GENERAL OBJECTIVE

To catalog the species of chiggers (Trombiculidae and Leeuwenhoeekiidae) from wild birds in Brazil and investigate the presence of *Anaplasma* spp., *Borrelia* spp. and *Rickettsia* spp. in specimens obtained in the field.

### 1.2.1 Specific objectives

- Catalog the types and material of mites in the family Trombiculidae s. l. parasites of birds recorded in Brazil deposited in national and international collections;
- Detail and illustrate the morphology of the species examined and redescribe the types, when necessary, of Brazilian species;
- Check the species distribution based on material deposited in the collections, as well as those obtained in recent collections, and in the literature records;
- Investigate the presence of *Anaplasma* spp., *Borrelia* spp. and *Rickettsia* spp. on mites collected in the field.

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2. **CHAPTER 1 - COMPLETE TYPE CATALOG OF TROMBICULIDAE  
SENSU LATO (ACARI: TROMBIDIFORMES) OF THE U.S. NATIONAL  
ENTOMOLOGY COLLECTION, SMITHSONIAN INSTITUTION**



SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY • NUMBER 652



Complete Type Catalog  
of Trombiculidae sensu lato  
(Acari: Trombidiformes)  
of the U.S. National  
Entomology Collection,  
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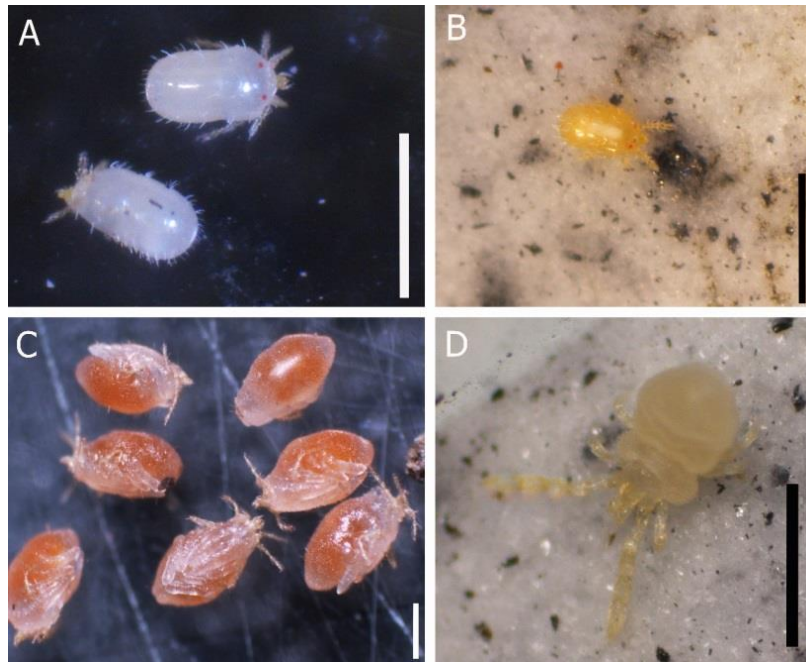
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WASHINGTON, D.C.  
2021

## 2.1 INTRODUCTION

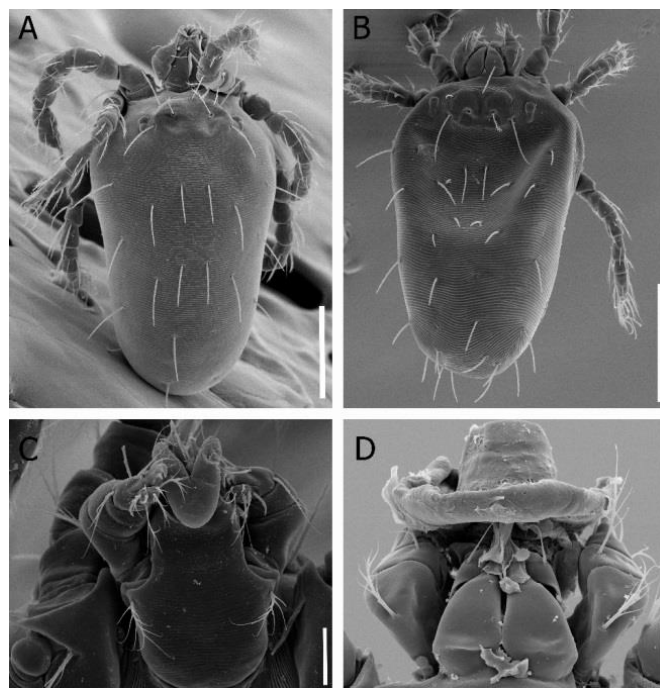
Mites of the family Trombiculidae (Figures 1A, 1B, 2 and 3) exhibit a varied life style with larvae (chiggers) parasitic on terrestrial vertebrates, including humans, while the active postlarval stages (deutonymph and adult, Figure 1D) predatory on eggs and other arthropods in the soil (Miyajima and Okumura, 1917). The protonymph (Figure 1C) and tritonymph are inactive calyptostases. Hyland (1951) suggested the coloring of the larva depends on the type of food ingested by the deutonymph or adult, and this phenomenon is illustrated in Figure 1A and B featuring two color morphs of *Quadrasetta* sp. larvae. During larval feeding, a stylostome (Figure 2D) is formed on the skin, which enables the mite to feed on deeper layers of tissue (Shatrov, 2000). In some mite species, the stylostome can be enveloped by host tissue remaining encapsulated for up to six months (Wharton and Fuller, 1952).

Unengorged larvae measure between 200 to 400  $\mu\text{m}$  (Figure 3A) and increase in size up to 1 mm in length when they are engorged (Figure 3B). During the parasitic phase, the larvae can cause lesions and severe skin reactions in the host (Hase et al., 1978), with species of *Leptotrombidium* Nagayo et al. vectoring the bacteria, *Orientia tsutsugamushi*, which causes human rickettsioses, as scrub typhus.

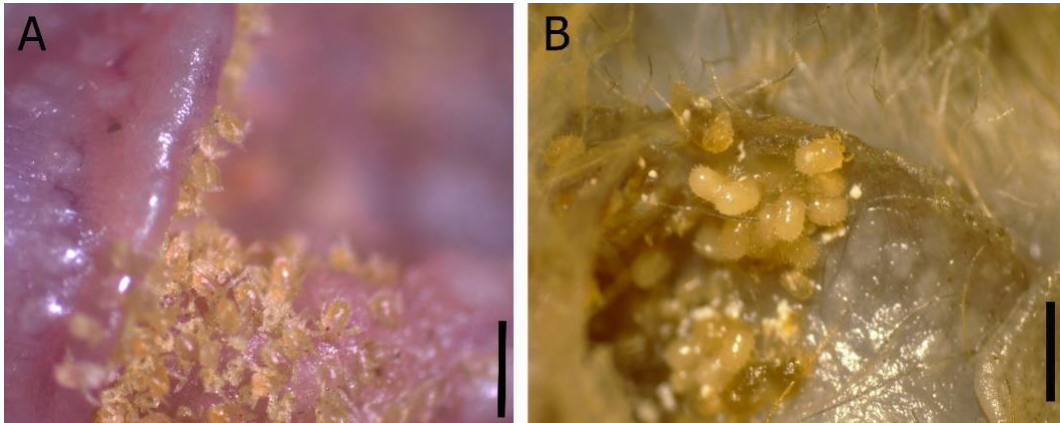
Krantz and Walter (2009) included chiggers in the superfamily Trombiculoidea (Trombidiformes) along with Audyanidae Southcott, 1987; Johnstonianidae Thor, 1935; Neotrombidiidae Feider, 1955 and Trombellidae Thor, 1935.



**Figure 1.** Chigger stages. A. larva of *Quadraseta* sp.; B. larva of *Quadraseta* sp.; C. protonymph of *Eutrombicula* sp.; D. deutonymph of *Quadraseta* sp. Scales bars: A and B 500  $\mu\text{m}$ , C 100  $\mu\text{m}$ , D 1000  $\mu\text{m}$ .



**Figure 2.** Chigger's Scanning Electron Microscope images. A. general dorsal view of *Eutrombicula* sp.; B. general dorsal view of *Parasecia* sp.; C. ventral view of gnathosoma of *Eutrombicula* sp.; D. dorsal view of gnathosoma attached the beginning of the stylostoma of *Parasecia* sp. Scales bars: A and B 100  $\mu\text{m}$ , C 40  $\mu\text{m}$ , D 30  $\mu\text{m}$ .



**Figure 3.** Chiggers attached on the rodent host's ear. A. engorged larvae; B. non- engorged larvae. Scales bars: A and B 500  $\mu$ m.

Wen (1999) revised Trombiculidae and recognized Leeuwenhoekinae Womersley 1944 and Walchiinae Ewing 1946 at the family level, based primarily on larval morphology. Here, we use Trombiculidae *sensu lato*, to refer to the three families. There are an estimated 3,700 described chiggers' species (Liu et al., 2013) and the types are placed in various collections worldwide.

One of most important chigger collections in the world is the collection at the Smithsonian Institution's National Museum of Natural History (Institution code USNM). This collection includes species described by researchers from the United States and other countries. Early researchers in the field include: Drs. H. E. Ewing (Figure 4A), G. W. Wharton (Figure 4B) and R. B. Loomis (Figure 4F), who published important papers on chiggers during the 20<sup>th</sup> century (Ewing, 1931; Wharton and Fuller, 1952; Loomis, 1973). In addition to their collection, a large assortment of slides (approximately 51,000) was incorporated into the USNM, most of them from Nearctic and Neotropical biodiversity research by Drs. J. M. Brennan (Figure 4C) and L. Goff (Figure 5) (Brennan and Goff, 1977a). Many Asian chigger type specimens provided by Drs. R. Traub (Figure 6) and M. Nadchatram (Figure 4D) have been incorporated into this collection, as have the African species from the collection of Dr. P. H. Vercammen-Grandjean (Figure 4E). The type material in the USNM collection includes approximately one third of the currently known chigger species worldwide. This work represents an update to the catalogue produced by Goff (1989) and includes additional holotypes and lectotypes, along with the addition of



paratypes, syntypes, and paralectotypes. Designations follow the recommendations of the ICZN (1999, article 72 F.4).



**Figure 4.** Some chigger's researchers. A. Dr. H. E. Ewing; B. Dr. G. W. Wharton; C. Dr. J. M. Brennan; D. Dr. M. Nadchatram; E. Dr. P. H. Vercammen-Grandjean; F. Dr. R. B. Loomis (photos taken from Prasad, 1987; Mallis, 1971; and Goff et al. 1986).



**Figure 5.** Dr. Lee Goff in a moment of his work.



**Figure 6.** U.S. Army team that conducted the first scrub typhus treatment and prophylaxis trials. Pictured at the Malaysian Institute for Medical Research, in the photo are (left to right) Robert Traub, Ted Woodward, Joe Smadel, Cornelius Philip and Herb Ley.



### 2.1.1 Approach and Format of Accounts

This catalog includes 645 holotypes, 782 paratypes, 19 lectotypes, 16 paralectotypes and 69 syntypes representing 1,026 nominal species. It was made due to the combined efforts of Brazilian (Figure 7A, B and E) and American (Figure 7C and D) researchers who devoted time to this collection. Figure 8A shows the entire type collection, the Figure 8B shows slide boxes with blue labels and Figure 8C shows an open box, showing the alphabetically slides.

The catalog is arranged alphabetically by species, starting with: specific epithet, subspecies (when present), genus, subgenus (when present), author, published year, page number and whether it is larva (L) or active postlarval instar (P). The holotype and lectotype data include locality, collection date, original host and author followed by the current host name in parentheses (if different), host order and family in parentheses, collector(s) and, when known, original collection number. The paratype and paralectotypes data are presented in the same order with the addition of the number of specimens per collection. In this catalog, syntypes are designated when there was no holotype designation in the original description. In many cases, the labels of the slides designated as holotypes had red markings, while the labels of paratypes were marked in blue, dark/light green or just written to identify the paratypes. At the end of each specimen record, after the original collection number, the current USNMENT number for each type specimen is added in parentheses. The specificity of the localities that are in the catalog depends on how accurate it was presented in the original description. Often in the original descriptions it was placed as “being close to somewhere”, these statements are random without a geographic coordinate. To avoid mistakes, we prefer to place as precise and accurate as possible. Therefore, some localities go further until city, and others are only up to the state.



**Figure 7.** Chigger's reserchers of this catalog. A. Fernando de Castro Jacinavicius; B. Darci Moraes Barros-Battesti; C. Cal Welbourn; D. Ronald Ochoa; E. Ricardo Bassini-Silva.

Over the years, the names of some host taxa have changed. Table 1 lists the original host names used in the original chigger descriptions and their current names. Host names not listed in Table 1 have not changed since the original chigger description. In addition, some country names have changed (Table 2). In the listing above, we chose to update the localities and hosts.



**Figure 8.** Smithsonian National Chigger Collection. A. cabinets storing the collection; B. shelves to store boxes of types; C. open type box.

More than 30 different researchers from around the world have deposited chigger types in the USNM collection over the years with 20% described by Dr. J.M. Brennan. Some type slides from various authors are highlighted in Figures 9 and 10 to show the variation in mounting and labeling (the unique USNMENT specimen identifiers are not visible on the slides in Figs. 9 and 10 because the photos were taken prior to these labels being physically attached to each slide). The USNM chigger type collection started in 1913 with the chigger types of Ewing. Between 1913 and 1939 approximately 6% of the current total 1,026 species were added to the USNM collection. Work in the 1940s, 1950s and 1960s accounted for about 55 % of the species represented in the collection. All of these contributions had significant help from the American army, as some of these mites are known vectors of human disease in the Asian region. In the 1970s, another 16% were added, but after 1980, the number of additions to the USNM collection significantly decreased. Goff (1989) listed 600 primary types deposited with USNM and we list 733 primary types from 72 countries and areas from every continent (except Antarctica). In this







**Figure 10.** Types housed at the USNM. A. Vercammen-Grandjean's holotype, *Schoutedenichia (Brennanichia) dipodilli*; B. Gater's paratype, *Trombicula spicea*; C. Radford's paratype, *Acomatacarus audyi*; D. Vercammen-Grandjean's holotype, *Microtrombicula (Scapuscutala) nadchatrami*; E. Fauran's paratype, *Eushcoengastia oblonga*; F. Hoffmann's holotype, *Walchiella (Cordiseta) mexicana*; G. Lawrence's paratype, *Acomatacarus namaquensis*; H. Greenberg's paratype, *Acomatacarus micheneri*; I. Brown's paratype, *Myotrombicula oconnori*.

Of the types in this collection, the largest number of species are from the USA, Venezuela and Malaysia. The importance of depositing type specimens and research vouchers in institutional or museum collections cannot be underestimated. As field

collected material becomes increasingly unavailable institutional or museum collections are more important in systematic research.

Some type catalogs including chigger records have been previously published such as the type catalog of the American Museum of Natural History, where Hernandez et al. (2011) listed 45 different families, including Trombiculidae, with only two species *Blankaartia attenuata* (Michener) and *Eutrombicula splendens* (Ewing). Stekolnikov (2019) recently published a type catalog containing 92 chigger holotypes deposited in the collection of the Natural History Museum of Geneva, Switzerland.

Stekolnikov (2019) stated that Goff (1989) incorrectly listed the “type” of *Microtrombicula (Scapuscutala) nadchatrami* Vercammen-Grandjean, 1965 as part of the USNM collection. He suggested the slide of *Microtrombicula paramunda (nomen nudum)*, labeled as “holotype”, could be the holotype of *M. (S.) nadchatrami*. Examination of the *M. (S.) nadchatrami* slide labeled “type” in the USNM collection (Figure 10D) agrees with Vercammen-Grandjean’s 1965 description, except for the slide number. The slide labeled “type” in the USNM is numbered 103433 while the original description lists 103441. Vercammen-Grandjean frequently labeled slides with unpublished names as types (Stekolnikov 2019). The slide of *M. paramunda* at the Natural History Museum of Geneva is a *nomen nudum* (Stekolnikov 2019), therefore the slide of *M. (S.) nadchatrami* in the USNM collection (Figure 2D) labeled “type” is the holotype for this species. In addition, the types of *Schoutedenichia (Brennanichia) dipodilli* Vercammen-Grandjean, 1958 which were thought to be missing (Stekolnikov 2018) were found (Figure 10A).

Several of the listed species are mainly reported from domestic and farm animals, and are, summarized in the Table 3. These chiggers can cause various skin problems that can significantly influence the health of these animals. In addition, chiggers can be introduced into other countries through the importation of domestic animals, which can then infest local domestic and endemic fauna.

Six of the species listed in Table 3 were collected from humans: *Trombicula (Eutrombicula) belkini* Gould, 1950, *Schoengastia blestowei* Gunther, 1939, *Trombicula hominis* Ewing, 1933, *Acariscus masoni* Ewing, 1943, *Neoschoengastia nuñezi* Hoffmann, 1944, *Trombicula (Neotrombicula) tanyiai* Philip and Fuller, 1950. It is well known that this family can carry diseases to humans. The role of chiggers in disease transmission and

the gaps in our knowledge of this family make the study of these mites increasingly important. Future chigger studies should include the active postlarval instars and their possible role in disease transmission.

### 2.1.2 Acronyms and Abbreviations

The following abbreviations were used in this catalog. In some cases, the collector's initials were included.

- **BMOC** B. M. OConnor collector;
- **BPBM** USA, Hawaii, Honolulu, Bernice Pauahi Bishop Museum;
- **CBR** C. B. Robbins collector;
- **CORU** Malaya, Kuala Lumpur, Colonial Office Medical Research Unit collector;
- **DBA** D. B. Abrell collector;
- **HK** H. Klompen collector;
- **HSL** H. S. Logsdon collector;
- **IBSP** Brazil, São Paulo, Butanta Institute, Acari Collection of the Instituto Butantan;
- **IMR** Malaysia, Kuala Lumpur, Institute for Medical Research;
- **JLF** J. L. Fowler collector;
- **JPW** J. P. Webb collector;
- **JTB** J. T. Baccus collector;
- **KDP** K. D. Petyon collector;
- **KU** USA, Kansas, University of Kansas, Snow Entomological Museum;
- **LCS** L. C. Spath collector;
- **LJB** L. J. Barkley collector;
- **LWR** L. W. Robbins collector;
- **NM** South Africa, Pietermaritzburg, KwaZulu-Natal Museum;
- **PDS** P. D. Spoecker collector;
- **RBL** R. B. Loomis collector;

- **REM** R. E. Martin collector;
- **RMD** R. M. Davis collector;
- **RML** USA, Montana, Hamilton, Rocky Mountain Laboratory;
- **RT B** R. Traub collector;
- **SAM** Australia, South Australia, Adelaide, South Australian Museum;
- **SMRL** Thailand, Bangkok, Southeast Asia Treaty Organization Medical Research Laboratory;
- **USATC** USA, Washington, D.C., United States of America Typhus Commission collection;
- **USNM** USA, Washington, D.C., Smithsonian Institution, National Museum of Natural History [formerly United States National Museum] and physically housed in Beltsville, MD at the Systematic Entomology Laboratory headquarter (BARC-USDA-ARS);
- **WAM** Australia, Western Australia, Western Australian Museum;
- **WCW** W. C. Welbourn collector;
- **WJW** W. J. Wrenn collector;

## 2.2 ACCOUNTS OF NAME-BEARING TYPE SPECIMENS

### **Order Trombidiformes Reuter, 1909**

#### **Family Trombiculidae *s. l.***

#### ***abditiva*, *Pseudoschoengastia* Brennan, 1960b: 482**

##### **Holotype (L)**

PANAMA • Panama province, Cerro Azul; 8 Feb. 1956; ex *Oryzomys talamancae* J.A. Allen (= *Transandinomys talamancae*) (Rodentia: Cricetidae); RML 35338; (USNMENT01750000).

##### **Paratype (L)**

PANAMA • 1; same data as holotype; (USNMENT01750001).

#### ***aberrans*, *Pseudoschoengastia* Brennan and Jones, 1959: 424**



**Holotype (L)**

MEXICO • Chiapas State, Teopisca Municipality; 1 Sep. 1953; ex *Peromyscus oaxacensis* Merriam (= *Peromyscus aztecus* [Saussure]) (Rodentia: Cricetidae); RML 34930; (USNMENT01750002) .

***abidi*, *Leptotrombidium* (*Leptotrombidium*) Traub and Nadchatram, 1967a: 4****Holotype (L)**

PAKISTAN • Balochistan Province, Quetta District, Urak Valley; 25 Jun. 1964; ex *Mus* sp. (Rodentia: Muridae); R. L. Amoureux and D. Wright coll.; (USNMENT01750003) .

***abrelli*, *Paraguacarus* Goff and Whitaker, 1984c: 329****Holotype (L)**

PARAGUAY • Boquerón Department, Teniente Agripino Enciso National Park; 28 Jun. 1982; ex *Andalgalomys pearsoni* (Myers) (Rodentia: Cricetidae); D. B. Abrell coll.; DBA 271; (USNMENT01750004).

**Paratypes (L)**

PARAGUAY • 1; same data as holotype; (USNMENT01750005) . 3; same locality and host; 29 Jun. 1982; DBA 277; (USNMENT01750006, USNMENT01750007, USNMENT01750008). 1; same locality and host; 7 Jul. 1982; DBA 281; (USNMENT01750009). 3; same locality; 12 Jul. 1982; ex *Akodon* [*sic*] *lasiurus* (= *Necromys lasiurus* [Lund]) (Rodentia: Cricetidae); DBA 297; (USNMENT01750010, USNMENT01750011, USNMENT01750012). 1; same locality; 7 Aug. 1982; ex *Calomys callosus* (Rengger) (Rodentia: Cricetidae); DBA 328; (USNMENT01750013).

***accola*, *Ascoschoengastia* (*Laurentella*) Nadchatram, 1970a: 17****Paratypes (L)**

PAPUA NEW GUINEA • 4; Morobe Province, Bulldog Track; 6 Nov. 1967; ex *Phalanger vestitus* (Milne-Edwards) (Diprotodontia: Phalangeridae); (USNMENT01750014, USNMENT01750015, USNMENT01750016, USNMENT01750017).

***acomys*, *Trombicula* Radford, 1957: 140**

**Paratype (L)**

ISRAEL • 1; kibbutz Mishmar Ha'Emek; 28 Nov. 1952; ex *Acomys cahirinus* (É. Geoffroy) (Rodentia: Muridae); O. Theodor coll.; (USNMENT01750018).

***acutascuta*, *Beamerella* Brennan, 1958: 72****Holotype (L)**

TRINIDAD AND TOBAGO • Sangre Grande Region, Mount Tamana, Taman Hill Cave; 12 Jun. 1956; ex *Chilonycteris rubiginosa* Wagner (= *Pteronotus (Phyllodia) parnellii rubiginosus*) (Chiroptera: Mormoopidae); RML 34019; (USNMENT01750019).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 2; same data as holotype; RML 34020; (USNMENT01750020, USNMENT01750021).

***aeci*, *Pseudoschoengastia* Brennan, 1965b: 108****Holotype (L)**

USA • Nevada State, Nye County, Mercury; 28 Oct. 1961; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); D. M. Allred coll.; RML 39763; (USNMENT01750022).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01750023, USNMENT01750024).

***aegypti*, *Euschoengastia (Brunehaldia)* Vercammen-Grandjean and Kolebinova, 1966: 434****Holotype (L)**

EGYPT • Sinai Peninsula, Saint Catherine's Monastery; 13 Nov. 1952; ex *Acomys cahirinus dimidiatus* Cretzschmar (= *Acomys dimidiatus*) (Rodentia: Muridae); H. Hoogstraal coll.; USNM 131152; (USNMENT01750025).

***aemulata*, *Euschoengastia* Brennan and Jones, 1964a: 307****Holotype (L)**

VENEZUELA • Aragua State, Rancho Grande; 19 Mar. 1960; ex *Glossophaga soricina* (Pallas) (Chiroptera: Phyllostomidae); V. J. Tipton coll.; RML 40658; (USNMENT01750026).

**Paratypes (L)**

VENEZUELA • 2; same data as holotype; (USNMENT01750027, USNMENT01750028).

***aenigma*, *Eutrombicula* Lawrence, 1949: 447**

**Paratype (L)**

ZIMBABWE • 1; Matabeleland South Province, Beitbridge; no date; ex *Mabuya varia* Loveridge (= *Trachylepis brauni* [Tornier]) (Squamata: Scincidae); NM 4813; (USNMENT01750029).

***aequalis*, *Microtrombicula* (*Scapuscutala*) Webb and Loomis, 1971: 321**

**Holotype (L)**

MEXICO • Sonora State, El Novillo; 7 Apr. 1966; ex *Peromyscus boylii* (Baird) (Rodentia: Cricetidae); J. L. Fowler, R. B. Loomis and L. K. Tanigoshi coll.; JLF 660407; (USNMENT01750030).

***aetherios*, *Crotiscus* Brennan, 1957: 677**

**Holotype (L)**

PERU • Puno Department, Sandia Province, Limbani District; 11 Jun. 1951; ex *Chinchillula sahamae* Thomas (Rodentia: Cricetidae); RML 31551; (USNMENT01750031).

**Paratypes (L)**

PERU • 8; same data as holotype; (USNMENT01750032, USNMENT01750033, USNMENT01750034, USNMENT01750035, USNMENT01750036, USNMENT01750037, USNMENT01750038, USNMENT01750039). 8; same locality and host; 19 Jun. 1951; RML 31553; (USNMENT01762000, USNMENT01762001, USNMENT01762002, USNMENT01762003, USNMENT01762004, USNMENT01762005, USNMENT01762006, USNMENT01762007). 1; same locality; 1

Sep. 1951; ex *Neotomys ebriosus* Thomas (Rodentia: Cricetidae); RML 31561; (USNMENT01750040).

***aethomyia*, *Neoschoengastia* Radford, 1942: 78**

**Paratype (L)**

SOUTH AFRICA • 1 larva, Eastern Cape Province, Grahamstown City, Glen Craig; 22 May 1939; ex *Thallomys namaquensis grahami* (Roberts) (= *Micaelamys namaquensis* (A. Smith) (Rodentia: Muridae); G. Theiler coll.; (USNMENT01750041).

***africana*, *Ascoschoengastia* Radford, 1948b: 220**

**Paratypes (L)**

SOUTH AFRICA • 3; Gauteng Province, Pretoria City, Onderstepoort; 22 May 1939; ex *Otomys tropicalis* Thomas (Rodentia: Muridae); Zoological Survey coll.; (USNMENT01750042, USNMENT01750043, USNMENT01750044).

***africana*, *Sauracarella* Lawrence, 1949: 451**

**Paratype (L)**

SOUTH AFRICA • 1; Western Cape Province, Frenchhoek; no date; ex *Tetradactylus seps* (L.) (Squamata: Gerrhosauridae); SAM 8717; (USNMENT01750045).

***aitkeni*, *Trombicula* Brennan and Jones, 1960: 510**

**Holotype (L)**

TRINIDAD AND TOBAGO • Sangre Grande Region, Cumaca; 8 Jun. 1954; ex *Nectomys squamipes* Brants (Rodentia: Cricetidae); RML 33628; (USNMENT01750046).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 4; same data as holotype; (USNMENT01750047, USNMENT01750048, USNMENT01750049, USNMENT01750050). 1; same data; RML 33633; (USNMENT01750051). 1; same locality and host; 2 Jun. 1954; RML 33620; (USNMENT01750052). 3; same data; RML 33621; (USNMENT01750053, USNMENT01750054, USNMENT01750055). 1; same data; RML 33623; (USNMENT01750056). 4; same host and locality; 5 Jun. 1954; RML 33626;

(USNMENT01750057, USNMENT01750058, USNMENT01750059,  
USNMENT01750060).

***alaskensis, Trombicula (Neotrombicula) Brennan and Wharton, 1950: 178***

**Holotype (L)**

USA • Alaska State, Juneau City; 6 Jun. 1948; ex *Hylocichla ustulata ustulata* Nuttall (= *Catharus ustulatus ustulatus*) (Passeriformes: Turdidae); R. B. Williams coll.; USNM 1839; (USNMENT01750061).

***albecki, Albeckia Vercammen-Grandjean and Watkins, 1966: 75***

**Holotype (L)**

USA • California State, Solano County, Rockville; 16 Jan. 1965; ex *Antrozous pallidus* (Le Conte) (Chiroptera: Vespertilionidae); A. J. Beck coll.; (USNMENT01750062).

**Paratypes (L)**

USA • 3; same data as holotype; (USNMENT01750063, USNMENT01750064, USNMENT01750065).

***alcithoae, Loomisia Brennan and Reed, 1972b: 797***

**Holotype (L)**

VENEZUELA • Barinas State, Altamira; 14 Dec. 1967; ex *Carollia* sp. (Chiroptera: Phyllostomidae); Smithsonian Army coll.; RML 55770; (USNMENT01750068).

**Paratypes (L)**

VENEZUELA • 2; same data as holotype; (USNMENT01750069, USNMENT01750070).

***alethrix, Leptotrombidium (Trombiculindus) Traub and Nadchatram, 1967b: 440***

**Holotype (L)**

MALAYSIA • Sarawak State, Kapit Division, Nanga Pelagus; 27 Nov. 1958; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); R. Traub coll.; RT B 49679; (USNMENT01750071).

***alexandrina, Microtrombicula (Microtrombicula) Vercammen-Grandjean, 1965: 109*****Paratype (L)**

DEMOCRATIC REPUBLIC OF THE CONGO • 1; South Kivu Province, Mushweshwe; 19 Mar. 1954; ex *Rattus rattus* (L.) (Rodentia: Muridae); (USNMENT01750072).

***alleei, Trombicula Ewing, 1926: 111*****Holotype (P)**

PANAMA • ♂; Panama province, Barro Colorado Island; no date; “in soil”; W. C. Allee coll.; USNM 953; (USNMENT01750073).

***alredi, Trombicula Brennan and Beck, 1955: 9*****Holotype (L)**

USA • Utah State, Washington County, Rockville; 13 Jul. 1953; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); RML 33182; (USNMENT01750074).

**Paratypes (L)**

USA • 3; same data as holotype; (USNMENT01750075, USNMENT01750076, USNMENT01750077). 2; Utah State, Washington County, Diamond Valley; 16 Jul. 1953; same host; RML 33184; (USNMENT01750078, USNMENT01750079). 3; Utah State, Washington County, Toquerville; 5 Sep. 1951; same host; RML 31208; (USNMENT01750080, USNMENT01750081, USNMENT01750082).

***almae, Trombicula Brennan, 1968b: 683*****Holotype (L)**

COLOMBIA • Valle del Cauca Department, Cali City, Pichinde; 17 Mar. 1967; ex *Oryzomys albigularis* (Tomes) (= *Nephelomys albigularis*) (Rodentia: Cricetidae); Trapido coll.; RML 47674; (USNMENT01750083).

**Paratypes (L)**

COLOMBIA • 2; same data as holotype; (USNMENT01750084, USNMENT01750085). 9; same data; RML 47672; (USNMENT01750086, USNMENT01750087, USNMENT01750088, USNMENT01750089, USNMENT01750090, USNMENT01750091, USNMENT01750092, USNMENT01750093,

USNMENT01750094). 1; same locality and host; 25 Jan. 1967; RML 47666; (USNMENT01750095). 4; same locality and host; 11 Mar. 1967; RML 47668; (USNMENT01750096, USNMENT01750097, USNMENT01750098, USNMENT01750099). 2; same locality and host; 15 Mar. 1967; RML 47670; (USNMENT01750100, USNMENT01750101). 1; same locality and host; 18 Mar. 1967; RML 47676; (USNMENT01750102). 1; same locality and host; 23 Mar. 1967; RML 47684; (USNMENT01750103). 5; same locality and host; 28 Mar. 1967; RML 47677; (USNMENT01750104, USNMENT01750105, USNMENT01750106, USNMENT01750107, USNMENT01750108). 1; same data; RML 47767; (USNMENT01750109). 2; same locality and host; 30 Mar. 1967; RML 47679; (USNMENT01750110, USNMENT01750111). 3; same locality and host; 1 Jun. 1967; RML 47685; (USNMENT01750112, USNMENT01750113, USNMENT01750114).

***alopeciatum*, *Leptotrombidium* (*Leptotrombidium*) Traub and Nadchatram, 1967c: 485**

**Paratypes (L)**

VIETNAM • 1; Lam Dong Province, Blao; 21 Oct. 1960; ex *Tupaia* sp. (Scandentia: Tupaiidae); BPBM 7453. 1; same locality; 23 Oct. 1960; ex *Rattus* sp. (Rodentia: Muridae); (USNMENT01750115).

***alpestris*, *Gahrliepia* (*Walchia*) Traub and Evans, 1957: 322**

**Holotype (L)**

MALAYSIA • Pahang State, Fraser's Hill, Raub District, Jeriau Waterfall; 12 Apr. 1956; ex *Rattus bowersi* Anderson (= *Berylmys bowersi*) (Rodentia: Muridae); R. Traub coll.; USATC 45047; (USNMENT01750116).

**Paratypes (L)**

MALAYSIA • 2; same locality and host; 10 Oct. 1956; USATC 45533; (USNMENT01750117, USNMENT01750118). 3; same locality and host; 13 Apr. 1956; USATC 45057; ; (USNMENT01750119, USNMENT01750120, USNMENT01750121). 1; same data; USATC 45049; (USNMENT01750122). 4; same locality and host; 14 Jan. 1956; USATC 40020; (USNMENT01750123, USNMENT01750124, USNMENT01750125, USNMENT01750126). 1; same data; USATC 40031;

(USNMENT01750127). 5; same locality and host; 13 Jan. 1956; USATC 40001; (USNMENT01750128, USNMENT01750129, USNMENT01750130, USNMENT01750131, USNMENT01750132).

***alpicula*, *Microtrombicula* Traub and Nadchatram, 1966a: 311**

**Holotype (L)**

PAKISTAN • Chilas District, Gilgit Agency; 10 Sep. 1964; ex *Rattus rattoides* Hodgson (= *Rattus pycctoris*) (Rodentia: Muridae); (USNMENT01750133).

***alpina*, *Guntherana* Domrow, 1964: 327**

**Paratype (L)**

AUSTRALIA • 1; New South Wales State, Mount Kosciuszko, White's River; 16 Jan. 1962; ex *Rattus assimilis* (Gould) (= *Rattus fuscipes* [Waterhouse]) (Rodentia: Muridae); J. H. Calaby coll.; (USNMENT01750134).

***alticola*, *Traubacarus* Audy and Nadchatram, 1957b: 207**

**Paratypes (L)**

MALAYSIA • 1; Pahang State, Raub District, Fraser's Hill; 12 Oct. 1956; ex *Rattus alticola* (Thomas) (= *Maxomys alticola*) (Rodentia: Muridae); CORU 47159; (USNMENT01750135). 1; same locality and host; 14 Apr. 1956; CORU 44750; (USNMENT01750136).

***amapensis*, *Arisocerus* Brennan, 1970c: 32**

**Paratypes (L)**

BRAZIL • 5; Amapa State, Serra do Navio; 15 Mar. 1968; ex *Oryzomys macconnelli* Thomas (= *Euryoryzomys macconnelli*) (Rodentia: Cricetidae); RML 49368; (USNMENT01750137, USNMENT01750138, USNMENT01750139, USNMENT01750140, USNMENT01750141). 6; same locality and host; 1 Feb. 1968; RML 49382; (USNMENT01750142, USNMENT01750143, USNMENT01750144, USNMENT01750145, USNMENT01750146, USNMENT01750147). 2; same data; RML 49331; (USNMENT01750148, USNMENT01750149).



***ambiguus, Anomalaspis Brennan, 1952c: 143*****Holotype (L)**

VENEZUELA • Aragua State, Rafael Rangel camping; 1950; ex *Heteromys anomalus* (Thompson) (Rodentia: Heteromyidae); Schwarz coll.; RML 28432; (USNMENT01750150).

***americana solomonis, Neoschoengastia Wharton and Hardcastle, 1946: 292*****Holotype (L)**

PAPUA NEW GUINEA • Bougainville Island, Cape Torokina; 3 Jul. 1944; ex *Hirundo tahitica* Gmelin (Passeriformes: Hirundinidae); L. A. Posekany coll.; USNM 1792; (USNMENT01750151).

**Paratype (L)**

PAPUA NEW GUINEA • 1; same data as holotype; (USNMENT01750152).

***americana, Euschoengastia Ewing, 1938: 293*****Syntype (L)**

USA • 8; Idaho State, Boise National Forest, Fall Creek Falls; 20 Sep. 1930; ex “unidentified chipmunk” (Rodentia: Sciuridae); S. B. Locke coll.; USNM 1277; (USNMENT01750153, USNMENT01750154, USNMENT01750155, USNMENT01750156, USNMENT01750157, USNMENT01750158, USNMENT01750159, USNMENT01750160).

***americana, Walchia Ewing, 1942: 491*****Lectotype (L)**

USA • Florida State, Leon County, Tallahassee City; 8 Nov. 1936; ex *Peromyscus gossypinus* (Le Conte) (Rodentia: Cricetidae); B. V. Travis coll.; USNM 1418; (USNMENT01750161).

***americanus, Comatacarus Ewing, 1942: 490*****Syntype (L)**

USA • 1; Oregon State, Portland City; 20 May 1936; ex “unidentified western mole” (Eulipotyphla: Talpidae); C. M. Gjullin coll.; USNM 1416; (USNMENT01750162).

***amersoni*, *Blankaartia* Brennan, 1965c: 888**

**Holotype (L)**

USA • Atol Johnston, Sand Island; 18 Jul. 1963; ex *Sterna fuscata* L. (= *Onychoprion fuscatus*) (Charadriiformes: Laridae); A. B. Amerson coll.; RML 45544; (USNMENT01750163).

**Paratypes (L)**

USA • 4; same data as holotype; (USNMENT01750164, USNMENT01750165, USNMENT01750166, USNMENT01750167). 3; same locality and host; 19 Jul. 1963; RML 45545; (USNMENT01750168, USNMENT01750169, USNMENT01750170). 1; same locality and host; 26 Jul. 1964; RML 45546; (USNMENT01750171). 4; same locality and host; 12 Jul. 1963; RML 45547; (USNMENT01750172, USNMENT01750173, USNMENT01750174, USNMENT01750175). 2; same locality and host; 15 Jul. 1963; RML 45549; (USNMENT01750176, USNMENT01750177). 1; same locality and host; 29 Jul. 1963; RML 45550; (USNMENT01750178). 3; same locality; 12 Jul. 1963; ex *Phaethon rubricauda* Boddaert (Phaethontiformes: Phaethontidae); RML 45548; (USNMENT01750179, USNMENT01750180, USNMENT01750181).

***amicula*, *Helenicula* Nadchatram and Traub, 1971: 587**

**Paratypes (L)**

IRAN • 1; Khuzestan Province, Behbahan County; 12 Feb. 1964; ex *Meriones persicus* (Blanford) (Rodentia: Muridae); (USNMENT01750182). 1; same locality and host; 25 Feb. 1964; (USNMENT01750183). 3; same locality and host; 24 Feb. 1964; (USNMENT01750184, USNMENT01750185, USNMENT01750186).

***ampliseta*, *Euschoengastia* Loomis and Somerby, 1966: 213**

**Holotype (L)**

MEXICO • Durango State; 6 Jul. 1962; ex *Peromyscus melanotis* J.A. Allen and Chapman (Rodentia: Cricetidae); W. J. Wrenn coll.; WJW 620706; (USNMENT01750187).

**Paratype (L)**

MEXICO • 1; same data as holotype; (USNMENT01750188).

***ampullata, Gahrlepiea (Gahrlepiea) Traub and Morrow, 1955: 43*****Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 30 Aug. 1953; ex *Rattus whiteheadi whiteheadi* Thomas (= *Maxomys whiteheadi*) (Rodentia: Muridae); RT B 19409; (USNMENT01750189).

**Paratypes (L)**

MALAYSIA • 1; same data as holotype; (USNMENT01750190). 3; Sabah State, Mount Trusmadi; 3 Aug. 1953; same host; RT B 19705; (USNMENT01750191, USNMENT01750192, USNMENT01750193).

***anastosi, Microtrombicula Traub and Nadchatram, 1966a: 320*****Holotype (L)**

PAKISTAN • Balochistan Province, Quetta District, Urak Valley; 23 Jun. 1964; ex *Mus* sp. (Rodentia: Muridae); (USNMENT01750194).

**Paratype (L)**

PAKISTAN • 1; same data as holotype; (USNMENT01750195).

***andrei, Ascoschoengastia Jadin and Vercammen-Grandjean, 1952: 622*****Paratype (L)**

RWANDA • 1; Southern Province, Butare; no date; ex *Otomys irroratus* (Brants) (Rodentia: Muridae); (USNMENT01750196).

***anguina, Fonseca Brennan and Loomis, 1959: 61*****Holotype (L)**

GUATEMALA •; Chimaltenango Department, Yepocapa; 12 Nov. 1949; ex “unidentified snake” (Squamata); RML 28004; (USNMENT01750197).

**Paratypes (L)**

GUATEMALA • 2; same data as holotype; (USNMENT01750198, USNMENT01750199).

***angulascuta*, *Whartonia* (*Whartonia*) Reed and Brennan, 1975: 35**

**Holotype (L)**

VENEZUELA • Falcón State, La Pastora; 21 Nov. 1967; ex *Carollia perspicillata* (L.) (Chiroptera: Phyllostomidae); Smithsonian Army coll.; RML 52990; (USNMENT01750200).

**Paratypes (L)**

VENEZUELA • 3; same data as holotype; (USNMENT01750201, USNMENT01750202, USNMENT01750203). 1; same data; RML 52784; (USNMENT01750204). 2; same locality; 14 Nov. 1967; ex *Chrotopterus auritus* (Peters) (Chiroptera: Phyllostomidae); RML 54829; (USNMENT01750205, USNMENT01750206). 5; same data; RML 55886; (USNMENT01750207, USNMENT01750208, USNMENT01750209, USNMENT01750210, USNMENT01750211). 2; Monagas State, Caripe; 11 Jul. 1967; ex *Diphylla ecaudata* Spix (Chiroptera: Phyllostomidae); Smithsonian Army coll.; RML 52712; (USNMENT01750212, USNMENT01750213). 1; same locality; 26 Jun. 1967; ex *Carollia brevicauda* (Schinz) (Chiroptera: Phyllostomidae); RML 52752; (USNMENT01750214).

***angulatus*, *Acomatacarus* (*Acomatacarus*) Greenberg, 1952: 485**

**Paratypes (L)**

USA • 2; Kansas State, Norton County; 26 Oct. 1946; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); H. W. Setzer coll.; (USNMENT01750215, USNMENT01750216).

***annectens*, *Euschoengastoides* Loomis, 1971: 693**

**Holotype (L)**

MEXICO • Sonora State, Alamos Municipality; 14 Jul. 1960; ex *Perognathus goldmani* Osgood (= *Chaetodipus goldmani*) (Rodentia: Heteromyidae); R. B. Loomis coll.; RML 56222; (USNMENT01750217).

***annereauxi, Nasicola Brennan and Yunker, 1969: 302*****Holotype (L)**

VENEZUELA • Bolivar State; 10 May 1968; ex *Phyllostomus hastatus* (Pallas) (Chiroptera: Phyllostomidae); C. E. Yunker coll.; RML 49117; (USNMENT01750218).

**Paratype (L)**

VENEZUELA • 1; same data as holotype; (USNMENT01750219).

***annulata, Ascoschoengastia Lawrence, 1949: 414*****Paratype (L)**

SOUTH AFRICA • 1; Gauteng Province, Bronkhorstspuit; Dec. 1942; ex *Elephantulus myurus* Thomas and Schwann (Macroscelidea: Macroscelididae); NM 4805; (USNMENT01750220).

***antica, Phalcophila Brennan and Reed, 1973b: 708*****Holotype (L)**

VENEZUELA • Bolivar State; 11 Apr. 1966; ex *Pteronotus (Chilonycteris) personatus psilotis* (Dobson) (Chiroptera: Mormoopidae); Smithsonian Army coll.; RML 48161; (USNMENT01750221).

**Paratypes (L)**

VENEZUELA • 2; same data as holotype; (USNMENT01750222, USNMENT01750223).

***antillarum, Quadraseta Brennan, 1967: 150*****Holotype (L)**

CURAÇAO • without specific locality; 8 Mar. 1949; ex *Sylvilagus floridanus* (J.A. Allen) (Lagomorpha: Leporidae); RML 45473; (USNMENT01750224).

**Paratypes (L)**

CURAÇAO • 6; same data as holotype; (USNMENT01750225, USNMENT01750226, USNMENT01750227, USNMENT01750228, USNMENT01750209, USNMENT01750230).

***apista, Pseudoschoengastia Brennan and Yunker, 1966a: 244***

**Holotype (L)**

PANAMA • Panama Province, Paraíso; 26 Mar. 1962; ex *Dasypus novemcinctus* L. (Cingulata: Dasypodidae); RML 44654; (USNMENT01750231).

***arenicola*, *Trombicula* Loomis, 1954: 930****Paratypes (L)**

USA • 4; Kansas State, Seward County; 8 Sep. 1948; ex *Dipodomys ordii* Woodhouse (Rodentia: Heteromyidae); R. B. Loomis and L. J. Lipovsky coll.; KU 3601; (USNMENT01750232, USNMENT01750233, USNMENT01750234, USNMENT01750235).

***armigera*, *Myotrombicula* Brown, 1997b: 157****Paratype (L)**

PHILIPPINES • 1; Negros Oriental Province; 15 Jul. 1984; ex *Rhinolophus arcuatus* Peters (Chiroptera: Rhinolophidae); H. Klompen coll.; HK 84-806; (USNMENT01750236).

***arona*, *Gahrliepia* (*Schoengastiella*) Traub and Evans, 1953: 95****Paratype (L)**

MALAYSIA • 1; Selangor State, Hulu Langat District; 5 Aug. 1952; ex *Rattus mulleri* Jentink (= *Sundamys muelleri*) (Rodentia: Muridae); British Scrub Typhus Unit coll.; USNM 2069; (USNMENT01750237).

***arremonops*, *Trombicula* Brennan and Jones, 1961a: 114****Holotype (L)**

PANAMA • Panama province; 4 Apr. 1955; ex *Arremonops conirostris* (Passeriformes: Passerellidae); RML 35280; (USNMENT01750238).

***asonluca*, *Euschoengastia* (*Walchiella*) Traub and Audy, 1954b: 84****Paratype (L)**

MALAYSIA • 1; Sarawak State, Kuching; 6 Sep. 1951; ex *Tupaia tana* Raffles (Scandentia: Tupaiidae); British Scrub Typhus Unit coll.; USNM 2116; (USNMENT01750239).

***aspasium*, *Polylopadium* (*Polylopadium*) Brennan, 1969c: 868**

**Holotype (L)**

BRAZIL • Amapa State, Serra do Navio; 12 Feb. 1968; ex *Oryzomys capito* (Olfers) (= *Hylaeamys megacephalus* [Fischer]) (Rodentia: Cricetidae); T. H. G. Aitken coll.; RML 49341; (USNMENT01750240).

**Paratypes (L)**

BRAZIL • 1; same data as holotype; (USNMENT01750241). 4; Pará State, Belém; 22 Oct. 1968; same host; RML 50352; (USNMENT01750242, USNMENT01750243, USNMENT01750244, USNMENT01750245). 2; Pará State, Bragança; 1 Apr. 1968; same host; RML 49092; (USNMENT01750246, USNMENT01750247).

***atecmartus*, *Fauranius* Brennan and Lukoschus, 1971: 43**

**Holotype (L)**

SURINAME • Coronie District; 28 Nov. 1969; ex *Philander opossum* (L.) (Didelphimorphia: Didelphidae); RML 55406; (USNMENT01750248).

**Paratypes (L)**

SURINAME • 2; same data as holotype; (USNMENT01750249, USNMENT01750250).

***atollensis*, *Neoschoengastia* Wharton and Hardcastle, 1946: 306**

**Syntypes (L)**

MICRONESIA • 3; Ulithi Atoll, Potangeras Isand; 17 Aug. 1945; ex *Numenius phaeopus* (L.) (Charadriiformes: Scolopacidae); J. N. Strong coll.; USNM 1797; (USNMENT01750251, USNMENT01750252, USNMENT01750253).

***audyi*, *Pseudoschoengastia* Brennan and Jones, 1959: 423**

**Holotype (L)**

GUATEMALA • Sacatepequez Department; 23 Jun. 1948; ex *Peromyscus guatemalensis* Merriam (Rodentia: Cricetidae); R. D. Mitchell and L. Torre coll.; RML 34060; (USNMENT01750254).

**Paratypes (L)**

GUATEMALA • 6, same data as holotype; (USNMENT01750255, USNMENT01750256, USNMENT01750257, USNMENT01750258, USNMENT01750259, USNMENT01750260).

***australis*, *Leptotrombidium* Brennan, 1970d: 810**

**Holotype (L)**

BRAZIL • Rondônia State, Pedras Negras; 23 Jul. 1964; ex *Tadarida laticaudata* É. Geoffroy (= *Nyctinomops laticaudatus*) (Chiroptera: Molossidae); G. van Gelder coll.; RML 50192; (USNMENT01750261).

**Paratypes (L)**

BRAZIL • 3; same data as holotype; (USNMENT01750261, USNMENT01750262, USNMENT01750263). 3; same data; RML 50202; (USNMENT01750264, USNMENT01750265, USNMENT01750266). 2; same locality and host; 24 Jul. 1964; RML 50148; (USNMENT01750267, USNMENT01750268). 2; same data; RML 50152; (USNMENT01750269, USNMENT01750270). 1; same data; RML 50149; (USNMENT01750271). 1; same data; RML 50150; (USNMENT01750272). 1; same data; RML 50151; (USNMENT01750273).

***australis*, *Trombicula* Ewing, 1929b: 10**

**Syntype (L)**

PERU • 1; Lima Province; 15 Jun. 1925; ex *Tropidurus peruvianus* (Lesson) (= *Microlophus peruvianus*) (Squamata: Tropiduridae); USNM 987; (USNMENT01750275).

***azulae*, *Euschoengastia* Brennan and Jones, 1964b: 698**

**Holotype (L)**

ARGENTINA • Buenos Aires Province, Azul ; 21 Mar. 1962; ex “unidentified opossum” (Didelphimorphia: Didelphidae); RML 38148; (USNMENT01750276).



**Paratypes (L)**

ARGENTINA • 5; same data as holotype; (USNMENT01750277, USNMENT01750278, USNMENT01750279, USNMENT01750280, USNMENT01750281). 1; same locality; 29 Mar. 1962; ex *Rattus* sp. (Rodentia: Muridae); RML 38152; (USNMENT01750282). 3; same locality; 4 Apr. 1962; ex “unidentified mice” (Rodentia); RML 38354; (USNMENT01750283, USNMENT01750284, USNMENT01750285).

***baccusi*, *Otorhinophila* Loomis and Wrenn, 1973: 175****Holotype (L)**

USA • Texas State, Chihuahua Desert, Big Bend National Park; 31 Jul. 1970; ex *Dipodomys merriami* Mearns (Rodentia: Heteromyidae); W. C. Welbourn coll.; WCW 700731; (USNMENT01750286).

***barrerai*, *Euschoengastia* Hoffmann, 1960: 101****Paratype (L)**

MEXICO • 1; stratovolcano Popocatepetl; 26 Dec. 1959; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); (USNMENT01750287).

***barticonycteris*, *Perissopala* Brennan, 1969a: 429****Holotype (L)**

BRAZIL • Pará State, Belém; 30 Jan. 1969; ex *Barticonycteris daviesi* Hill (= *Glyphonycteris daviesi*) (Chiroptera: Phyllostomidae); T. H. G. Aitken coll.; RML 49939; (USNMENT01750288).

**Paratypes (L)**

BRAZIL • 8; same data as holotype; (USNMENT01750289, USNMENT01750290, USNMENT01750291, USNMENT01750292, USNMENT01750293, USNMENT01750294, USNMENT01750295, USNMENT01750296).

***batui*, *Trombicula* Philip and Traub, 1950: 29****Holotype (L)**

MALAYSIA • Selangor State, Gombak District, Batu caves; 28 Mar. 1948; ex *Eonycteris spelaea* (Dobson) (Chiroptera: Pteropodidae); R. Traub and C. B. Philip coll.; USNM 1865; (USNMENT01750297).

**Paratypes (L)**

MALAYSIA • 3; same data as holotype; (USNMENT01750298, USNMENT01750299, USNMENT01750300).

***baylissi*, *Neoschoengastia* Asanuma, 1959: 38**

**Holotype (P)**

MYANMAR • deutonymph; Kachin State, Myitkyina; Feb. 1945; laboratory reared; USATC 584; (USNMENT01750301).

**Paratype (P)**

MYANMAR • 1; deutonymph; same data as holotype; (USNMENT01750302).

***beauforti*, *Walchiella* Domrow, 1962e: 106**

**Paratypes (L)**

MALAYSIA • 2; Sabah State, Beaufort District, Klias Forest Reserve; 18 May 1952; ex *Thecurus crassispinis* Günther (= *Hystrix crassispinis*) (Rodentia: Hystricidae); (USNMENT01750303, USNMENT01750304).

***belgicae*, *Euschoengastia* Brennan and Yunker, 1966a: 232**

**Holotype (L)**

PANAMA • Panama province, Cerro Azul; 17 Mar. 1961; ex *Heteromys desmarestianus* Gray (Rodentia: Heteromyidae); RML 40556; (USNMENT01750305).

***belkini*, *Trombicula* (*Eutrombicula*) Gould, 1950: 367**

**Holotype (L)**

USA • California State, Los Angeles County, Palos Verdes Estates ; 31 Aug. 1949; ex *Perognathus californicus* Merriam (= *Chaetodipus californicus*) (Rodentia: Heteromyidae); D. J. Gould coll.; (USNMENT01750306).

**Paratypes (L)**

USA • 1; same locality; 31 Aug. 1949; “under a brush”; (USNMENT01750307). 1; same locality; 27 Aug. 1949; ex *Homo sapiens* (L.) (Primates: Hominidae); (USNMENT01750308). 4; California State, Ventura County, Sespe Creek; same date; ex *Phrynosoma coronatum frontale* (Van Denburgh) (Squamata: Phrynosomatidae); (USNMENT01750309, USNMENT01750310, USNMENT01750311, USNMENT01750312).

***beltrani, Trombicula Hoffmann, 1949: 186***

**Paratypes (L)**

MEXICO • 2; Puebla State, Tecamatlán; 15 Jan. 1946; ex “unidentified bat” (Chiroptera); A. Hoffmann coll.; (USNMENT01750313, USNMENT01750314).

***benensoni, Miyatrombicula Tanskul and Nadchatram, 1983: 599***

**Holotype (L)**

THAILAND • Chiang Mai Province, Chom Thong District, Doi Inthanon National Park; 17 Nov. 1980; ex *Rattus rattus* (L.) (Rodentia: Muridae); USNM 152082; (USNMENT01750315).

***berghei, Trombigastia (Ascoschoengastoides) Vercammen-Grandjean and Fain, 1958:***

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**Paratypes (L)**

DEMOCRATIC REPUBLIC OF THE CONGO • 13; North Kivu Province, Irangi, Kavumu-Walikale route; 14 Aug. 1956; ex *Hipposideros caffer* (Sundevall) (Chiroptera: Hipposideridae); A. Fain coll.; (USNMENT01750316, USNMENT01750317, USNMENT01750318, USNMENT01750319, USNMENT01750320, USNMENT01750321, USNMENT01750322, USNMENT01750323, USNMENT01750324, USNMENT01750325, USNMENT01750326, USNMENT01750327, USNMENT01750328).

***besali, Leptotrombidium Vercammen and Langston, 1976: 327***

**Paratype (L)**

PAKISTAN • 1; Khyber Pakhtunkhwa Province, Mansehra District, Kaghan Valley; no date; ex *Alticola roylei* Gray (Rodentia: Cricetidae); (USNMENT01750329).

***bhattipadensis*, *Trombicula* Joshee, 1964: 47**

**Holotype (L)**

INDIA • 1; Maharashtra State Mumbai Suburban District, Bhandup, Bhattipada; 17 Oct. 1959; ex *Rattus rattus* (L.) (Rodentia: Muridae); MZ 110440; (USNMENT01750330).

***bicoxalae*, *Schoengastia* Goff, 1981a: 36**

**Paratypes (L)**

PAPUA NEW GUINEA • 4; Western Province, Daru City, Oriomo River; 24 Feb. 1964; ex *Thylogale brunii* (Schreber) (Diprotodontia: Macropodidae); BPBM 11806; (USNMENT01750331, USNMENT01750332, USNMENT01750333, USNMENT01750334).

***bifax*, *Aniatus* Brennan and Jones, 1961a: 106**

**Holotype (L)**

PANAMA • Panama province, Panama; 17 Mar. 1959; ex *Dasypus novemcinctus* L. (Cingulata: Dasypodidae); RML 35904; (USNMENT01750335).

***bigenuala*, *Euschoengastia* Farrell, 1956: 128**

**Holotype (L)**

USA • Texas State, Galveston County, Bayview; 8 Aug. 1947; ex *Sigmodon* sp. (Rodentia: Cricetidae); R. W. Strandtmann coll.; USNM 1989; (USNMENT017503336).

***biliranensis*, *Gahrleipia* (*Ripiaspichia*) Brown, 1997a: 29**

**Paratypes (L)**

PHILIPPINES • 1; Biliran Province, Biliran Island; 29 Apr. 1984; ex *Batomys salomonseni* (Sanborn) (Rodentia: Muridae); H. Klompen coll.; HK 84-0723; (USNMENT01750337).  
1; Leyte Province Leyte Island; 16 Mar. 1987; same host; HK 87-0316; (USNMENT01750338).

***binbium*, *Leptotrombidium* (*Leptotrombidium*) Traub and Lakshana, 1966: 284****Holotype (L)**

THAILAND • Chiang Mai Province, Hot District; 6 Nov. 1962; ex *Callosciurus erythraeus* (Pallas) (Rodentia: Sciuridae); R. Traub coll.; SMRL 1757; (USNMENT017503339).

**Paratypes (L)**

THAILAND • 1 same data as holotype; (USNMENT01750340). 2; same locality; 7 Nov. 1962; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); SMRL 1766; (USNMENT01750341, USNMENT01750342). 3; Chiang Mai Province, Chiang Dao District; 15 Nov. 1962; same host; SMRL 1909; (USNMENT01750343, USNMENT01750344, USNMENT01750345). 1; same locality and host; 16 Nov. 1962; SMRL 1962; (USNMENT01750346). 1; same locality; 14 Nov. 1962; ex *Arctogalidia trivirgata* (Gray) (Carnivora: Viverridae); SRML 1879; (USNMENT01750347). 1; same data; SMRL 1878; (USNMENT01750348).

***biops*, *Trombicula* Wharton, 1948: 94****Paratype (L)**

PERU • 2; Puno Department, Caccachara Valley; 28 Sep. 1946; ex *Phyllotis boliviensis* Thomas (= *Auliscomys boliviensis* [Waterhouse]) (Rodentia: Cricetidae); O. P. Pearson coll.; RML 25956; (USNMENT01750349, USNMENT01750350).

***biplumulosa*, *Shunsennia* Teller, 1956: 173****Holotype (L)**

JAPAN • Yamanashi Prefecture, Mount Fuji; 17 Aug. 1954; ex *Urotrichus talpoides* Temminck (Eulipotyphla: Talpidae); Preventive Medicine Unit coll.; USNM 2222; (USNMENT017503351).

**Paratype (L)**

JAPAN • 1; same data as holotype; (USNMENT01750352).

***birella*, *Gahrlipeia* (*Schoengastiella*) Traub and Evans, 1953: 95**

**Holotype (L)**

MALAYSIA • Selangor State, Hulu Langat District; 4 Mar. 1952; ex *Rattus bowersi* Anderson (= *Berylmys bowersi*) (Rodentia: Muridae); British Scrub Typhus Unit coll.; USNM 2070; (USNMENT01750353).

**Paratype (L)**

MALAYSIA • 1; Federal Territory of Kuala Lumpur State, Kepong; same date; ex *Rattus* sp. (Rodentia: Muridae); (USNMENT01750354).

***bisetifer*, *Fereus* Brennan and Jones, 1961b: 179****Holotype (L)**

PERU • Piura Province, Piura; 8 May 1954; ex *Thomasomys* sp. (Rodentia: Cricetidae); RML 33552; (USNMENT01750355).

***bisetosa*, *Guntheria* (*Guntheria*) Goff, 1981g: 533****Paratype (L)**

PAPUA NEW GUINEA • 1; Morobe Province, Mount Kaindi; 20 Jun. 1967; ex *Pseudochirops cupreus* (Thomas) (Diprotodontia: Pseudocheiridae); A. C. Ziegler coll.; BPBM 12115; (USNMENT01750356).

***bisetosa*, *Schoutedenichia* Domrow, 1962c: 359****Paratypes (L)**

MALAYSIA • 1; Selangor State, Hulu Langat District; 7 Aug. 1952; ex *Rattus mulleri* Jentink (= *Sundamys muelleri*) (Rodentia: Muridae; (USNMENT01750357). 2; same locality and host; 13 Aug. 1952; (USNMENT01750358, USNMENT01750359). 1; same locality and host; 14 Aug. 1952; (USNMENT01750360).

***bishopae*, *Walchiella* Brown, 1998b: 110****Paratype (L)**

PHILIPPINES • 1; Mindanau Island, Davao Oriental Province, Mount Mayo; no date; ex *Exilisciurus concinnus* (Thomas) (Rodentia: Sciuridae); BPBM 9209; (USNMENT01750361).

***bisignata*, *Trombicula* Ewing, 1929a: 295****Syntype (L)**

USA • Maine State, Piscataquis County, Baxter State Park, Mt. Katahdin, Basin Ponds; 22 Aug. 1928; ex *Microtus pennsylvanicus* (Ord) (Rodentia: Cricetidae); W. J. Hamilton coll.; USNM 992; (USNMENT01750362).

***blarinae*, *Euschoengastia* Ewing, 1931: 11****Syntypes (L)**

USA • 7; District of Columbia, Washington, Rock Creek Park; 20 Sep. 1929; ex *Blarina brevicauda* (Say) (Eulipotyphla: Soricidae); J. C. Jones coll.; USNM 1018; (USNMENT01750363, USNMENT01750364, USNMENT01750365, USNMENT01750366, USNMENT0175030067, USNMENT01750368, USNMENT01750369).

***blestowei*, *Shoengastia* Gunther, 1939: 92****Paratype (L)**

PAPUA NEW GUINEA • 1; Morobe Province, Bulolo; no date; ex *Homo sapiens* (L.) (Primates: Hominidae); (USNMENT01750370).

***boaedonia*, *Trombicula* Jadin and Vercammen-Grandjean, 1952: 630****Paratype (L)**

RWANDA • 1; Southern Province, Butare; no date; ex *Boaedon lineatus* Duméril, Bibron and Duméril (Squamata: Lamprophiidae) (USNMENT01750371).

***bobbiana*, *Peltochus* Brennan, 1972a: 16****Holotype (L)**

VENEZUELA • Táchira State; 24 Mar. 1968; ex *Thomasomys hylophilus* Osgood (Rodentia: Cricetidae); Smithsonian Army coll.; RML 52862; (USNMENT01750372).

**Paratypes (L)**

VENEZUELA • 1; same locality and host; 27 Mar. 1968; RML 52993; (USNMENT01750373). 1; same locality and host; 25 Mar. 1968. RML 52964; (USNMENT01750374).

***boneti*, *Trombicula* (*Trombicula*) Hoffmann, 1952: 87****Paratypes (L)**

MEXICO • 3; Tamaulipas State, El Mante, Quintero Cave; 30 Dec. 1950; ex *Mormoops megalophylla* (Peters) (Chiroptera: Mormoopidae); F. Bonet coll.; USNM 1062; (USNMENT017503375, USNMENT01750376, USNMENT01750377).

***booliati*, *Babiangia* Audy, 1956: 46****Paratype (L)**

MALAYSIA • 1; Selangor State, Hulu Langat District; 17 Apr. 1951; ex *Mabuya multifasciata* (Kuhl) (= *Eutropis multifasciata*) (Squamata: Scincidae); CORU 40800; (USNMENT01750378).

***bosaviensis*, *Guntheria* Goff, 1981f: 370****Paratypes (L)**

PAPUA NEW GUINEA • 5; Southern Highlands District, Mount Bosavi; 23 Jun. 1973; ex *Rattus niobe* Thomas (Rodentia: Muridae); BPBM 12109; (USNMENT01750379, USNMENT01750380, USNMENT01750381, USNMENT01750382, USNMENT01750383).

***bougainvillensis*, *Neoschoengastia* Wharton and Hardcastle, 1946: 296****Holotype (L)**

PAPUA NEW GUINEA • Bougainville Island, Cape Torokina; 14 Jul. 1944; ex *Hirundo tahitica* Gmelin (Passeriformes: Hirundinidae); Beecher coll.; USNM 1793; (USNMENT01750384).

***brachiospissi*, *Schoutedenichia* (*Nasichia*) Vercammen-Grandjean, 1958: 75****Paratypes (L)**

DEMOCRATIC REPUBLIC OF THE CONGO • 1; Orientale Province, Ituri District, Irumu territory; 20 May 1953; ex *Arvicanthis abyssinicus* (Rüppell) (Rodentia: Muridae); (USNMENT01750385). 3; North Kivu Province, Mutwanga; 16 Nov. 1953; same host;



(USNMENT01750386, USNMENT01750387, USNMENT01750388). 1; North Kivu Province, Beni; 6 Feb. 1954; ex *Mastomys choucha* Smith (Rodentia: Muridae; (USNMENT01750389).

***brachypus, Traubacarus* Audy and Nadchatram, 1957b: 212**

**Paratype (L)**

MALAYSIA • 1; Selangor State, Hulu Langat District; 17 May 1956; ex *Rattus bowersi* Anderson (= *Berylmys bowersi*) (Rodentia: Muridae); CORU 48165; (USNMENT01750390).

***brachytrichia, Microtrombicula* Brennan, 1971b: 214**

**Holotype (L)**

BRAZIL • Pará State, Belém; 11 Sep. 1968; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); T. H. G. Aitken coll.; RML 50350; (USNMENT01750391).

**Paratypes (L)**

BRAZIL • 2; same data as holotype; (USNMENT01750392, USNMENT01750393).

***brasiliensis, Colicus* Goff, Whitaker and Dietz, 1983: 185**

**Holotype (L)**

BRAZIL • Minas Gerais State, São Roque de Minas; 30 Aug. 1979; ex *Oryzomys fornesi* Massoia (= *Oligoryzomys fornesi*) (Rodentia: Cricetidae); J. M. Dietz coll.; BPBM 12711; (USNMENT01750394).

**Paratypes (L)**

BRAZIL • 3; same data as holotype. (USNMENT01750395, USNMENT01750396, USNMENT01750397). 1; same locality and host; 31 Aug. 1979; (USNMENT01750398). 2; same locality; 31 Aug. 1979; ex *Oryzomys subflavus* (Wagner) (= *Cerradomys subflavus*) (Rodentia: Cricetidae); (USNMENT01750399, USNMENT01750400).

***brasiliensis, Trombewingia* Goff and Gettinger, 1989: 401**

**Holotype (L)**

BRAZIL • Federal District, Brasilia; 29 Jan. 1974; ex *Bolomys lasiurus* (Lund) (= *Necromys lasiurus*) (Rodentia: Cricetidae); (USNMENT01750401).

***brasiliensis*, *Trombicula* Ewing, 1925b: 92**

**Syntype (L)**

BRAZIL • 1; Amazonas State, Manaus; 25 Jul. 1924; no host information; Bequaert coll.; USNM 946; (USNMENT01750402).

***brennani*, *Crotiscus* Goff, 1987b: 811**

**Holotype (L)**

PERU • Cusco Department, Urubamba Province, Machu Picchu; Apr. 1915; ex *Lestoros inca* (Thomas) (Paucituberculata: Caenolestidae); E. Heller coll.; USNM 194935; (USNMENT01750403).

***brennani*, *Euschoengastia* Wrenn and Loomis, 1974: 250**

**Holotype (L)**

USA • California State, Humboldt County; 24 Feb. 1969; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); RBL 690224; (USNMENT01750404).

**Paratypes (L)**

USA • 1; same data as holotype; (USNMENT01750405).

***brennani*, *Microtrombicula* Goff, Whitaker and Dietz, 1986: 171**

**Holotype (L)**

BRAZIL • Rio de Janeiro State, Poço das Antas Biological Reserve; 1985; ex *Leontopithecus rosalia* (L.) (Primates: Callitrichidae); J. M. Dietz coll.; (USNMENT01750406).

**Paratypes (L)**

BRAZIL • 9; same data as holotype; (USNMENT01750407, USNMENT01750408, USNMENT01750409, USNMENT01750410, USNMENT01750411, USNMENT01750412, USNMENT01750413, USNMENT01750414, USNMENT01750415).

***brennani*, *Neoschoengastia* Crossley and Loomis, 1955: 114****Paratypes (L)**

USA • 2; Kansas State, Barber County; 26 Jul. 1952; ex *Melanerpes erythrocephalus* (L.) (Piciformes: Picidae); (USNMENT01750416, USNMENT01750417).

***brennani*, *Quadrasetta* Goff and Whitaker, 1984c: 332****Holotype (L)**

PARAGUAY • Boquerón Department, Teniente Agripino Enciso National Park; 7 Jun. 1982; ex *Andalgalomys pearsoni* (Myers) (Rodentia: Cricetidae); D B. Abrell coll.; DBA 281; (USNMENT01750418).

**Paratypes (L)**

PARAGUAY • 1; same data as holotype; (USNMENT01750419). 1; same locality; 8 Jul. 1982; ex *Akodon* [*sic*] *lasiurus* (= *Necromys lasiurus* [Lund]) (Rodentia: Cricetidae); (USNMENT01750420).

***brennani*, *Trombicula* (*Neotrombicula*) Gould, 1956: 40****Holotype (L)**

USA • California State, Plumas County; 1 Jun. 1950; ex *Sorex trowbridgii* Baird (Eulipotyphla: Soricidae); RML 28076; (USNMENT01750421).

**Paratype (L)**

USA • 3; same data as holotype; (USNMENT01750422, USNMENT01750423, USNMENT01750424). 1; California State, Plumas County, Quincy; 7 May 1950; ex *Neurotrichus gibbsii* (Baird) (Eulipotyphla: Talpidae); (USNMENT01750425).

***brevicalcar*, *Acomatacarus* Brennan and Jones, 1954: 156****Holotype (L)**

USA • California State, Monterey County, Hastings Natural History Reservation; 26 Aug. 1950; ex *Perognathus californicus* Merriam (= *Chaetodipus californicus*) (Rodentia: Heteromyidae); RML 28165; (USNMENT01750426).

**Paratypes (L)**

USA • 1; same data as holotype; (USNMENT01750427). 3; same locality and host; 2 Sep. 1953; RML 32540; (USNMENT01750428, USNMENT01750429, USNMENT01750430). 1; same locality and host; 10 Aug. 1951; RML 32530; (USNMENT01750431). 1; same data; RML 32531; (USNMENT01750432).

***brevipes*, *Neoschoengastia* Ewing, 1931: 16**

**Syntypes (L)**

USA • 14; Maryland State, College Park; 3 May 1929; ex *Peromyscus leucopus* (Rafinesque) (Rodentia: Cricetidae); H. E. Ewing and H. S. Peters coll.; USNM 1025; (USNMENT01750433, USNMENT01750434, USNMENT01750435, USNMENT01750436, USNMENT01750437, USNMENT01750438, USNMENT01750439, USNMENT01750440, USNMENT01750441, USNMENT01750442, USNMENT01750443, USNMENT01750444, USNMENT01750445, USNMENT01750446).

***brevis*, *Whartonia* Domrow, 1962a: 5**

**Holotype (L)**

LAOS • Xieng Khouang Province; 20 Aug. 1960; ex “unidentified bat” (Chioptera); (USNMENT01750447).

**Paratype**

LAOS • 1; same data as holotype; (USNMENT01750448).

***breviseta*, *Trombicula* Loomis and Crossley, 1963: 374**

**Paratypes (L)**

USA • 2; Texas State, Brewster County; 19 Jun. 1951; ex *Peromyscus eremicus* (Baird) (Rodentia: Cricetidae); E. T. Ashworth coll.; (USNMENT01750449, USNMENT01750450).

***brevitarsa*, *Trombicula* Radford, 1954: 301**

**Holotype (L)**

YEMEN • Ta'izz; 1951; ex *Rhinolophus clivosus* Cretzschmar (Chiroptera: Rhinolophidae); H. Hoogstraal coll.; (USNMENT01750451).

***brinchangense*, *Leptotrombidium* (*Leptotrombidium*) Nadchatram and Upham, 1966a: 103**

**Holotype (L)**

MALAYSIA • Pahang State, Cameron Highlands District, Mount Batu Brinchang; 30 Nov. 1964; ex *Reithrodontomys fulvescens* J.A. Allen (Rodentia: Cricetidae); (USNMENT01750452).

**Paratype (L)**

MALAYSIA • 1; same locality; 1 Dec. 1964; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); (USNMENT01750453).

***browni*, *Trombicula* (*Neotrombicula*) Brennan and Wharton, 1950: 179**

**Syntype (L)**

USA • 1; Wyoming State, Washakie County, Ten Sleep; 13 Jul. 1947; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); R. B. Finley coll.; USNM 1840; (USNMENT01750454).

***browningi*, *Traubacarus* Audy and Nadchatram, 1957b: 215**

**Paratypes (L)**

MALAYSIA • 1; Selangor State, Hulu Langat District; 12 Jul. 1956; ex *Rattus rajah* Thomas (= *Maxomys rajah*) (Rodentia: Muridae); CORU 44185; (USNMENT01750455).  
1; Pahang State, Raub District, Fraser's Hill, Jeriau Waterfall; 12 Jan. 1956; ex *Rattus bowersi* Anderson (= *Berylmys bowersi*) (Rodentia: Muridae); CORU 44410; (USNMENT01750456).

***bruynoghei*, *Trombicula* Jadin and Vercammen-Grandjean, 1952: 618**

**Paratype (L)**

RWANDA • 1; Southern Province, Butare; no date; ex *Thamnomys* sp. (Rodentia: Muridae); USNM 1252; (USNMENT01750457).

***buelowi*, *Guntheria (Domrowana)* Goff, 1981a: 36****Paratypes (L)**

PAPUA NEW GUINEA • 2; Morobe Province, Bulldog Track; 14 Jul. 1966; ex *Rattus niobe* Thomas (Rodentia: Muridae); BBPM 11805; (USNMENT01750458, USNMENT01750459).

***bufonica*, *Endotrombicula* Radford, 1954: 307****Holotype (L)**

YEMEN • Wādī Sihām; 1951; ex *Bufo orientalis* Parker (= *Sclerophrys arabica* [Heyden]) (Anura: Bufonidae); (USNMENT01750460).

***bulbifera*, *Pseudoschoengastia* Brennan, 1960b: 483****Holotype (L)**

PANAMA • Panama province; 22 Dec. 1954; ex *Sigmodon hispidus* Say and Ord (Rodentia: Cricetidae); RML 35248; (USNMENT01750461).

**Paratypes (L)**

PANAMA • 5; same data as holotype; (USNMENT01750462, USNMENT01750463, USNMENT01750464, USNMENT01750465, USNMENT01750466). 2; same locality and date; ex *Zygodontomys cherriei* J. A. Allen (= *Zygodontomys brevicauda* J. A. Allen and Chapman) (Rodentia: Cricetidae); RML 35247; (USNMENT01750467, USNMENT01750468). 1; same locality and host; 3 Mar. 1955; RML 35316; (USNMENT01750469). 1; same locality; 10 Mar. 1954; ex *Marmosa* sp. (Didelphimorphia: Didelphidae); RML 35238; (USNMENT01750470). 1; same locality; 9 Mar. 1955; ex *Liomys adpersus* (Peters) (= *Heteromys adpersus*) (Rodentia: Heteromyidae); RML 35325; (USNMENT01750471). 1; Panama province, Panama City, Summit Botanical Gardens and Miraflores lock; 15 Sep. 1954; ex *Sigmodon hispidus* Say and Ord (Rodentia: Cricetidae); RML 35242; (USNMENT01750472). 1; Panama province, Cerro Azul; 8 Feb. 1956; ex *Oryzomys talamancae* J.A. Allen (= *Transandinomys talamancae*) (Rodentia: Cricetidae); RML 35338; (USNMENT01750473). 1; same locality; 26 Jan. 1956; ex *Oryzomys caliginosus* Tomes (= *Melanomys caliginosus*) (Rodentia: Cricetidae); RML 35312; (USNMENT01750474). 1; Colón province, Galeta

Point; 23 Feb. 1954; ex *Proechimys semispinosus* Tomes (Rodentia: Echimyidae); RML 35229; (USNMENT01750475). 1; same locality; 16 Feb. 1954; ex “unidentified opossum” (Didelphimorphia: Didelphidae); RML 35220; (USNMENT01750476).

***bulbocalcar*, *Loomisia* Brennan and Reed, 1972b: 798**

**Holotype (L)**

VENEZUELA • Carabobo State, Montalbán; 14 Nov. 1967; ex *Peropteryx kappleri* Peters (Chiroptera: Emballonuridae); Smithsonian Army coll.; RML 55744; (USNMENT01750477).

**Paratypes (L)**

VENEZUELA • 5; same data as holotype; (USNMENT01750478, USNMENT01750479, USNMENT01750480, USNMENT01750481, USNMENT01750482). 1; same data; RML 53021; (USNMENT01750483). 6; same data; RML 53031; (USNMENT01750484, USNMENT01750485, USNMENT01750486, USNMENT01750487, USNMENT01750488, USNMENT01750489). 1; same data; RML 53032; (USNMENT01750490). 7; same data; RML 53100; (USNMENT01750491, USNMENT01750492, USNMENT01750493, USNMENT01750494, USNMENT01750495, USNMENT01750496, USNMENT01750497). 3; same data; RML 53101; (USNMENT01750498, USNMENT01750499, USNMENT01750500). 2; same data; RML 53102; (USNMENT01750501, USNMENT01750502). 3; same data; RML 53104; (USNMENT01750503, USNMENT01750504, USNMENT01750505). 3; same data; RML 53105; (USNMENT01750506, USNMENT01750507, USNMENT01750508).

***bulbocalcar*, *Parasecia* Goff, 1992b: 966**

**Holotype (L)**

MEXICO • Morelos State, Tlaltizapan, San Pablo Hidalgo; 11 May 1988; ex *Sturnira ludovici* Anthony (Chiroptera: Phyllostomidae); A. Losoya coll.; (USNMENT01750509).

**Paratypes (L)**

MEXICO • 10; same data as holotype; (USNMENT01750510, USNMENT01750511, USNMENT01750512, USNMENT01750513, USNMENT01750514,

USNMENT01750515, USNMENT01750516, USNMENT01750517,  
USNMENT01750518, USNMENT01750519). 3; same locality and host; 20 Mar. 1989;  
(USNMENT01750520, USNMENT01750521, USNMENT01750522).

***burmensis*, *Trombicula* Ewing, 1945: 63**

**Holotype (L)**

MYANMAR • Tingkaw Sakan Airfield; 14 Jun. 1944; ex “unidentified rat” (Rodentia);  
H. S. Fuller coll.; USNM 1484; (USNMENT01750523).

**Paratypes (L)**

MYANMAR • 4; same data as holotype; (USNMENT01750524, USNMENT01750525,  
USNMENT01750526, USNMENT01750527).

***bushlandi*, *Ascoshengastia* Philip, 1947: 387**

**Holotype (L)**

INDONESIA • Papua Province, Owi Island; 18 Dec. 1944; ex *Megapodius* sp.  
(Galliformes: Megapodiidae); C. B. Philip coll.; USNM 1780; (USNMENT01750528).

**Paratypes (L)**

INDONESIA • 18; same data as holotype; (USNMENT01750529, USNMENT01750530,  
USNMENT01750531, USNMENT01750532, USNMENT01750533,  
USNMENT01750534, USNMENT01750535, USNMENT01750536,  
USNMENT01750537, USNMENT01750538, USNMENT01750539,  
USNMENT01750540, USNMENT01750541, USNMENT01750542,  
USNMENT01750543, USNMENT01750544, USNMENT01750545,  
USNMENT01750546).

***busuanga*, *Gahrliepia* (*Scrobiculata*) Brown, 1998b: 109**

**Paratype (L)**

PHILIPPINES • 1; Palawan Province, Busuanga Island; 24 May 1962; ex *Rattus panglima*  
Robinson (= *Maxomys panglima*) (Rodentia: Muridae); M. Thompson coll.; BPBM 3023;  
(USNMENT01750547).



***cabassoi*, Blix Brennan and Yunker, 1966: 229****Holotype (L)**

PANAMA • Panama Province, Gamboa; 29 Nov. 1960; ex *Cabassous centralis* (Miller) (Cingulata: Chlamyphoridae); RML 40076; (USNMENT01750548).

**Paratypes (L)**

PANAMA • 10; same data as holotype; (USNMENT01750549, USNMENT01750550, USNMENT01750551, USNMENT01750552, USNMENT01750553, USNMENT01750554, USNMENT01750555, USNMENT01750556, USNMENT01750557, USNMENT01750558).

***caccabulus*, Trombicula Brennan and Jones, 1961a: 115****Holotype (L)**

PANAMA • Chiriquí province; 14 Feb. 1960; ex *Peromyscus* sp. (Rodentia: Cricetidae); RML 35875; (USNMENT01750559).

**Paratypes (L)**

PANAMA • 1; same data as holotype; (USNMENT01750560). 1; same locality and host; 30 Jan. 1960; RML 35854; (USNMENT01750561). 4; same locality; 14 Feb. 1960; ex *Oryzomys flavescens* Waterhouse (= *Oligoryzomys flavescens*) (Rodentia: Cricetidae); RML 35943; (USNMENT01750562, USNMENT01750563, USNMENT01750564, USNMENT01750565). 3; same locality; 13 Feb. 1960; ex *Scotinomys teguina* Alston (Rodentia: Cricetidae); RML 35935; (USNMENT01750566, USNMENT01750567, USNMENT01750568). 1; same locality and host; 4 May 1960; RML 35966; (USNMENT01750569). 1; same data; RML 35964; (USNMENT01750570). 2; same data; RML 35967; (USNMENT01750571, USNMENT01750572). 1; same locality; 12 Feb. 1960; ex *Peromyscus nudipes* Goodwin (= *Peromyscus mexicanus* [Saussure]) (Rodentia: Cricetidae); RML 35929; (USNMENT01750573). 1; same locality and host; 31 Jan. 1960; RML 35919; (USNMENT01750574). 1; same locality and host; 3 May 1960; RML 35961; (USNMENT01750575). 2; same locality and host; 4 May 1960; RML 35965; (USNMENT01750576, USNMENT01750577). 1; same data; RML 35940; (USNMENT01750578). 2; same locality; 12 Feb. 1960; ex *Reithrodontomys mexicanus* (Saussure) (Rodentia: Cricetidae); RML 35927; (USNMENT01750579;

USNMENT01762008). 3; same locality; 14 Feb. 1960; ex *Oryzomys* sp. (Rodentia: Cricetidae); RML 35873; (USNMENT01762009, USNMENT01762010, USNMENT01762011).

***cadigani*, *Herpetacarus* Nadchatram and Kethley, 1974: 584**

**Paratype (L)**

THAILAND • 1; Nakhon Ratchasima Province, Wang Nam Khiao District, Sakaerat Environmental Reserach Station; 17 Feb. 1969; ex *Phyllodactylus siamensis* (Boulenger) (= *Dixonius siamensis*) (Squamata: Gekkonidae); RML 111248; (USNMENT01750580).

***calcar*, *Ascochoengastia* (*Laurentella*) Nadchatram and Domrow, 1964: 35**

**Holotype (L)**

MALAYSIA • Pahang State; 18 May 1961; ex *Rattus whiteheadi* Thomas (= *Maxomys whiteheadi*) (Rodentia: Muridae); IMR 75759; (USNMENT01750581).

**Paratype (L)**

MALAYSIA • 1; same locality; 19 May 1961; ex *Rattus rajah* Thomas (= *Maxomys rajah*) (Rodentia: Muridae); IMR 75742; (USNMENT01750582). 1; Selangor State, Gombak District, Bukit Lanjan; 8 Jan. 1962; ex *M. whiteheadi*; IMR 73866; (USNMENT01750583).

***calculata*, *Perissopalla* Goff and Brennan, 1982: 171**

**Holotype (L)**

VENEZUELA • Capital District; 31 Jul. 1965; ex *Eptesicus fuscus* (Beauvois) (Chiroptera: Vespertilionidae); Smithsonian Army coll.; RML 52797; (USNMENT01750584).

**Paratypes (L)**

VENEZUELA • 5; same data as holotype; (USNMENT01750585, USNMENT01750586, USNMENT01750587, USNMENT01750588, USNMENT01750589).

***californica*, *Schoengastia* Ewing, 1925a: 262**

**Syntype (L)**

USA • 1; California State, Mono County, Topaz; 16 Sep. 1916; ex “unidentified ground squirrel” (Rodentia: Sciuridae); USNM 893; (USNMENT01750590).

***californica, Trombicula Ewing, 1942: 488***

**Syntype (L)**

USA • 1; California State, Los Angeles County, Acton; 12 Apr. 1933; ex *Thomomys neglectus* Merriam (= *Cratogeomys fumosus*) (Rodentia: Geomyidae); A. G. Barr coll.; USNM 1414; (USNMENT01750591).

***callosus, Paraguacarus Goff and Whitaker, 1984a: 31***

**Holotype (L)**

PARAGUAY • Boquerón Department, Teniente Agripino Enciso National Park; 7 Aug. 1982; ex *Calomys callosus* (Rengger) (Rodentia: Cricetidae); (USNMENT01750592).

**Paratypes (L)**

PARAGUAY • 4; same data as holotype; (USNMENT01750593, USNMENT01750594, USNMENT01750595, USNMENT01750596).

***calunosa, Euschoengastia (Walchiella) Traub and Audy, 1954b: 84***

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 26 Jul. 1951; ex *Rattus baluensis* (Thomas) (Rodentia: Muridae); R. Traub coll.; USNM 2115; (USNMENT01750597).

**Paratypes (L)**

MALAYSIA • 22; same data as holotype; (USNMENT01750598, USNMENT01750599, USNMENT01750600, USNMENT01750601, USNMENT01750602, USNMENT01750603, USNMENT01750604, USNMENT01750605, USNMENT01750606, USNMENT01750607, USNMENT01750608, USNMENT01750609, USNMENT01750610, USNMENT01750611, USNMENT01750612, USNMENT01750613, USNMENT01750614, USNMENT01750615, USNMENT01750616, USNMENT01750617, USNMENT01750618, USNMENT01750619).

***camilla*, *Trombicula* Wharton, 1938: 141****Syntypes (P)**

MEXICO • 1♂; Yucatán State; 4 Jul. 1936; “in cave soil”; USNM 1263; (USNMENT01750620). 1♀; same locality; 18 Jul. 1931; (USNMENT01750621).

***campestris*, *Austracarus* Goff, 1990b: 201****Holotype (L)**

SOUTH AFRICA • Cape Province; 4 Jun. 1968; ex *Raphicerus campestris* (Thunberg) (Artiodactyla: Bovidae); (USNMENT01750622).

***campi*, *Euschoengastia* Brown and Brennan, 1952: 338****Holotype (L)**

CANADA • Alberta Province, Sibbald hamlet; 9 Jul. 1950; ex *Citellus richardsonii* Sabine (= *Urocitellus richardsonii*) (Rodentia: Sciuridae); RML 28556; (USNMENT01750623).

**Paratype (L)**

CANADA • 28; same data as holotype; (USNMENT01750624, USNMENT01750625, USNMENT01750626, USNMENT01750627, USNMENT01750628, USNMENT01750629, USNMENT01750630, USNMENT01750631, USNMENT01750632, USNMENT01750633, USNMENT017506034, USNMENT01750635, USNMENT01750636, USNMENT01750637, USNMENT01750638, USNMENT01750639, USNMENT01750640, USNMENT01750641, USNMENT01750642, USNMENT01750643, USNMENT01750644, USNMENT01750645, USNMENT01750646, USNMENT01750647, USNMENT01750648, USNMENT01750649, USNMENT01750650, USNMENT01750651). 10; same locality and host; 7 Jul. 1950; RML 28555; (USNMENT01750652, USNMENT01750653, USNMENT01750654, USNMENT01750655, USNMENT01750656, USNMENT01750657, USNMENT01750658, USNMENT01750659, USNMENT01750660, USNMENT01750661). 4; same locality and host; 10 Jul. 1950; RML 28557; (USNMENT01750662, USNMENT01750663, USNMENT01750664, USNMENT01750665). 3; Alberta province, Compeer hamlet; 17 Jul. 1950; same host;

RML 28558; (USNMENT01750666, USNMENT01750667, USNMENT01750668). 19; same locality and host; RML 28559; (USNMENT01750669, USNMENT01750670, USNMENT01750671, USNMENT01750672, USNMENT01750673, USNMENT01750674, USNMENT01750675, USNMENT01750676, USNMENT01750677, USNMENT01750678, USNMENT01750679, USNMENT01750680, USNMENT01750681, USNMENT01750682, USNMENT01750683, USNMENT01750684, USNMENT01750685, USNMENT01750686, USNMENT01750687).

***cana*, *Oenoschoengastia* Womersley and Kohls, 1947: 8**

**Paratypes (L)**

PAPUA NEW GUINEA • 42; Oro Province, Dobodura Airfield; 18 May 1944; “on the turkey’s nest”; G. M. Kohls coll.; USNM 1831; (USNMENT01750688, USNMENT01750689, USNMENT01750690, USNMENT01750691, USNMENT01750692, USNMENT01750693, USNMENT01750694, USNMENT01750695, USNMENT01750696, USNMENT01750697, USNMENT01750698, USNMENT01750699, USNMENT01750700, USNMENT01750701, USNMENT01750702, USNMENT01750703, USNMENT01750704, USNMENT01750705, USNMENT01750706, USNMENT01750707, USNMENT01750708, USNMENT01750709, USNMENT01750710, USNMENT01750711, USNMENT01750712, USNMENT01750713, USNMENT01750714, USNMENT01750715, USNMENT01750716, USNMENT01750717, USNMENT01750718, USNMENT01750719, USNMENT01750720, USNMENT01750721, USNMENT01750722, USNMENT01750723, USNMENT01750724, USNMENT01750725, USNMENT01750726, USNMENT01750727, USNMENT01750728, USNMENT01750729).

***canis*, *Trombicula* Floch and Abonnenc, 1941: 6**

**Paratype (L)**

FRENCH GUIANA • 3; Comté River; 1944; ex *Canis lupus familiaris* L. (Carnivora: Canidae); H. Floch coll.; (USNMENT01750730, USNMENT01750731, USNMENT01750732).

***canus, Acoschoengastia (Laurentella) Domrow, 1962d: 586***

**Paratypes (L)**

MALAYSIA • 2; Federal Territory of Kuala Lumpur State, Kepong; 23 Aug. 1954; ex *Rattus canus* Miller (= *Lenothrix canus*) (Rodentia: Muridae); (USNMENT01750733, USNMENT01750734).

***carmenae, Trombicula Brennan and Jones, 1960: 513***

**Holotype (L)**

TRINIDAD AND TOBAGO • Port of Spain City, Emperor Valley Zoo; 14 Mar. 1958; ex *Phyllostomus discolor* Wagner (Chiroptera: Phyllostomidae); RML 34680; (USNMENT01750735).

**Paratype (L)**

TRINIDAD AND TOBAGO • 1; same data as holotype; (USNMENT01750736).

***carolinensis, Euschoengastia Farrell, 1956: 196***

**Syntype (L)**

USA • 4; North Carolina State, Orange County, Duke Forest; 1 Jan. 1950; “in humus near mammal's burrow”; USNM 1996; (USNMENT01750737, USNMENT01750738, USNMENT01750739, USNMENT01750740).

***carpenteri, Whartonia Brennan, 1962: 619***

**Holotype (L)**

MEXICO • Morelos State; 18 Aug. 1950; ex *Lasiurus borealis* (Müller) (Chiroptera: Vespertilionidae); G. W. Wharton coll.; RML 35477; (USNMENT01750741).

**Paratypes (L)**

MEXICO • 5; same data as holotype; (USNMENT01750742, USNMENT01750743, USNMENT01750744, USNMENT01750745, USNMENT01750746). 1; same locality and

date; ex *Balantiopteryx plicata* Peters (Chiroptera: Emballonuridae); RML 35476; (USNMENT01750747).

***carterae, Trombicula (Neotrombicula) Brennan and Wharton, 1950: 184***

**Syntypes (L)**

USA • 2; North Carolina State, Orange County, Duke Forest; 7 Dec. 1947; ex *Peromyscus* sp. (Rodentia: Cricetidae); USNM 1843; (USNMENT01750748, USNMENT01750749).

***carveri, Neoschoengastia Wharton and Hardcastle, 1946: 313***

**Holotype (L)**

GUAM • Port Ajayan; 16 Jul. 1945; ex *Demigretta sacra* Gmelin (= *Egretta sacra*) (Pelecaniformes: Ardeidae); J. N. Strong coll.; USNM 1784; (USNMENT01750780).

***catatonus, Buclypeus Brennan, 1972b: 1178***

**Holotype (L)**

BRAZIL • Pará State Belém; 4 Jan. 1968; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); T. H. G. Aitken coll.; RML 49322; (USNMENT01750781).

**Paratypes (L)**

BRAZIL • 9; same data as holotype; (USNMENT01750782, USNMENT01750783, USNMENT01750784, USNMENT01750785, USNMENT01750786, USNMENT01750787, USNMENT01750788, USNMENT01750789, USNMENT01750790).

***cavernarum, Trombicula Ewing, 1933: 4***

**Syntypes (P)**

PANAMA • 2♂ and 1♀; Panama province, Chilibre City, Chilibrillo caves; 7 May 1931; “on rock caves”; L. H. Dunn coll.; USNM 1064; (USNMENT01750791, USNMENT01750792, USNMENT01750793).

***cavicola, Trombicula Ewing, 1931: 14***

**Lectotype (L)**

USA • Kentucky State, Reynolds cave; 1881; “on cave soil”; USNM 1022; (USNMENT01750794).

**Paralectotypes (L)**

USA • 3; same data as lectotype; (USNMENT01750795, USNMENT01750796, USNMENT01750797).

***cayolangoensis*, *Odontacarus* Brennan, 1959: 2**

**Holotype (L)**

USA • Florida State, Monroe County, Key Largo; 2 Jan. 1945; ex *Sigmodon hispidus* Say and Ord (Rodentia: Cricetidae); B. A. Barrington coll.; RML 34631; (USNMENT01750798).

**Paratypes (L)**

USA • 9; same data as holotype; (USNMENT01750799, USNMENT01750800, USNMENT01750801, USNMENT01750802, USNMENT01750803, USNMENT01750804, USNMENT01750805, USNMENT01750806, USNMENT01750807).

***celesteae*, *Fonsecia* Audy, 1956: 49**

**Paratype (L)**

MALAYSIA • 2; Selangor State, Gombak District, Bukit Lagong, Batu caves; 18 Mar. 1953; ex *Natrix trianguligera* Barbour (= *Xenochrophis trianguligerus* [Boie]) (Squamata: Natricidae); CORU 35960; (USNMENT01750808, USNMENT01750809).

***centropodis*, *Trombicula* Ewing, 1928: 78**

**Syntypes (L)**

LIBERIA • 7; Bong County, Gbarnga; 26 Sep. 1926; ex *Centropus* sp. (Cuculiformes: Cuculidae); J. Bequaert coll.; USNM 982; (USNMENT01750810, USNMENT01750811, USNMENT01750812, USNMENT01750813, USNMENT01750814, USNMENT01750815, USNMENT01750816).

***cervulicola*, *Trombicula* Ewing, 1931: 13**



**Syntypes (L)**

INDIA • 3; Uttarakhand State, Kumaon Hills, Mukteshwar; Mar. 1930; ex *Cervulus aureus* Ham (= *Muntiacus muntjak*) (Cetartiodactyla: Cervidae); USNM 1020; (USNMENT01750817, USNMENT01750818, USNMENT01750819).

***cetrata*, *Gahrleipia* Gater, 1932: 165****Holotype (L)**

MALAYSIA • Pahang State, Raub District, Fraser's Hill; 25 Apr. 1930; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); USNM 1058; (USNMENT01750820).

**Paratypes (L)**

MALAYSIA • 1; same data as holotype; USNM 1059; (USNMENT01750821). 1; same data; USNM 1060; (USNMENT01750822).

***chaetolecanium*, *Polylopadium* Brennan and Reed, 1972a: 461****Holotype (L)**

VENEZUELA • Sucre State; 2 Aug. 1967; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); Smithsonian Army coll.; RML 53053; (USNMENT01750823).

**Paratype (L)**

VENEZUELA • 1; same data as holotype; (USNMENT01750824).

***chaetosa*, *Trombicula* Brennan and Jones, 1961b: 193****Holotype (L)**

PERU • Piura Province, Piura; no date; ex *Tropidurus peruvianus* (Lesson) (= *Microlophus peruvianus*) (Squamata: Tropiduridae); RML 34062; (USNMENT01750825).

**Paratypes (L)**

PERU • 6; same data as holotype; (USNMENT01750826, USNMENT01750827, USNMENT01750828, USNMENT01750829, USNMENT01750830, USNMENT01750831).

***chalepus*, *Vanidicus* Brennan, 1973: 107**

**Holotype (L)**

VENEZUELA • Merida State; 10 Apr. 1966; ex *Oryzomys albigularis* (Tomes) (= *Nephelomys albigularis*) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 48417; (USNMENT01750832).

**Paratypes (L)**

VENEZUELA • 5; same data as holotype; (USNMENT01750833, USNMENT01750834, USNMENT01750835, USNMENT01750836, USNMENT01750837). 10; same locality and host; 17 May 1966; RML 48506; (USNMENT01750838, USNMENT01750839, USNMENT01750840, USNMENT01750841, USNMENT01750842, USNMENT01750843, USNMENT01750844, USNMENT01750845, USNMENT01750846, USNMENT01750847). 2; same locality and host; 28 May 1966; RML 48421; (USNMENT01750849, USNMENT01750850). 1; same locality and host; 26 May 1966; RML 49547; (USNMENT01750851). 6; same locality and host; 18 May 1966; RML 48508; (USNMENT01750852, USNMENT01750853, USNMENT01750854, USNMENT01750855, USNMENT01750856, USNMENT01762012).

***chamlongi*, *Microtrombicula* Nadchatram and Kethley, 1974: 585****Paratype (L)**

THAILAND • 1; Nakhon Ratchasima Province, Pak Thong, Chai District; 14 Sep. 1969; ex *Riopa bowringi* Dunn (= *Lygosoma bowringii* [Günther]) (Squamata: Scincidae); IMR 110593; (USNMENT01750857).

***chara*, *Trombicula* Wharton, 1948: 98****Syntypes (L)**

PERU • 2; Puna Department, Caccachara Valley; 5 Oct. 1946; ex *Phyllotis darwini* (Waterhouse) (Rodentia: Cricetidae); O. P. Pearson coll.; (USNMENT01750858, USNMENT01750859).

***charmosyna*, *Neoschoengastia* Goff, 1979c: 112****Paratypes (L)**

PAPUA NEW GUINEA • 3; Sandaun Province, Telefomin District; 26 Mar. 1971; ex *Charmosyna pulchella* Gray (Psittaciformes: Psittacidae); A. B. Mirza coll.; BPBM 11409; (USNMENT01750860, USNMENT01750861, USNMENT01750862).

***chejudoensis*, *Sasatrombicula* Goff, 1984a: 23**

**Paratypes (L)**

SOUTH KOREA • 3; Jeju Province, Jeju Island; May to Jun. 1975; ex *Rhinolophus ferrumequinum* (Schreber) (Chiroptera: Rhinolophidae); (USNMENT01750863, USNMENT01750864, USNMENT01750865).

***chilensis*, *Poliremotus* Brennan and Goff, 1978a: 542**

**Holotype (L)**

CHILE • without specific locality and date; ex *Octodon degus* (Molina) (Rodentia: Octodontidae); J. Zelebor coll.; (USNMENT01750866).

***chilonycteris*, *Alexfainia* Yunker and Jones, 1961: 995**

**Holotype (L)**

PANAMA • Panama province; 2 Aug. 1960; ex *Chilonycteris rubiginosa* Wagner (= *Pteronotus (Phyllodia) parnellii rubiginosus*) (Chiroptera: Mormoopidae); RML 36602; (USNMENT01750867).

**Paratypes (L)**

PANAMA • 76; same data as holotype; (USNMENT01750868, USNMENT01750869, USNMENT01750870, USNMENT01750871, USNMENT01750872, USNMENT01750873, USNMENT01750874, USNMENT01750875, USNMENT01750876, USNMENT01750877, USNMENT01750878, USNMENT01750879, USNMENT01750880, USNMENT01750881, USNMENT01750882, USNMENT01750883, USNMENT01750884, USNMENT01750885, USNMENT01750886, USNMENT01750887, USNMENT01750888, USNMENT01750889, USNMENT01750890, USNMENT01750891, USNMENT01750892, USNMENT01750893, USNMENT01750894, USNMENT01750895, USNMENT01750896,

USNMENT01750897,                   USNMENT01750898,                   USNMENT01750899,  
 USNMENT01750900,                   USNMENT01750901,                   USNMENT01750902,  
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 USNMENT01750905,                   USNMENT01750906,                   USNMENT01750907,  
 USNMENT01750908,                   USNMENT01750909,                   USNMENT01750910,  
 USNMENT01750911,                   USNMENT01750912,                   USNMENT01750913,  
 USNMENT01750914,                   USNMENT01750915,                   USNMENT01750916,  
 USNMENT01750917,                   USNMENT01750918,                   USNMENT01750919,  
 USNMENT01750920,                   USNMENT01750921,                   USNMENT01750922,  
 USNMENT01750923,                   USNMENT01750924,                   USNMENT01750925,  
 USNMENT01750926,                   USNMENT01750927,                   USNMENT01750928,  
 USNMENT01750929,                   USNMENT01750930,                   USNMENT01750931,  
 USNMENT01750932,                   USNMENT01750933,                   USNMENT01750934,  
 USNMENT01750935,                   USNMENT01750936,                   USNMENT01750937,  
 USNMENT01750938,                   USNMENT01750939,                   USNMENT01750940,  
 USNMENT01750941, USNMENT01750942, USNMENT01750943).

***chingae*, *Guntheria* Goff, 1982d: 406**

**Paratypes (L)**

PAPUA NEW GUINEA • 3; Morobe Province, Mount Shungol; 7 Sep. 1967; ex *Rattus ruber* Thomas (= *Rattus feliceus*) (Rodentia: Muridae); A. B. Mirza coll.; BPBM 12322; (USNMENT01750944, USNMENT01750945, USNMENT01762013).

***chiriquensis*, *Trombicula* Brennan and Jones, 1961a: 116**

**Holotype (L)**

PANAMA • Chiriquí province; 4 May 1960; ex *Scotinomys teguina* Alston (Rodentia: Cricetidae); RML 35966; (USNMENT01750946).

**Paratypes (L)**

PANAMA • 2; same data as holotype; (USNMENT01750947, USNMENT01750948). 3; same data; RML 35967; (USNMENT01750949, USNMENT01750950, USNMENT01750951). 7; same locality; 16 Feb. 1960; ex *Reithrodontomys* sp. (Rodentia:

Cricetidae); RML 35877; (USNMENT01750952, USNMENT01750953, USNMENT01750954, USNMENT01750955, USNMENT01750956, USNMENT01750957, USNMENT01750958). 2; same locality; 2 Feb. 1960; ex *Peromyscus* sp. (Rodentia: Cricetidae); RML 35863; (USNMENT01750959, USNMENT01750960).

***chironectes, Doloisia (Kymocta) Yunker and Brennan, 1962: 574***

**Holotype (L)**

PANAMA • Panama Province, Pedro Miguel; 19 Feb. 1962; ex *Chironectes minimus* (Zimmermann) (Didelphimorphia: Didelphidae); N. Gale coll.; RML 44474; (USNMENT01750961).

**Paratype (L)**

PANAMA • 1; same data as holotype; (USNMENT01750962).

***chiropteraphilus, Cheladonta (Susa) Brown, 1997b: 147***

**Holotype (L)**

PHILIPPINES • Leyte Province, Leyte Island; 26 Mar. 1987; ex *Rhinolophus inops* Andersen (Chiroptera: Rhinolophidae); H. Klompen coll.; HK 87-0326; (USNMENT01750963).

***chocoensis, Polylopadium (Kjellum) Brennan, 1969c: 870***

**Holotype (L)**

COLOMBIA • Chocó Department, Docampado River; 21 May 1958; ex *Hoplomys gymnurus* Thomas (Rodentia: Echimyidae); von Sneider coll.; RML 49981; (USNMENT01750964).

**Paratypes (L)**

COLOMBIA • 2; same data as holotype; (USNMENT01750965, USNMENT01750966).  
1; Cauca Department; Saija River; 21 May 1958; same host; RML 49965; (USNMENT01750967).

***ciscunctatus, Aitkenius Brennan and Reed, 1973a: 532***

**Holotype (L)**

VENEZUELA • Amazonas State, La Esmeralda; 5 Nov. 1966; ex *Zygodontomys microtinus* Thomas (= *Zygodontomys brevicauda* J.A. Allen and Chapman) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 48403; (USNMENT01750968).

**Paratypes (L)**

VENEZUELA • 6; same data as holotype; (USNMENT01750969, USNMENT01750970, USNMENT01750971, USNMENT01750972, USNMENT01750973, USNMENT01750974). 2; same data; RML 48404; (USNMENT01750975, USNMENT01750976). 2; same data; RML 48371; (USNMENT01750977, USNMENT01750978). 6; same locality and host; 4 Nov. 1966; RML 48402; (USNMENT01750979, USNMENT01750980, USNMENT01750981, USNMENT01750982, USNMENT01750983, USNMENT01750984).

***citellicola*, *Euschoengastia* Gould, 1956: 61****Holotype (L)**

USA • California State, Plumas County; 17 May 1949; ex *Citellus lateralis* Say (= *Callospermophilus lateralis*) (Rodentia: Sciuridae); RML 28103. (USNMENT01750985).

**Paratypes (L)**

USA • 5; same data as holotype; (USNMENT01750986, USNMENT01750987, USNMENT01750988, USNMENT01750989, USNMENT01750990). 4; California State, Lassen County; 24 Jun. 1950; ex *Citellus beldingi* Merriam (= *Urocitellus beldingi*) (Rodentia: Sciuridae); PT 2863; (USNMENT01750991, USNMENT01750992, USNMENT01750993, USNMENT01750994). 3; same data; PT 2837; (USNMENT01750995, USNMENT01750996, USNMENT01750997). 1; same data; PT 2864; (USNMENT01750998). 1; same locality and host; 23 Jun. 1950; PT 2838; (USNMENT01750999).

***clangula*, *Speleocola* Goff and Brennan, 1977b: 1090****Holotype (L)**

VENEZUELA • Monagas State, Caripe; 26 Jun. 1967; ex *Rhipidomys* sp. (Rodentia: Cricetidae); Smithsonian Army coll.; RML 52526; (USNMENT01751000).

**Paratypes (L)**

VENEZUELA • 4; same data as holotype; (USNMENT01751001, USNMENT01751002, USNMENT01751003, USNMENT01751004).

***claviglia*, *Trombicula* Radford, 1948b: 213****Paratype (L)**

UGANDA • 1; Serere District; 3 Oct. 1945; ex *Graphiurus murinus* (Desmarest) (Rodentia: Gliridae); G. H. E. Hopkins coll.; (USNMENT01751005).

***cockingsi*, *Neoschoengastia* Radford, 1946b: 262****Paratypes (L)**

INDIA • 1; Manipur State, Imphal West District, Kanglatongbi; 13 Jun. 1945; ex *Rattus* sp. (Rodentia: Cricetidae); C. D. Radford coll.; USNM 1567; (USNMENT01751006).

***cognatus*, *Odontacarus* Brennan, 1966: 772****Holotype (L)**

MEXICO • Baja California State, Las Arrastras; 26 Jun. 1963; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); R. E. Ryckman coll.; RML 38677; (USNMENT01751007).

***colombiae*, *Neoschoengastia* Boshell and Kerr, 1942: 16****Lectotype (L)**

COLOMBIA • Meta Department, Restrepo; 6 Oct. 1937; ex *Proechimys chrysaеolus* (Thomas) (Rodentia: Echimyidae); Moyano coll.; USNM 53017; (USNMENT01751008).

**Paralectotypes (L)**

COLOMBIA • 2; same data as lectotype; (USNMENT01751009, USNMENT01751010).

***colombiana*, *Euschoengastia* Brennan, 1968b: 680****Holotype (L)**

COLOMBIA • Antioquia Department, Caicedo; 12 May 1967; ex *Oryzomys albigularis* (Tomes) (= *Nepheleomys albigularis*) (Rodentia: Cricetidae); Trapido coll.; RML 47753; (USNMENT01751011).

**Paratypes (L)**

COLOMBIA • 1; North Santander Department, La Playa; 22 Mar. 1967; ex *Thomasomys fuscatus* J.A. Allen (= *Handleyomys fuscatus*) (Rodentia: Cricetidae); RML 47723; (USNMENT01751012). 2; North Santander Department; 8 Feb. 1967; same host; RML 47712; (USNMENT01751013, USNMENT01751014).

***coluberina*, *Fonsecia* Radford, 1946b: 249****Paratypes (L)**

INDIA • 1; Manipur State; 19 May 1945; ex *Coluber radiatus* Boie (= *Coelognathus radiatus*) (Squamata: Colubridae); C. D. Radford coll.; USNM 1573; (USNMENT01751015). 1; same locality and host; 10 May 1945; (USNMENT01751016).

***comata*, *Neotrombicula* Domrow, 1961: 82****Paratype (L)**

AUSTRALIA • 1; New South Wales, Tooloon; 19 Jul. 1960; ex *Perameles nasuta* É. Geoffroy (Peramelemorphia: Peramelidae); (USNMENT01751017).

***comataxilla*, *Gahrliepia* (*Walchia*) Traub, Morrow and Lipovsky, 1958: 158****Holotype (L)**

SOUTH KOREA • Gwandong Region, Gyeonggi Province, Cheorwon County; 19 Aug. 1953; ex *Microtus fortis* Büchner (Rodentia: Cricetidae); RT B 24925; (USNMENT01751018).

**Paratypes (L)**

SOUTH KOREA • 4; same data as holotype; (USNMENT01751019, USNMENT01751020, USNMENT01751021, USNMENT01751022). 5; same locality; 12 Sep. 1953; ex *Apodemus agrarius* (Pallas) (Rodentia: Muridae); RT B-25311; (USNMENT01751023, USNMENT01751024, USNMENT01751025, USNMENT01751026, USNMENT01751027). 1; Gwandong Region, Gangwon Province, Kumwha City; 9 Sep. 1952; ex “unidentified hamster” (Rodentia: Cricetidae); RT B-12246; (USNMENT01751028). 1; Kijöng-dong; 20 Sep. 1952; ex “unidentified gray hamster” (Rodentia: Cricetidae); RT B-12392; (USNMENT01751029). 6; same locality



and host; 7 Oct. 1952; RT B-12564; (USNMENT01751030, USNMENT01751031, USNMENT01751032, USNMENT01751033, USNMENT01751034, USNMENT01751035) 2; same locality and host; 13 Nov. 1952; RT B-12296; (USNMENT01751036, USNMENT01751037) 1; same locality and host; 16 Sep. 1952; RT B-12328; (USNMENT01751038).

***comosa, Euschoengastia (Heaslipioides) Vercammen-Grandjean, Nadchatram and Traub, 1966: 453***

**Holotype (L)**

PAKISTAN • Mansehra District, Kaghan Valley; 18 Sep. 1964; ex *Alticola roylei* Gray (Rodentia: Cricetidae); (USNMENT01751039).

***comosus comosus, Odontacarus (Odontacarus) Reed and Brennan, 1975: 12***

**Holotype (L)**

VENEZUELA • Táchira State, San Cristóbal; 23 Mar. 1968; ex *Thomasomys hylophilus* Osgood (Rodentia: Cricetidae); Smithsonian Army coll.; RML 53639; (USNMENT01751040).

**Paratypes (L)**

VENEZUELA • 3; same data as holotype; (USNMENT01751041, USNMENT01751042, USNMENT01751043). 1; same data; RML 56007; (USNMENT01751044). 2; same locality and host; 22 Mar. 1968; RML 56006; (USNMENT01751045, USNMENT01751046). 1; same locality and host; 23 Mar. 1968; RML 53253; (USNMENT01751047). 2; same locality and host; 24 Mar. 1968; RML 52962; (USNMENT01751048, USNMENT01751049). 3; same data; RML 52963; (USNMENT01751050, USNMENT01751051, USNMENT01751052). 3; same locality and host; 25 Mar. 1968; RML 52964; (USNMENT01751053, USNMENT01751054, USNMENT01751055). 1; same locality and host; 27 Mar. 1968; RML 52993; (USNMENT01751056). 3; same locality and host; 9 Mar. 1968; RML 55930; (USNMENT01751057, USNMENT01751058, USNMENT01751059). 2; same locality and host; 5 Mar. 1968; RML 53642; (USNMENT01751060, USNMENT01751061). 1; same data; RML 55977; (USNMENT01751062). 1; same data; RML 55983;

(USNMENT01751063). 3; same locality and host; 14 Mar. 1968; RML 53664; (USNMENT01751064, USNMENT01751065, USNMENT01751066). 3; same locality and host; 8 Mar. 1968; RML 53659; (USNMENT01751067, USNMENT01751068, USNMENT01751069).

***comosus novemsetus*, *Odontacarus* (*Odontacarus*) Reed and Brennan, 1975: 13**

**Holotype (L)**

VENEZUELA • Miranda State, El Ávila National Park; 28 Aug. 1965; ex *Oryzomys albigularis* (Tomes) (= *Nephelomys albigularis*) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 48752; (USNMENT01751070).

**Paratypes (L)**

VENEZUELA • 3; same data as holotype; (USNMENT01751071, USNMENT01751072, USNMENT01751073). 3; same data; RML 48753; (USNMENT01751074, USNMENT01751075, USNMENT01751076). 2; same locality and host; 26 Aug. 1965; RML 48729; (USNMENT01751077, USNMENT01751078). 1; same data; RML 48715; (USNMENT01751079). 1; same locality and host; 2 Sep. 1965; RML 48748; (USNMENT01751080). 2; same locality and host; 20 Dec. 1965; RML 48888; (USNMENT01751081, USNMENT01751082). 1; same locality; 3 Sep. 1965; ex *Heteromys anomalus* (Thompson) (Rodentia: Heteromyidae); RML 48746; (USNMENT01751083). 1; Capital District; 21 Dec. 1965; ex *Marmosa fuscata* Thomas (= *Marmosops fuscatus*) (Didelphimorphia: Didelphidae); RML 48889; (USNMENT01751084).

***comptum*, *Polylopadium* (*Polylopadium*) Brennan, 1969c: 868**

**Holotype (L)**

COLOMBIA • Chocó Department, Docampado River; 14 Sep. 1958; ex *Hoplomys gymnurus* Thomas (Rodentia: Echimyidae); von Sneidern coll.; RML 49981; (USNMENT01751087).

**Paratypes (L)**

COLOMBIA • 2; same data as holotype; (USNMENT01751088, USNMENT01751089).  
1; same data; RML 49967; (USNMENT01751090). 1; same data; RML 49973;  
(USNMENT01751091).

***conantae, Eutrombicula Goff, 1984c: 257***

**Holotype (L)**

USA • Hawaii State, Nihoa Island; May 1981; ex *Telespyza ultima* Bryan (Passeriformes: Fringillidae); S. Conant coll.; BPBM 13031; (USNMENT01751092).

***confirmatum, Polylopadium Brennan and Yunker, 1966: 224***

**Holotype (L)**

PANAMA • Bocas del Toro province; 31 Nov. 1961; ex *Oryzomys caliginosus* Tomes (= *Melanomys caliginosus*) (Rodentia: Cricetidae); C. E. Yunker coll.; RML 43719; (USNMENT01751093).

**Paratypes (L)**

PANAMA • 1; same locality and host; 26 Sep. 1961; RML 43867; (USNMENT01751094). 1; same locality and host; 27 Sep. 1961; RML 48907; (USNMENT01751095).

***cooli, Trombicula Domrow, 1962b: 39***

**Holotype (L)**

INDIA • Uttar Pradesh State, Lucknow; no date; ex *Hemidactylus flaviviridis* Rüppell (Squamata: Gekkonidae); B. K. Tandan coll.; (USNMENT01751096).

**Paratype (L)**

INDIA • 1; same data as holotype; (USNMENT01751097).

***cordiformis, Schoutedenichia (Schoutedenichia) Vercammen-Grandjean, 1958: 48***

**Paratypes (L)**

DEMOCRATIC REPUBLIC OF THE CONGO • 11; Équateur Province, Mbandaka; 22 Jan. 1954; ex *Crocidura* sp. (Eulipotyphla: Soricidae); (USNMENT01751098, USNMENT01751099, USNMENT01751100, USNMENT01751101,

USNMENT01751102,                   USNMENT01751103,                   USNMENT01751104,  
 USNMENT01751105,                   USNMENT01751106,                   USNMENT01751107,  
 USNMENT01751108).

***cordiremus*, *Euschoengastia* Brennan, 1948: 470**

**Holotype (L)**

USA • Montana State, Ravalli County; 18 Feb. 1946; ex *Peromyscus maniculatus artemisiae* (Rhoads) (= *Peromyscus maniculatus* [Wagner]) (Rodentia: Cricetidae); (USNMENT01751109).

**Paratypes (L)**

USA • 3; same locality and host; 16 Oct. 1945; (USNMENT01751110, USNMENT01751111, USNMENT01751112). 1; same locality and host; 17 Oct. 1945; (USNMENT01751113). 3; same locality; 10 May 1945; ex *Citellus lateralis tescorum* Say (= *Callospermophilus lateralis*) (Rodentia: Sciuridae); (USNMENT01751114, USNMENT01751115, USNMENT01751116).

***cortezi*, *Speleocola* Loomis and Webb, 1969: 37**

**Holotype (L)**

MEXICO • Baja California State, Puertecitos; 29 May 1963; ex *Pizonyx vivesi* Ménègaux (= *Myotis vivesi*) (Chiroptera: Vespertilionidae); WJW 630529; (USNMENT01751117).

**Paratype (L)**

MEXICO • 1; same data as holotype; (USNMENT01751118).

***crateris*, *Euschoengastia* Farrell, 1956: 202**

**Syntypes (L)**

USA • 3; Pennsylvania State, Blair County; 27 Jun. 1949; ex *Peromyscus leucopus* (Rafinesque) (Rodentia: Cricetidae); USNM 1998; (USNMENT01751119, USNMENT01751120, USNMENT01751121).

***cribanus*, *Trombicula* Brennan and Jones, 1961a: 117**

**Holotype (L)**

PANAMA • Panama province, Cerro Azul; 24 Jan. 1956; ex *Proechimys semispinosus* Tomes (Rodentia: Echimyidae); RML 35306; (USNMENT01751122).

***criceticola*, *Euschoengastia* Brennan, 1948: 476**

**Holotype (L)**

USA • Montana State, Ravalli County; 6 Feb. 1946; ex *Peromyscus maniculatus artemisiae* (Rhoads) (= *Peromyscus maniculatus* [Wagner]) (Rodentia: Cricetidae); RML 22130; (USNMENT01751123).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01751124, USNMENT01751125). 4; Montana State, Beaverhead County; 2 Sep. 1945; same host; RML 21979; (USNMENT01751126, USNMENT01751127, USNMENT01751128, USNMENT01751129). 1; Idaho State, Elmore County, Fall Creek Falls; 26 Jun. 1945; ex *Citellus lateralis* Say (= *Callospermophilus lateralis*) (Rodentia: Sciuridae); RML 21862; (USNMENT01762014).

***cricetivora*, *Eutrombicula* Brennan and Reed, 1974b: 700**

**Holotype (L)**

VENEZUELA • Mérida State; 8 Apr. 1966; ex *Rhipidomys* sp. (Rodentia: Cricetidae); Smithsonian Army coll.; RML 48115; (USNMENT01751130).

**Paratype (L)**

VENEZUELA • 9; same data as holotype; (USNMENT01751131, USNMENT01751132, USNMENT01751133, USNMENT01751134, USNMENT01751135, USNMENT01751136, USNMENT01751137, USNMENT01751138, USNMENT01751139). 5; Trujillo State; 23 Jan. 1966; same host; RML 48911; (USNMENT01751140, USNMENT01751141, USNMENT01751142, USNMENT01751143, USNMENT01751144). 3; same data; RML 48913; (USNMENT01751145, USNMENT01751146, USNMENT01751147). 2; same locality and hosts; 24 Jan. 1966; RML 48916; (USNMENT01751148, USNMENT01751149). 10; same locality and host; 26 Jan. 1966; RML 48927; (USNMENT01751150, USNMENT01751151, USNMENT01751152, USNMENT01751153,

USNMENT01751154, USNMENT01751155, USNMENT01751156,  
 USNMENT01751157, USNMENT01751158, USNMENT01751159). 10; same data; RML  
 48928; (USNMENT01751160, USNMENT01751161, USNMENT01751162,  
 USNMENT01751163, USNMENT01751164, USNMENT01751165,  
 USNMENT01751166, USNMENT01751167, USNMENT01751168,  
 USNMENT01751169). 8; same data; RML 48929; (USNMENT01751170,  
 USNMENT01751171, USNMENT01751172, USNMENT01751173,  
 USNMENT01751174, USNMENT01751175, USNMENT01751176,  
 USNMENT01751177). 8; same locality and host; 29 Jan. 1966; RML 49031;  
 (USNMENT01751178, USNMENT01751179, USNMENT01751180,  
 USNMENT01751181, USNMENT01751182, USNMENT01751183,  
 USNMENT01751184, USNMENT01751185). 9; same locality and host; 27 Jan. 1966;  
 RML 49026; (USNMENT01751186, USNMENT01751187, USNMENT01751188,  
 USNMENT01751189, USNMENT01751190, USNMENT01751191,  
 USNMENT01751192, USNMENT01751193, USNMENT0175110094). 12; same locality  
 and host; 20 Jan. 1966. RML 48904; (USNMENT01751195, USNMENT01751196,  
 USNMENT01751197, USNMENT01751198, USNMENT01751199,  
 USNMENT01751200, USNMENT01751201, USNMENT01751202,  
 USNMENT01751203, USNMENT01751204, USNMENT01751205,  
 USNMENT01751206).

***crocidurae, Ascochoengastia* Lawrence, 1949: 416**

**Paratype (L)**

SOUTH AFRICA • 1; KwaZulu-Natal Province, Pietermaritzburg; Aug. 1948; ex  
*Crocidura flavescens* (I. Geoffroy) (Eulipotyphla: Soricidae); NM 4902;  
 (USNMENT01751207).

***crossleyi, Trombicula* Loomis, 1954: 920**

**Paratypes (L)**

USA • 4; Kansas State, Barber County, Hardtner City; 26 Jul. 1952; ex *Melanerpes erythrocephalus* (L.) (Piciformes: Picidae); USNM 3083; (USNMENT01751208, USNMENT01751209, USNMENT01751210, USNMENT01751211).

***ctenacarus, Ascochoengastia (Laurentella) Domrow, 1962d: 592***

**Paratypes (L)**

MALAYSIA • 5; Federal Territory of Kuala Lumpur State, Kepong; 21 Dec. 1953; ex *Callosciurus tenuis* (Horsfield) (= *Sundasciurus tenuis*) (Rodentia: Sciuridae); (USNMENT01751212, USNMENT01751213, USNMENT01751214, USNMENT01751215, USNMENT01751216).

***cucurbitula, Gahrleipia (Schoengastiella) Traub and Morrow, 1957: 183***

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 18 Jul. 1953; ex *Rattus whiteheadi whiteheadi* Thomas (= *Maxomys whiteheadi*) (Rodentia: Muridae); USNM 2444; (USNMENT01751217).

**Paratype (L)**

MALAYSIA • 1; same locality and host; 20 Jul. 1953; (USNMENT01751218).

***cunctata, Euschoengastia Brennan and Jones, 1961a: 108***

**Holotype (L)**

PANAMA • Panama province, Cerro Azul; 8 Feb. 1956; ex *Oryzomys talamancae* J.A. Allen (= *Transandinomys talamancae*) (Rodentia: Cricetidae); RML 35338; (USNMENT01751219).

**Paratypes (L)**

PANAMA • 1; same data as holotype.; 2; same data; RML 35321; (USNMENT01751220).

***cuneatus, Trombiculindus Traub and Evans, 1951: 268***

**Holotype (L)**

MYANMAR • Kachin State, Myitkyina; 29 Nov. 1944; ex *Crocidura* sp. (Eulipotyphla: Soricidae); USNM 1487; (USNMENT01751221).

**Paratypes (L)**

MYANMAR • 6; same data as holotype; (USNMENT01751222, USNMENT01751223, USNMENT01751224, USNMENT01751225, USNMENT01751226, USNMENT01751227).

***cunninghamae*, *Chatia* Goff and Brennan, 1980: 836**

**Holotype (L)**

USA • Washington State, Grays Harbor County, Oakville; 23 Sep. 1950; ex *Tamiasciurus douglasii* (Bachman) (Rodentia: Sciuridae); RML 28431; (USNMENT01751228).

**Paratype (L)**

USA • 1; same data as holotype; (USNMENT01751229).

***cupa*, *Gahrliopia* (*Walchia*) Traub and Evans, 1957: 321**

**Holotype (L)**

MALAYSIA • Selangor State, Gombak District, Bukit Lagong, Batu caves; 10 Sep. 1956; ex *Rattus rajah* Thomas (= *Maxomys rajah*) (Rodentia: Muridae); USATC 45953; (USNMENT01751230).

**Paratypes (L)**

MALAYSIA • 1; Selangor State Hulu Langat District; 10 Nov. 1953; same host; USATC 45956; (USNMENT01751231). 2; Selangor State, Gombak District, Ulu Gombak Forest Reserve; 22 Nov. 1948; same host; USATC 45955; (USNMENT01751232, USNMENT01751233).

***cuspidata*, *Gahrliopia* (*Walchia*) Traub and Evans, 1957: 307**

**Holotype (L)**

MALAYSIA • Selangor State, Hulu Langat District; 6 Sep. 1951; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); R. Traub coll.; USNM 2427; (USNMENT01751234).

**Paratypes (L)**

MALAYSIA • 2; same data as holotype; (USNMENT01751235, USNMENT01751236).

***cuzcoensis*, *Trombicula* Brennan and Jones, 1961b: 194**



**Paratypes (L)**

PERU • 2; Cuzco Department, Cuzco City 13 Jul. 1953; ex *Oryzomys keaysi* J.A. Allen (= *Nephelomys keaysi*) (Rodentia: Cricetidae); RML 33550; (USNMENT01751237, USNMENT01751238).

***cynictia mafekingi, Microtrombicula* Vercammen-Grandjean, 1967a: 135****Holotype (L)**

SOUTH AFRICA • North West Province, Mahikeng; Jul. 1964; ex *Cynictis penicillata* (G. [Baron] Cuvier) (Carnivora: Herpestidae); F. Zumpt coll.; (USNMENT01751239).

***cynictia, Zumptrombicula* Vercammen-Grandjean, 1967a: 138****Holotype (L)**

SOUTH AFRICA • North West Province, Mahikeng; Jul. 1964; ex *Cynictis penicillata* (G. [Baron] Cuvier) (Carnivora: Herpestidae), F. Zumpt coll.; (USNMENT01751240).

**Paratypes (L)**

SOUTH AFRICA • 2; same data as holotype; (USNMENT01751241, USNMENT01751242).

***cynomyicola, Euschoengastia* Crossley and Lipovsky, 1954: 240****Paratypes (L)**

USA • 1; Nebraska State, Hitchcock County; 8 to 10 Aug. 1949; ex *Cynomys ludovicianus* (Ord) (Rodentia: Sciuridae); R. B. Loomis and R. E. Elbel coll.; (USNMENT01751243).  
1; Kansas State, Rawlins County; 8 Aug. 1949; same host; (USNMENT01751244).

***cynos, Trombicula* Ewing, 1937: 171****Holotype (L)**

USA • New York State, Tompkins County, Ithaca; 9 Jan. 1933; ex *Procyon* sp. (Carnivora: Procyonidae); USNM 1257; (USNMENT01751245).

***dalmati, Neoschoengastia* Brennan, 1951: 579****Holotype (L)**

GUATEMALA • Chimaltenango Department, Yepocapa; 16 Jun. 1949; ex *Momotus lessonii* Lesson (Coraciiformes: Momotidae); RML 28009; (USNMENT01751246).

**Paratypes (L)**

GUATEMALA • 3; same data as holotype; (USNMENT01751247, USNMENT01751248, USNMENT01751249).

***danae*, *Crotiscus* Brennan and Goff, 1978b: 569**

**Holotype (L)**

VENEZUELA • Táchira State, San Cristóbal; 18 Mar. 1968; ex *Thomasomys hylophilus* Osgood (Rodentia: Cricetidae); Smithsonian Army coll.; RML 53230; (USNMENT01751250).

**Paratypes (L)**

VENEZUELA • 4; same data as holotype; (USNMENT01751251, USNMENT01751252, USNMENT01751253, USNMENT01751254).

***daptops*, *Buclypeus* Brennan, 1972b: 1179**

**Holotype (L)**

VENEZUELA • Amazonas State; 1 Jun. 1967; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); Smithsonian Army coll.; RML 55887; (USNMENT01751255).

**Paratypes (L)**

VENEZUELA • 2; same data; RML 56030; (USNMENT01751256, USNMENT01751257). 1; same locality and host; 31 Mar. 1967; RML 56028; (USNMENT01751258). 1; same locality and host; 4 Jun. 1967; RML 52656; (USNMENT01751259).

***daria*, *Euschoengastia* Traub and Audy, 1954b: 81**

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 28 Jul. 1951; ex “unidentified bird” (Aves); R. Traub coll.; (USNMENT01751260).

**Paratypes (L)**

MALAYSIA • 12; same locality; 18 Jul. 1951; ex *Tupaia montana* Thomas (Scandentia: Tupaiidae); R. Traub and J. R. Audy coll.; (USNMENT01751261, USNMENT01751262, USNMENT01751263, USNMENT01751264, USNMENT01751265, USNMENT01751266, USNMENT01751267, USNMENT01751268, USNMENT01751269, USNMENT01751270, USNMENT01751271, USNMENT01751272). 1; same locality and host; 17 Jul. 1951; (USNMENT01751273).

***darita, Gahrlepiea (Gahrlepiea) Traub and Morrow, 1955: 12***

**Paratypes (L)**

MYANMAR • 2; Kachin State, Myitkyina; 18 Jan. 1945; ex *Suncus* sp. (Eulipotyphla: Soricidae); USATC 544; (USNMENT01751274, USNMENT01751275). 1; same locality and host; 25 Oct. 1945; USATC 4026; (USNMENT01751276). 1; same locality; 16 Feb. 1945; ex *Tupaia belangeri versurae* Thomas (= *Tupaia belangeri* (Wagner) (Eulipotyphla: Soricidae); USATC 676; (USNMENT01751277). 1; same locality; 17 Jan. 1945; ex *Crocidura* sp. (Eulipotyphla: Soricidae); USATC 538; (USNMENT01751278). 1; same locality; 10 Jul. 1945; ex *Rattus rattus sladeni* (Anderson) (= *Rattus tanezumi* [Temminck]) (Rodentia: Muridae); USATC 1191; (USNMENT01751279). 7; same locality and host; 28 Oct. 1945; USATC 3316; (USNMENT01751280, USNMENT01751281, USNMENT01751282, USNMENT01751283, USNMENT01751284, USNMENT01751285, USNMENT01751286). 1; same data; USATC 3314; (USNMENT01751287). 3; same locality and host; 25 Oct. 1945; USATC 3280; (USNMENT01751288, USNMENT01751289, USNMENT01751290). 2; same locality and host; 22 May 1945; USATC 1035; (USNMENT01751291, USNMENT01751292). 1; same locality and host; 14 Jun. 1945; USATC 1153; (USNMENT01751293). 3; same locality and host; 12 Oct. 1945; USATC 3219; (USNMENT01751294, USNMENT01751295, USNMENT01751296). 1; same locality; 6 Apr. 1945; ex *Rattus rattus fulvescens* Gray (= *Niviventer fulvescens*) (Rodentia: Muridae); USATC 903; (USNMENT01751297). 1; same locality; 24 Jan. 1945; ex “unidentified rat” (Rodentia: Muridae); USATC 532; (USNMENT01751298).

***dasia, Microtrombicula (Eltonella) Brown, 1999: 19***

**Paratype (L)**

PHILIPPINES • 1; Cebu Province, Poro Island; 1968; ex *Dasia smaragdina* Lesson (= *Lamprolepis smaragdina*) (Squamata: Scincidae); R. B. Gonzales coll.; BPBM 126894; (USNMENT01751299).

***dasypi*, *Axiogastia* Loomis, 1966: 49****Holotype (L)**

MEXICO • Nayarit State, Las Peñitas; 1 Aug. 1963; ex *Dasypus novemcinctus* L. (Cingulata: Dasypodidae); W. J. Wrenn col.; WJW 630801; (USNMENT01751300).

***dasypi*, *Pseudoschoengastia* Brennan and Yunker, 1966a: 245****Holotype (L)**

PANAMA • Panama Province, Paraíso; 26 Mar. 1962; ex *Dasypus novemcinctus* L. (Cingulata: Dasypodidae); RML 44654; (USNMENT01751301).

**Paratypes (L)**

PANAMA • 3; same data as holotype; (USNMENT01751302, USNMENT01751303, USNMENT01751304).

***dasyproctae*, *Neoschoengastia* Ewing, 1937: 168****Lectotype (L)**

COLOMBIA • Boyacá Department, Muzo; 1 Jan. 1937; ex *Dasyprocta variegata* Goldman (Rodentia: Dasyproctidae); M. R. Garcia coll.; USNM 1260; (USNMENT01751305).

**Paralectotypes (L)**

COLOMBIA • 6; same data as lectotype; (USNMENT01751306, USNMENT01751307, USNMENT01751308, USNMENT01751309, USNMENT01751310, USNMENT01751311).

***dasyproctae*, *Trombicula* Ewing, 1937: 172****Syntypes (L)**

PANAMA • 6; Panamá Oeste Province, Capira; 28 Aug. 1931; ex *Dasyprocta punctata* (Rodentia: Dasyproctidae); L. H. Dunn coll.; USNM 1258; (USNMENT01751312,

USNMENT01751313, USNMENT01751314, USNMENT01751315,  
USNMENT01751316, USNMENT01751317).

***davisi*, *Speleocola* Webb and Loomis, 1969: 59**

**Holotype (L)**

MEXICO • Sonora State, La Aduana; 6 Aug. 1963; ex *Glossophaga soricina* (Pallas) (Chiroptera: Phyllostomidae); W. J. Wrenn coll.; WJW 630806; (USNMENT01751319).

**Paratype (L)**

MEXICO • 1; same locality and date; ex *Leptonycteris nivalis* (Saussure) (Chiroptera: Phyllostomidae); (USNMENT01751320).

***deccanense*, *Leptotrombidium* (*Trombiculindus*) Mitchell and Nadchatram, 1966: 68**

**Paratype (L)**

INDIA • 1; Madhya Pradesh State, Kanha National Park; 23 Oct. 1964; ex *Golunda ellioti* Gray (Rodentia: Muridae); USNM 231264; (USNMENT01751321).

***decipiens*, *Euschoengastia* Gould, 1956: 61**

**Holotype (L)**

USA • California State, Lassen County, Plumas; 16 Oct. 1949; ex *Perognathus parvus* (Peale) (Rodentia: Heteromyidae); E. W. Jameson coll.; (USNMENT01751322).

**Paratypes (L)**

USA • 18; same data as holotype; (USNMENT01751323, USNMENT01751324,  
USNMENT01751325, USNMENT01751326, USNMENT01751327,  
USNMENT01751328, USNMENT01751329, USNMENT01751330,  
USNMENT01751331, USNMENT01751332, USNMENT01751333,  
USNMENT01751334, USNMENT01751335, USNMENT01751336,  
USNMENT01751337, USNMENT01751338, USNMENT01751339,  
USNMENT01751340).

***defecta*, *Eutrombicula* Ewing, 1946b: 439**

**Syntypes (L)**

WEST INDIES • 2; Erwin Island; 28 Jul. 1923; ex “unidentified spiny rat” (Rodentia: Echimyidae); R. Shannon coll.; USNM 1429; (USNMENT01751341, USNMENT01751342).

***dendrohyracis*, *Acomatacarus* (*Austracarus*) Vercammen-Grandjean, 1957: 17**

**Paratypes (L)**

RWANDA • 12; Rubavu District, Gisenyi; 25 Nov. 1954; ex *Dendrohyrax* sp. (Hyracoidea: Procaviidae); (USNMENT01751343, USNMENT01751344, USNMENT01751345, USNMENT01751346, USNMENT01751347, USNMENT01751348, USNMENT01751349, USNMENT01751350, USNMENT01751351, USNMENT01751352, USNMENT01751353, USNMENT01751354).

***dentata*, *Ascoschoengastia* (*Laurentella*) Nadchatram and Domrow, 1964: 34**

**Holotype (L)**

MALAYSIA • Pahang State, Raub District, Fraser’s Hill; 12 Oct. 1956; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); IMR 43182; (USNMENT01751355).

**Paratypes (L)**

MALAYSIA • 1; same locality and host; 12 Apr. 1956; IMR 44118; (USNMENT01751356). 1; same locality; 13 Jan. 1956; ex *Rattus alticola* (Thomas) (= *Maxomys alticola*) (Rodentia: Muridae); IMR 41755; (USNMENT01751357).

***dentata*, *Trombicula* Ewing, 1925a: 257**

**Holotype (L)**

USA • Texas state, Sutton County, Sonora; 17 Dec. 1922; ex *Odocoileus virginianus* (Zimmermann) (Cetartiodactyla: Cervidae); USNM 888; (USNMENT01751358).

**Paratype (L)**

PANAMA • 1; Panama province, Balboa; 17 Dec. 1922; ex *Sigmodon* sp. (Rodentia: Cricetidae); (USNMENT01751359).

***deopertus, Colicus Brennan, 1970b: 491*****Holotype (L)**

PERU • Quispicanchi Province, Marcapata District, Hacienda Cadena; 26 Jul. 1950; ex *Micronycteris megalotis* (Gray) (Chiroptera: Phyllostomidae); C. Kalinowski coll., RML 32050; (USNMENT01751360).

**Paratypes (L)**

PERU • 4; same data as holotype; (USNMENT01751361, USNMENT01751362, USNMENT01751363, USNMENT01751364). 6; same data. RML 31775; (USNMENT01751365, USNMENT01751366, USNMENT01751367, USNMENT01751368, USNMENT01751369, USNMENT01751370).

***deschiensi, Trombicula (Eutrombicula) Vercammen-Grandjean, 1956a: 81*****Paratypes (L)**

MOROCCO • 8; Casablanca Province, Nefifik forest; 26 Jan. 1956; ex *Mus spicilegus* Petényi (Rodentia: Muridae); (USNMENT01751371, USNMENT01751372, USNMENT01751373, USNMENT01751374, USNMENT01751375, USNMENT01751376, USNMENT01751377, USNMENT01751378).

***desdentata, Trombicula Boshell and Kerr, 1942: 11*****Lectotype (L)**

COLOMBIA • Santander Department, Landázuri; no date; ex *Proechimys chrysaolus* (Thomas) (Rodentia: Echimyidae); USNM 53012; (USNMENT01751379).

**Paralectotype (L)**

COLOMBIA • 1; same data as lectotype; (USNMENT01751380).

***desdentatus tissoti, Crotiscus Fauran, 1960: 9*****Paratype (L)**

FRENCH GUIANA • 1; Régina commune; Aug. 1959; ex *Dasyprocta aguti* L. (Rodentia: Dasyproctidae); (USNMENT01751381).

***desertorum, Otorhinophila Loomis and Wrenn, 1973: 177***

**Holotype (L)**

USA • California State, Imperial County; 11 Jul. 1964; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); L. K. Tanigoshi coll.; RML 60179; (USNMENT01751382).

***desmodus, Euschoengastia Brennan and Dalmat, 1960: 188*****Holotype (L)**

GUATEMALA • Chimaltenango Department, Yepocapa Municipality; 5 Apr. 1952; ex *Desmodus rotundus* (É. Geoffroy) (Chiroptera: Phyllostomidae); RML 30447; (USNMENT01751383).

**Paratypes (L)**

GUATEMALA • 2; same data as holotype; (USNMENT01751384, USNMENT01751385). 1; same data; RML 30446; (USNMENT01762015).

***dewitti, Whartonia Nadchatram, 1980: 324*****Paratype (L)**

THAILAND • 1; Chiang Mai Province; 19 Dec. 1965; ex *Rhinolophus affinis* Horsfield (Chiroptera: Rhinolophidae); (USNMENT01751386).

***dianneae, Hoffmannina Brennan and Goff, 1977b: 911*****Holotype (L)**

VENEZUELA • Amazonas State, La Culebra; 19 Jan. 1967; ex *Rhipidomys macconnelli* (de Winton) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 52644; (USNMENT01751387).

**Paratypes (L)**

VENEZUELA • 3; same data as holotype; (USNMENT01751388, USNMENT01751389, USNMENT01751390).

***diazi, Ascoschoengastia Hoffmann, 1948: 177*****Paratype (L)**

MEXICO • 1; Chiapas State; Mar. 1947; ex *Cuniculus paca* (L.) (Rodentia: Cuniculidae); A. D. Najera coll.; (USNMENT01751391).



***dicoxalae*, *Neotrombicula* (*Neotrombicula*) Vercammen-Grandjean et al., 1971: 1404****Holotype (L)**

TURKEY • Ankara Province; no date; ex *Ovis aries* L. (Cetartiodactyla: Bovidae); RML 46990; (USNMENT01751392).

**Paratype (L)**

TURKEY • 5; same data as holotype; (USNMENT01751393, USNMENT01751394, USNMENT01751395, USNMENT01751396, USNMENT01751397).

***dicrura*, *Trombicula* Brennan and Jones, 1961a: 119****Holotype (L)**

PANAMA • Chiriquí province; 14 Feb. 1960; ex *Peromyscus nudipes* (J. A. Allen) (= *Peromyscus mexicanus* Saussure) (Rodentia: Cricetidae); RML 35938; (USNMENT01751398).

**Paratypes (L)**

PANAMA • 6; same data as holotype; (USNMENT01751399, USNMENT01751400, USNMENT01751401, USNMENT01751402, USNMENT01751403, USNMENT01751404). 3; same data; RML 35937; (USNMENT01751405, USNMENT01751406, USNMENT01751407). 7; same data; RML 35939; (USNMENT01751408, USNMENT01751409, USNMENT01751410, USNMENT01751411, USNMENT01751412, USNMENT01751413, USNMENT01751414). 2; same data; RML 35940; (USNMENT01751415, USNMENT01751416). 3; same data; RML 35941; (USNMENT01751417, USNMENT01751418, USNMENT01751419). 2; same data; RML 35942; (USNMENT01751421, USNMENT01751422). 10; same locality and host; 1 Feb. 1960; RML 35920; (USNMENT01751423, USNMENT01751424, USNMENT01751425, USNMENT01751426, USNMENT01751427, USNMENT01751428, USNMENT01751429, USNMENT01751430, USNMENT01751431, USNMENT01751432). 9; same locality and host; 13 Feb. 1960; RML 35936; (USNMENT01751433, USNMENT01751434, USNMENT01751435, USNMENT01751436, USNMENT01751437, USNMENT01751438,

USNMENT01751439, USNMENT01751440, USNMENT01751441). 2; same data; RML 35934; (USNMENT01751442, USNMENT01751443). 1; same data; RML 35935; (USNMENT01751444). 2; same locality and host; 12 Feb. 1960; RML 35929; (USNMENT01751445, USNMENT017514246). 6; same data; RML 35930; (USNMENT01751447, USNMENT01751448, USNMENT01751449, USNMENT01751450, USNMENT01751451, USNMENT01751452). 1; same data; RML 35928; (USNMENT01751454). 7; same data; RML 35926; (USNMENT01751455, USNMENT01751456, USNMENT01751457, USNMENT01751458, USNMENT01751459, USNMENT01751460, USNMENT01751461). 1; same locality and host; 31 Feb. 1960; RML 35919; (USNMENT01751462). 6; same locality; 14 Feb. 1960; ex *Peromyscus* sp. (Rodentia: Cricetidae); RML 35875; (USNMENT01751463, USNMENT01751464, USNMENT01751465, USNMENT01751466, USNMENT01751467, USNMENT01751468). 6; same locality and host, 30 Jan. 1960; RML 35854; (USNMENT01751469, USNMENT01751470, USNMENT01751471, USNMENT01751472, USNMENT01751473, USNMENT01751474). 12; same data; RML 35855; (USNMENT01751475, USNMENT01751476, USNMENT01751477, USNMENT01751478, USNMENT01751479, USNMENT01751480, USNMENT01751481, USNMENT01751482, USNMENT01751483, USNMENT01751484, USNMENT01751485, USNMENT01751486). 6; same locality and host, 2 Feb. 1960; RML 35863; (USNMENT01751487, USNMENT01751488, USNMENT01751489, USNMENT01751490, USNMENT01751491, USNMENT01751492). 6; same locality and host, 31 Jan. 1960; RML 35857; (USNMENT01751493, USNMENT01751494, USNMENT01751495, USNMENT01751496, USNMENT01751497, USNMENT01751498). 3; same locality; 11 May 1960; ex *Scotinomys teguina* Alston (Rodentia: Cricetidae); RML 35964; (USNMENT01751499, USNMENT01751500, USNMENT01751501). 1; same locality and host; 14 Feb. 1960; RML 35874; (USNMENT01751502). 1; same locality and date; ex *Oryzomys* sp. (Rodentia: Cricetidae); RML 35873; (USNMENT01751503). 1; same locality, 31 Jan. 1960; ex *Heteromys desmarestianus* Gray (Rodentia: Heteromyidae); RML 35858; (USNMENT01751504). 1; same locality; 12 Feb. 1960; ex *Sciurus* sp. (Rodentia: Sciuridae); RML 35870; (USNMENT01751505). 1; same locality and date; ex

*Sciurus granatensis* Humboldt (Rodentia: Sciuridae); RML 35931; (USNMENT01751506). 1; Bocas del Toro Province; 22 Jan. 1960; ex *Proechimys semispinosus* Tomes (Rodentia: Echimyidae); RML 35836; (USNMENT01751507).

***dienteslargus*, *Odontacarus* (*Odontacarus*) Reed and Brennan, 1975: 15**

**Holotype (L)**

VENEZUELA • Táchira State, San Cristóbal; 9 Mar. 1968; ex *Thomasomys hylophilus* Osgood (Rodentia: Cricetidae); Smithsonian Army coll.; RML 53661; (USNMENT01751508).

**Paratypes (L)**

VENEZUELA • 3; same locality and host; 2 Mar. 1968; RML 53211; (USNMENT01751509, USNMENT01751510, USNMENT01751511). 1; same locality and host; 5 Mar. 1968; RML 53639; (USNMENT01751512). 4; same locality and host; 6 Mar. 1968; RML 55984; (USNMENT01751513, USNMENT01751514, USNMENT01751515, USNMENT01751516). 1; same locality and host; 7 Mar. 1968; RML 53685; (USNMENT01751517). 2; same locality and host; 8 Mar. 1968; RML 53629; (USNMENT01751518, USNMENT01751519). 1; same locality and host; 17 Mar. 1968; RML 56001; (USNMENT01751520). 1; same locality and host; 18 Mar. 1968; RML 53637; (USNMENT01751521). 1; same data; RML 53230; (USNMENT01751522). 1; same locality and host; 19 Mar. 1968; RML 55939; (USNMENT01751523). 3; same locality and host; 22 Mar. 1968; RML 56006; (USNMENT01751524, USNMENT01751525, USNMENT01751526). 2; same locality and host; 23 Mar. 1968; RML 55988; (USNMENT01751527, USNMENT01751528). 1; same locality and host; 24 Mar. 1968; RML 52962; (USNMENT01751529). 2; same locality and host; 25 Mar. 1968; RML 52964; (USNMENT01751530, USNMENT01751531).

***dietzi*, *Serratacarus* Goff and Whitaker, 1984b: 163**

**Holotype (L)**

BRAZIL • Minas Gerais State, National Park of Serra da Canastra, Fazenda das Pedras; 27 Jul. 1979; ex *Zygodontomys lasiurus* Lund (= *Necromys lasiurus*) (Rodentia: Cricetidae); (USNMENT01751532).

***dihumerale*, *Leptotrombidium* (*Leptotrombidium*) Traub and Nadchatram, 1967a: 3****Holotype (L)**

PAKISTAN • Mansehra District, Kaghan Valley; 19 Aug. 1963; ex *Alticola roylei* Gray (Rodentia: Cricetidae); (USNMENT01751533).

**Paratypes (L)**

PAKISTAN • 3; same locality and host; 16 Aug. 1963; (USNMENT01751534, USNMENT01751535, USNMENT01751536). 2; same locality; 19 Jun. 1963; ex *Hyperacrius fertilis* (True) (Rodentia: Cricetidae); (USNMENT01751537, USNMENT01751538).

***dinehartae*, *Trombicula* (*Neotrombicula*) Brennan and Wharton, 1950: 179****Holotype (L)**

USA • California State, Marin County; 22 Nov. 1944; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); RML 21448; (USNMENT01751539).

***dipodilli*, *Schoutedenichia* (*Brennanichia*) Vercammen-Grandjean, 1958: 36****Holotype (L)**

MOROCCO • Casablanca Province; 11 May 1956; ex *Dipodillus campestris* (Loche) (= *Gerbillus campestris*) (Rodentia: Muridae); (USNMENT01751540).

**Paratype (L)**

MOROCCO • 1; same data as holotype; (USNMENT01751541).

***discalis*, *Helenicula* Nadchatram and Traub, 1971: 575****Paratypes (L)**

NEPAL • 3; Ilam District; 17 Dec. 1965; ex *Mus musculus* (L.) (Rodentia: Muridae); M. Nadchatram coll.; BPBM 9494; (USNMENT01751542, USNMENT01751543, USNMENT01751544).

***discalis*, *Schoutedenichia* Goff, 1983c: 76****Paratypes (L)**

TANZANIA • 2; Dar es Salaam; 2 Dec. 1980; ex *Crocidura* sp. (Eulipotyphla: Soricidae); C. M. Howell coll.; BPBM 12771; (USNMENT01751545, USNMENT01751546).

***discors*, *Trombicula* Brennan and Jones, 1960: 513**

**Holotype (L)**

TRINIDAD AND TOBAGO • Sangre Grande Region, Mount Tamana, Taman Hill Cave; 20 Dec. 1957; ex *Mormoops tumidiceps* Miller (= *Mormoops megalophylla*) (Chiroptera: Mormoopidae); RML 34665; (USNMENT01751547).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 5; same data as holotype; (USNMENT01751548, USNMENT01751549, USNMENT01751550, USNMENT01751551, USNMENT01751552).

***dispar*, *Crotiscus* Brennan, 1957: 678**

**Holotype (L)**

PERU • Puno Department 31 Aug. 1951; ex *Punomys lemminus* Osgood (Rodentia: Cricetidae); RML 31558; (USNMENT01751553).

***disparunguis*, *Pseudoscheongastia* Goff, 1982a: 12**

**Holotype (L)**

PANAMA • Bocas del Toro province; 24 Sep. 1961; ex *Heteromys desmarestianus* Gray (Rodentia: Heteromyidae); RML 43789; (USNMENT01751554).

**Paratypes (L)**

PANAMA • 5; same data as holotype; (USNMENT01751555, USNMENT01751556, USNMENT01751557, USNMENT01751558, USNMENT01751559).

***dispaseta*, *Fonsecia* Nadchatram and Upham, 1966b: 345**

**Holotype (L)**

MYANMAR • Kelantan State, Kota Bharu; 21 Aug. 1965; “in a rice plantation”; W. D. Kundin coll.; (USNMENT01751560).

***diversa acuta, Euschoengastia* Farrell, 1956: 172****Syntypes (L)**

USA • 6; Pennsylvania State, Warren County; 18 Jun. 1948; ex *Zapus hudsonius* (Zimmermann) (Rodentia: Dipodidae); USNM 1994; (USNMENT01751561, USNMENT01751562, USNMENT01751563, USNMENT01751564, USNMENT01751565, USNMENT01762016).

***diversa diversa, Euschoengastia* Farrell, 1956: 169****Syntype (L)**

USA • 1; Ohio State, Clermont County; 15 Mar. 1948; ex *Synaptomys cooperi* Baird (Rodentia: Cricetidae); USNM 1993; (USNMENT01751566).

***dohanyi, Blankaartia (Megaciella)* Nadchatram and Goff, 1980: 218****Paratypes (L)**

INDONESIA • 2; Papua Province, Nabire; 30 Aug. 1962; ex *Egretta intermedia* Wagler (= *Ardea intermedia*) (Pelecaniformes: Ardeidae); BPBM 11543; (USNMENT01751567, USNMENT01751568).

***dolosa, Leeuwenhoekia* Gould, 1956: 16****Holotype (L)**

USA • California State, Contra Costa County; 27 Dec. 1949; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); D. J. Gould coll.; (USNMENT01751569).

**Paratypes (L)**

USA • 1; same data as holotype; (USNMENT01751570). 2; same locality and date; ex *Peromyscus californicus* (Gambel) (Rodentia: Cricetidae); (USNMENT01751571, USNMENT01751572). 1; same locality; 28 Dec. 1949; ex *Mus musculus* (L.) (Rodentia: Muridae); (USNMENT01751573).

***domrowi, Guntherana* Brennan, 1965c: 890****Holotype (L)**

USA • Hawaii State, Honolulu County, Lisianski Island; 12 Mar. 1963; ex *Arenaria interpres* (L.) (Charadriiformes: Scolopacidae); RML 45541; (USNMENT01751574).

**Paratypes (L)**

USA • 6; same data as holotype; (USNMENT01751575, USNMENT01751576, USNMENT01751577, USNMENT01751578, USNMENT01751579, USNMENT01751580). 1; Hawaii State, Pearl and Hermes Atoll; 27 Jul. 1963; ex *Anous stolidus* (L.) (Charadriiformes: Laridae); RML 45543; (USNMENT01751581). 1; Hawaii State, Johnston Atoll; 16 Jul. 1963; ex *Sterna fuscata* L. (= *Onychoprion fuscatus*) (Charadriiformes: Laridae); RML 45551; (USNMENT01751582).

***domrowi*, *Trabacarus* Audy and Nadchatram, 1957b: 217**

**Paratypes (L)**

MALAYSIA • 1; Pahang State, Raub District, Fraser's Hill; 13 Apr. 1956; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); CORU 43194; (USNMENT01751583). 1; same locality and date; ex *Rattus alticola* (Thomas) (= *Maxomys alticola*) (Rodentia: Muridae); CORU 44653; (USNMENT01751584).

***dooleyi*, *Leptotrombidium* (*Leptotrombidium*) Nadchatram, 1970b: 150**

**Paratype (L)**

NEPAL • 1; Makwanpur District, Thaha, Daman; 16 Nov. 1965; ex *Rattus nitidus* (Hodgson) (Rodentia: Muridae); BPBM 8892; (USNMENT01751585).

***doratanae*, *Gahrliepia* (*Schoengastiella*) Nadchatram, 1979: 79**

**Paratype (L)**

INDONESIA • 1; West Java Province, Tjibodas; 30 May 1970; ex *Rattus rattus fulvescens* Gray (= *Niviventer fulvescens*) (Rodentia: Muridae); (USNMENT01751586).

***doremi*, *Trombicula* Brennan and Beck, 1955: 10**

**Holotype (L)**

USA • Utah State, Grafton County, 6 Sep. 1951; ex *Dipodomys merriami* Mearns (Rodentia: Heteromyidae); RML 31216; (USNMENT01751587).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01751588, USNMENT01751589).

***downsi, Euschoengastia* Brennan and Jones, 1960: 501****Holotype (L)**

TRINIDAD AND TOBAGO • Borough of Arima Region, Arima; 19 Nov. 1954; ex *Didelphis marsupialis* L. (Didelphimorphia: Didelphidae); RML 33663; (USNMENT01751590).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 4; same data as holotype; (USNMENT01751591, USNMENT01751592, USNMENT01751593, USNMENT01751594). 3; same locality; 4 May 1954; ex “unidentified mongoose” (Carnivora: Herpestidae); RML 33149; (USNMENT01751595, USNMENT01751596, USNMENT01751597). 10; Boyacá Department; no date; ex *Dasyprocta variegata* Goldman (Rodentia: Dasyproctidae); RML 35176; (USNMENT01751598, USNMENT01751599, USNMENT01751600, USNMENT01751601, USNMENT01751602, USNMENT01751603, USNMENT01751604, USNMENT01751605, USNMENT01751606, USNMENT01751607).

***dracophilis, Odontacarus* Brown and Goff, 1988a: 215****Paratype (L)**

PHILIPPINES • 1; Agusan del Sur, San Luis; 8 Aug. 1964; ex *Draco* sp. (Squamata: Agamidae); (USNMENT01751608).

***dumogaensis, Gahrliepia (Walchia)* Goff and Durden, 1987: 209****Holotype (L)**

INDONESIA • Sulawesi Island, Bogani Nani Wartabone National Park; 25 to 28 Aug. 1985; ex *Paruromys dominator* Thomas (Rodentia: Muridae); (USNMENT01751609).

***dunni, Trombicula* Ewing, 1931: 12****Lectotype (L)**



PANAMA • Chiriquí province; 26 Oct. 1929; ex *Dasyprocta punctata* Gray (Rodentia: Dasyproctidae); L. H. Dunn coll.; USNM 1019; (USNMENT01751610).

**Paralectotypes (L)**

PANAMA • 7; same data as lectotype; (USNMENT01751611, USNMENT01751612, USNMENT01751613, USNMENT01751614, USNMENT01751615, USNMENT01751616, USNMENT01751617).

***dupliseta, Gahrliopia (Gahrliopia) Traub and Morrow, 1955: 26***

**Holotype (L)**

INDIA • Assam State, Ledo City, Ledo Road; 28 Aug. 1945; ex *Suncus caeruleus* (Kerr) (= *Suncus murinus* L.) (Eulipotyphla: Soricidae); USNM 2162; (USNMENT01751618).

***dyscrita, Ascoschoengastia Brennan and Jones, 1961a: 107***

**Holotype (L)**

PANAMA • Panama province, Soberanía National Park; 21 Dec. 1954; ex *Liomys adpersus* (Peters) (= *Heteromys adpersus*) (Rodentia: Heteromyidae); RML 35230; (USNMENT01751619).

**Paratypes (L)**

PANAMA • 13; same data as holotype; (USNMENT01751620, USNMENT01751621, USNMENT01751622, USNMENT01751623, USNMENT01751624, USNMENT01751625, USNMENT01751626, USNMENT01751627, USNMENT01751628, USNMENT01751629, USNMENT01751630, USNMENT01751631, USNMENT01751632). 1; same locality and host; 9 Mar. 1955; RML 35325; (USNMENT01751633). 1; same locality and host; 4 Mar. 1955; RML 35326; (USNMENT01751634). 2; same locality and host; 8 Aug. 1954; RML 35292; (USNMENT01751635, USNMENT01751636). 4; same locality; 20 Apr. 1955; ex *Sigmodon hispidus* Say and Ord (Rodentia: Cricetidae); RML 35239; (USNMENT01751637, USNMENT01751638, USNMENT01751639, USNMENT01751640). 1; Panama province, Cerro Azul; 8 Feb. 1956; ex *Oryzomys talamancae* J.A. Allen (= *Transandinomys talamancae*) (Rodentia: Cricetidae); RML 35321; (USNMENT01751641).

***eadi*, *Euschoengastia* Loomis and Crossley, 1963: 372****Paratypes (L)**

USA • 2; Texas State, Bexar County; 2 Mar. 1953; ex *Sylvilagus audubonii* (Baird) (Lagomorpha: Leporidae); J. S. Wiseman coll.; (USNMENT01751642, USNMENT01751643).

***echymipera*, *Ascoschoengastia* Womersley and Kohls, 1947: 11****Paratypes (L)**

PAPUA NEW GUINEA • 5; Oro Province, Dobodura Airfield; 29 Nov. 1943; ex *Echymipera kalubu cockerelli* (Ramsay) (Peramelemorphia: Peramelidae); (USNMENT01751644, USNMENT01751645, USNMENT01751646, USNMENT01751647, USNMENT01751648).

***ecuadorensis*, *Peltoculus* Goff and Timm, 1985: 233****Holotype (L)**

ECUADOR • Imbabura Province; 11 Sep. 1983; ex *Caenolestes* sp. Thomas (Paucituberculata: Caenolestidae); (USNMENT01751649).

**Paratypes (L)**

ECUADOR • 3; same data as holotype; (USNMENT01751650, USNMENT01751651, USNMENT01751652).

***edibakeri*, *Helenicula* Nadchatram and Traub, 1971: 571****Paratypes (L)**

CHINA • 5; Hong Kong; 17 Mar. 1964; ex *Rattus niviventer* Hodgson (= *Niviventer niviventer*) (Rodentia: Muridae); (USNMENT01751653, USNMENT01751654, USNMENT01751655, USNMENT01751656, USNMENT01751657).

***egretta*, *Neoschoengastia* Wharton and Hardcastle, 1946: 304****Syntypes (L)**

JAPAN • 2; Okinawa Island, Ie Shima Airfield; 2 Aug. 1945; ex *Egretta intermedia* Wagler (= *Ardea intermedia*) (Pelecaniformes: Ardeidae); L. A. Posekany coll.; USNM 1798; (USNMENT01751658, USNMENT01751659).

***elbeli*, *Gahrliopia* (*Gahrliopia*) Traub and Morrow, 1955: 18**

**Holotype (L)**

THAILAND • Nan Province, Mueang Nan District; 21 Jan. 1953; ex *Menetes* sp. Thomas (Rodentia: Sciuridae); USNM 2159; (USNMENT01751660).

**Paratypes (L)**

THAILAND • 3; same data as holotype; (USNMENT01751661, USNMENT01751662, USNMENT01751663).

***electron*, *Neoschoengastia* Brennan and Yunker, 1966a: 240**

**Holotype (L)**

PANAMA • Panama province; 2 Feb. 1962; ex *Electron platyrhynchum* (Leadbeater) (Coraciiformes: Momotidae); RML 44332; (USNMENT01751664).

***elisbergi*, *Leptotrombidium* (*Leptotrombidium*) Traub and Lakshana, 1966: 286**

**Holotype (L)**

THAILAND • Chiang Mai Province, Hot District; 2 Nov. 1962; ex *Menetes berdmorei* (Blyth) (Rodentia: Sciuridae); SMRL 1676; (USNMENT01751665).

**Paratypes (L)**

THAILAND • 2; same data as holotype; (USNMENT01751666, USNMENT01751667). 1; Chiang Mai Province, Chiang Dao District; 17 Nov. 1962; ex *Rattus niviventer* Hodgson (= *Niviventer niviventer*) (Rodentia: Muridae); SMRL 1955; (USNMENT01751668). 1; same data; SMRL 1979; (USNMENT01751669). 2; same locality; 12 Nov. 1962; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); SMRL 1340; (USNMENT01751670, USNMENT01751671). 2; same data; SMRL 1840; (USNMENT01751672, USNMENT01751673). 1; same locality and host; 17 Nov. 1962; SMRL 1962; (USNMENT01751674). 1; same locality; 16 Nov. 1962; ex *Pellorneum ruficeps* Swainson (Passeriformes: Pellorneidae); SMRL 1960; (USNMENT01751675).

***elongotarsala, Ascoschoengastia (Laurentella) Nadchatram, 1970a: 21*****Paratype (L)**

PAPUA NEW GUINEA • 1; Southern Highlands Province, Lavani valley; 17 Jan. 1968; ex *Rattus niobe* Thomas (Rodentia: Muridae); (USNMENT01751676).

***eltoni, Eutrombicula (Eltonella) Audy, 1956: 33*****Paratype (L)**

MALAYSIA • 1; Selangor State, Gombak District, Bukit Lanjan; 21 Sep 1949; ex *Heterometrus longimanus* (Herbst) (Scorpiones: Scorpionidae); CORU 8667; (USNMENT01751677).

***emphyla, Guntherana (Guntherana) Domrow, 1960b: 217*****Paratypes (L)**

AUSTRALIA • 1; Queensland State, Innisfail; 29 Aug. 1958; ex *Isoodon macrourus* (Gould) (Peramelemorphia: Peramelidae); (USNMENT01751678). 1; same locality; 15 Sep. 1958; ex *Perameles nasuta* É. Geoffroy (Peramelemorphia: Peramelidae); (USNMENT01751679).

***empodiformia, Mackiena Traub and Evans, 1950a: 126*****Holotype (L)**

MYANMAR • Kachin State, Myitkyina; 23 Feb. 1945; ex *Ploceus manyar* (Horsfield) (Passeriformes: Ploceidae); R. Traub coll.; USNM 1486; (USNMENT01751680).

**Paratype (L)**

MYANMAR • 1; same data as holotype; (USNMENT01751681).

***enciscoensis, Paratrombicula Goff and Whitaker, 1984c: 329*****Holotype (L)**

PARAGUAY • Boquerón Department, Teniente Agripino Enciso National Park; 21 Jun. 1982; ex *Akodon varius* Thomas (Rodentia: Cricetidae); D. B. Abrell coll.; DBA 261; (USNMENT01751682)

**Paratypes (L)**

PARAGUAY • 3; same data as holotype; (USNMENT01751683, USNMENT01751684, USNMENT01751685). 1; same data as holotype; DBA 260; (USNMENT01751686). 5; same locality and host; 23 Jun. 1982; DBA 265; (USNMENT01751687, USNMENT01751688, USNMENT01751689, USNMENT01751690, USNMENT01751691). 1; same data; DBA 266; (USNMENT01751692). 5; same data; DBA 267; (USNMENT01751693, USNMENT01751694, USNMENT01751695, USNMENT01751696, USNMENT01751697). 3; same locality and host; 29 Jun. 1982; DBA 276; (USNMENT01751698, USNMENT01751699, USNMENT01751700). 1; same locality; 12 Jul. 1982; ex *Akodon [sic] lasiurus* (= *Necromys Lasiurus* [Lund]) (Rodentia: Cricetidae); DBA 297; (USNMENT01751701). 2; same data; DBA 284; (USNMENT01751702, USNMENT01751703). 6; same locality and host; 8 Jul. 1982; DBA 283; (USNMENT01751704, USNMENT01751705, USNMENT01751706, USNMENT01751707, USNMENT01751708, USNMENT01751709). 1; same locality; 28 Jun. 1982; ex *Andalgalomys pearsoni* (Myers) (Rodentia: Cricetidae); DBA 271; (USNMENT01751710). 1; same locality and host; 7 Jul. 1982; DBA 281; (USNMENT01751711). 4; same locality; 4 Jul. 1982; ex *Galea musteloides* Meyen (Rodentia: Caviidae); DBA 280; (USNMENT01751712, USNMENT01751713, USNMENT01751714, USNMENT01751715). 3; same locality; 21 Jun. 1982; ex *Graomys griseoflavus* (Waterhouse) (Rodentia: Cricetidae); DBA 263; (USNMENT01751716, USNMENT01751717, USNMENT01751718).

***enemi*, *Euschoengastia* Brennan and Jones, 1954: 166****Holotype (L)**

USA • California State, Monterey County, Hastings Natural History Reservation; 2 Sep. 1953; ex *Perognathus californicus* Merriam (= *Chaetodipus californicus*) (Rodentia: Heteromyidae); RML 32540; (USNMENT01751719).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01751720, USNMENT01751721). 1; same locality and host; 10 Aug. 1953; RML 32531; (USNMENT01751722). 1; same data; RML 32530; (USNMENT01762017).

***enhebra*, Euschoengastia Brennan and Yunker, 1966a: 233****Holotype (L)**

PANAMA • Colón province, Piña; 7 Feb. 1962; ex *Tylomys watsoni* Thomas (Rodentia: Cricetidae); RML 44401; (USNMENT01751723).

***enode*, Walchia Gater, 1932: 169****Paratype (L)**

MALAYSIA • 1; Selangor State, Petaling District, Sungai Buloh; 24 Apr. 1930; ex *Rattus mulleri* Jentink (= *Sundamys muelleri*) (Rodentia: Muridae); USNM 1061; (USNMENT01751724).

***eptesici*, Trombicula Brennan, 1947: 247****Holotype (L)**

USA • Montana State, Hamilton County; 24 Aug. 1935; ex *Eptesicus fuscus pallidus* (Young) (Chiroptera: Vespertilionidae); R. A. Cooley coll.; RML 11305; (USNMENT01751725).

**Paratype (L)**

USA • 6; same data as holotype; (USNMENT01751726, USNMENT01751727, USNMENT01751728, USNMENT01751729, USNMENT01751730, USNMENT01751731).

***erana*, Gahrliopia (Walchia) Traub and Evans, 1957: 301****Holotype (L)**

MYANMAR • Kachin State, Myitkyina; 26 Oct. 1945; ex *Tupaia belangeri versurae* Thomas (= *Tupaia belangeri* (Wagner) (Eulipotyphla: Soricidae); USNM 2426; (USNMENT01751732).

**Paratype (L)**

MYANMAR • 1; same data as holotype; (USNMENT01751733).

***erula*, Gahrliopia (Schoengastiella) Traub and Evans, 1953: 91**

**Holotype (L)**

MYANMAR • Kachin State, Shing Bwi Yang; 6 Apr. 1945; ex *Rattus rattus sladeni* (Anderson) (= *Rattus tanezumi* [Temminck]) (Rodentia: Muridae); USATC 906; (USNMENT01751734).

**Paratypes (L)**

MYANMAR • 1; same data as holotype; (USNMENT01751735). 2; same locality and host; 9 Jan. 1945; USATC 824; (USNMENT01751736, USNMENT01751737). 1; same locality and host, 8 May 1945; USATC 955; (USNMENT01751738). 1; same data; USATC 992; (USNMENT01751739). 1; same locality; 27 Oct. 1945; ex *Rattus flavipectus yunnanensis* (Milne-Edwards) (= *Rattus tanezumi* [Temminck]) (Rodentia: Muridae); USATC 4186; (USNMENT01751740). 1; Kachin State, Myitkyina; 17 Jan. 1945; ex “unidentified rat” (Rodentia: Muridae); USATC 535; (USNMENT01751741).

***esorhina*, *Neoschoengastia* Brennan, 1971a: 666****Holotype (L)**

BRAZIL • Pará State, Ananindeua; 28 Jul. 1970; ex *Automolus infuscatus* (Sclater) (Passeriformes: Furnariidae); T. H. G. Aitken coll.; RML 56193; (USNMENT01751742).

**Paratypes (L)**

BRAZIL • 11; same data as holotype; (USNMENT01751743, USNMENT01751744, USNMENT01751745, USNMENT01751746, USNMENT01751747, USNMENT01751748, USNMENT01751749, USNMENT01751750, USNMENT01751751, USNMENT01751752, USNMENT01751753). 1; same data; RML 56194; (USNMENT01751754). 1; same data; RML 56195; (USNMENT01751755).

***euryphylla*, *Euschoengastia* Brennan and Jones, 1961b: 182****Paratypes (L)**

PERU • 2; Quispicanchi Province, Marcapata District; 13 Jul. 1953; ex *Oryzomys keaysi* J.A. Allen (= *Nephelomys keaysi*) (Rodentia: Cricetidae); RML 33550; (USNMENT01751756, USNMENT01751757).

***eusignata*, *Trombicula* (*Neotrombicula*) Brennan and Wharton, 1950: 161**

**Holotype (L)**

USA • Montana State, Missoula County; 11 Aug. 1945; ex *Eutamias* sp. (Rodentia: Sciuridae); RML 21943; (USNMENT01751758).

**Paratype (L)**

USA • 1; same data as holotype; (USNMENT01751759).

***evansi, Gahrliopia (Gahrliopia) Traub and Morrow, 1955: 30*****Holotype (L)**

MYANMAR • Kachin State, Myitkyina; 24 Jan. 1945; ex “unidentified rat” (Rodentia: Muridae); USATC 561; (USNMENT01751760).

**Paratypes (L)**

MYANMAR • 1; same data as holotype; USATC 552; (USNMENT01751761). 1; same locality; 22 May 1945; ex *Rattus rattus sladeni* (Anderson) (= *Rattus tanezumi* [Temminck]) (Rodentia: Muridae); USATC 1035; (USNMENT01751762). 1; same locality and host; 22 May 1945; USATC 1044; (USNMENT01751763).

***ewingi lupella, Gahrliopia (Walchia) Traub and Evans, 1957: 335*****Holotype (L)**

THAILAND • Chaiyaphum Province; 11 Dec. 1952; ex *Bandicota* sp. (Rodentia: Muridae); R. E. Elbel coll.; USATC 880; (USNMENT01751764).

**Paratypes (L)**

THAILAND • 14; same data as holotype; (USNMENT01751765, USNMENT01751766, USNMENT01751767, USNMENT01751768, USNMENT01751769, USNMENT01751770, USNMENT01751771, USNMENT01751772, USNMENT01751773, USNMENT01751774, USNMENT01751775, USNMENT01751776, USNMENT01751777, USNMENT01751778). 5; Nakhon Ratchasima Province, Nakhon Ratchasima; 30 Jan. 1953; ex *Bandicota indica* (Bechstein) (Rodentia: Muridae); USATC 1782; (USNMENT01751779, USNMENT01751780, USNMENT01751781, USNMENT01751782, USNMENT01751783). 3; same locality and host; 11 Aug. 1952; USATC 1001; (USNMENT01751784, USNMENT01751785, USNMENT01751786). 1; same locality and host; 12 Aug. 1952; USATC 1005;



(USNMENT01751787). 6; same locality and host; 30 Jan. 1953; USATC 1782; (USNMENT01751788, USNMENT01751789, USNMENT01751790, USNMENT01751791, USNMENT01751792, USNMENT01751793). 14; same locality; 3 Feb. 1953; ex *Rattus rattus* (Rodentia: Muridae); USATC 1712; (USNMENT01751794, USNMENT01751795, USNMENT01751796, USNMENT01751797, USNMENT01751798, USNMENT01751799, USNMENT01751800, USNMENT01751801, USNMENT01751802, USNMENT01751803, USNMENT01751804, USNMENT01751805, USNMENT01751806, USNMENT01751807). 1; same data; USATC 1783; (USNMENT01751808). 2; same locality and host; 10 Feb. 1953; USATC 1717; (USNMENT01751809, USNMENT01751810). 1; same locality and host; 30 Jan. 1953; USATC 1781; (USNMENT01751811). 1; same locality; 12 Feb. 1953; ex “unidentified mongoose” (Carnivora: Herpestidae); USATC 1724; (USNMENT01751812).

***ewingi*, *Neoschoengastia* Wharton and Hardcastle, 1946: 308**

**Holotype (L)**

REPUBLIC OF PALAU • Ngabad Island; 11 Sep. 1945; ex *Gallus* sp. (Galliformes: Phasianidae); Strong coll.; USNM 1796; (USNMENT01751813).

***exhumatus*, *Colicus* Brennan, 1970b: 492**

**Holotype (L)**

TRINIDAD AND TOBAGO • Diego Martin City, Blue range, Croney Cave; 5 May 1958; ex *Carollia perspicillata* (L.) (Chiroptera: Phyllostomidae); RML 34778; (USNMENT01751814).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 5; same data as holotype; (USNMENT01751815, USNMENT01751816, USNMENT01751817, USNMENT01751818, USNMENT01751819).

***exigua*, *Intercutestrix* Brennan and Reed, 1974a: 187**

**Holotype (L)**

VENEZUELA • Barinas State; 27 Dec. 1967; ex *Proechimys semispinosus* Tomes (Rodentia: Echimyidae); RML 59308; (USNMENT01751820).

**Paratype (L)**

VENEZUELA • 1; Carabobo State; 7 Nov. 1967; ex *Sigmodon hispidus* Say and Ord (Rodentia: Cricetidae); RML 53188; (USNMENT01751821).

***exilis, Gahrlipeia (Gahrlipeia) Traub and Morrow, 1955: 6***

**Holotype (L)**

MYANMAR • Kachin State, Shing Bwi Yang; 7 Mar. 1945; ex *Rattus rattus sladeni* (Anderson) (= *Rattus tanezumi* [Temminck]) (Rodentia: Muridae); USATC 750; (USNMENT01751822).

**Paratypes (L)**

MYANMAR • 6; same data; USATC 750; (USNMENT01751823, USNMENT01751824, USNMENT01751825, USNMENT01751826, USNMENT01751827, USNMENT01751828). 5; same data; USATC 752; (USNMENT01751829, USNMENT01751830, USNMENT01751831, USNMENT01751832, USNMENT01751833). 13; same locality; 8 Mar. 1945; ex *Tupaia belangeri versurae* Thomas (= *Tupaia belangeri* (Wagner) (Eulipotyphla: Soricidae); USATC 754; (USNMENT01751834, USNMENT01751835, USNMENT01751836, USNMENT01751837, USNMENT01751838, USNMENT01751839, USNMENT01751840, USNMENT01751841, USNMENT01751842, USNMENT01751843, USNMENT01751844, USNMENT01751845, USNMENT01751846). 3; same locality; 6 Apr. 1945; ex *Rattus rattus fulvescens* Gray (= *Niviventer fulvescens*) (Rodentia: Muridae); USATC 900; (USNMENT01751847, USNMENT01751848, USNMENT01751849).

***expansellus, Eushcoengastoides Loomis, 1971: 700***

**Holotype (L)**

MEXICO • Sinaloa State, Guamúchil; 24 Aug. 1963; ex *Perognathus parnix* J.A. Allen (= *Chaetodipus pernix*) (Rodentia: Heteromyidae); RML 56224; (USNMENT01751850).

***extrinseca*, *Pseudoschoengastia* Brennan, 1960b: 484****Holotype (L)**

MEXICO • Veracruz State, 17 Oct. 1950; ex *Peromyscus mexicanus* (Saussure) (Rodentia: Cricetidae); RML 35511; (USNMENT01751851).

**Paratypes (L)**

MEXICO • 15; same data as holotype; (USNMENT01751852, USNMENT01751853, USNMENT01751854, USNMENT01751855, USNMENT01751856, USNMENT01751857, USNMENT01751858, USNMENT01751859, USNMENT01751860, USNMENT01751861, USNMENT01751862, USNMENT01751863, USNMENT01751864, USNMENT01751865, USNMENT01751866).

***faitkeni*, *Kymocta* Brennan, 1968a: 614****Holotype (L)**

BRAZIL • Amapa State, Serra do Navio; 6 Dec. 1967; ex *Oryzomys capito* (Olfers) (= *Hylaeamys megacephalus* [Fischer]) (Rodentia: Cricetidae); T. H. G. Aitken coll.; RML 48875. (USNMENT01751867).

**Paratypes (L)**

BRAZIL • 2; same data as holotype; (USNMENT01751868, USNMENT01751869). 1; same locality and host; 5 Dec. 1967; RML 48874; (USNMENT01751870).

***falconensis*, *Quadrasetta* Goff and Brennan, 1977a: 505****Holotype (L)**

VENEZUELA • Falcon State, 17 Jul. 1968; ex *Sylvilagus floridanus* (J.A. Allen) (Lagomorpha: Leporidae); Smithsonian Army coll.; RML 53360; (USNMENT01751871).

**Paratypes (L)**

VENEZUELA • 7; same data as holotype; (USNMENT01751872, USNMENT01751873, USNMENT01751874, USNMENT01751875, USNMENT01751876, USNMENT01751877, USNMENT01751878).

***fanestrulata*, *Gahrlipeia* (*Gahrlipeia*) Traub and Morrow, 1957: 171**

**Holotype (L)**

THAILAND • Kanchanaburi Province; 14 Nov. 1952; ex “unidentified rat” (Rodentia: Muridae); R. E. Elbel coll.; USNM 2440; (USNMENT01751879).

***farneri, Pseudoschoengastia* Lipovsky, 1951: 101****Paratype (L)**

USA • 3; Kansas State, Douglas County; 19 Aug. 1947; ex *Cryptotis parva* (Say) (Eulipotyphla: Soricidae); (USNMENT01751880, USNMENT01751881, USNMENT01751882).

***farrelli, Trombicula (Neotrombicula)* Brennan and Wharton, 1950: 185****Holotype (L)**

USA • North Carolina State, Orange County; 2 Jan. 1948; ex *Peromyscus* sp. (Rodentia: Cricetidae); USNM 1844; (USNMENT01751883).

**Paratype (L)**

USA • 1; same data as holotype; (USNMENT01751884).

***fasolla, Euschoengastia* Brennan and Beck, 1955: 12****Holotype (L)**

USA • Utah State, Washington County, Berry Springs Nature Reserve; 19 Dec. 1950; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); RML 28271; (USNMENT01751885).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01751886, USNMENT01751887).

***fieldi, Eutrombicula* Audy, 1956: 39****Paratype (L)**

MALAYSIA • 1; Selangor State, Gombak District, Bukit Lagong, Batu caves; 12 Jan. 1953; ex *Lygosoma olivaceum* Dammerman (= *Dasia olivacea* Gray) (Squamata: Scincidae); CORU 40796; (USNMENT01751888).

***fieldi, Odontacarus* Brennan and Jones, 1961a: 105**

**Holotype (L)**

PANAMA • Panama province; 24 Jan. 1954; ex *Sigmodon hispidus* Say and Ord (Rodentia: Cricetidae); G. Field coll.; RML 35270; (USNMENT01751889).

**Paratypes (L)**

PANAMA • 2; same locality; 8 Jun. 1954; ex *Zygodontomys cherriei* J. A. Allen (= *Zygodontomys brevicauda* J. A. Allen and Chapman) (Rodentia: Cricetidae); RML 35284; (USNMENT01751890, USNMENT01751891).

***filamentosa*, *Trombicula* Radford, 1954: 299****Holotype (L)**

YEMEN • Ta'izz; 1951; ex *Rhinolophus clivosus* Cretzschmar (Chiroptera: Rhinolophidae); H. Hoogstraal coll.; (USNMENT01751892).

***finitima*, *Pseudoschoengastia* Brennan and Yunker, 1966a: 246****Holotype (L)**

PANAMA • Colón province, Piña; 7 Dec. 1960; ex *Heteromys desmarestianus* Gray (Rodentia: Heteromyidae); RML 40112; (USNMENT01751893).

**Paratypes (L)**

PANAMA • 5; same data as holotype; (USNMENT01751894, USNMENT01751895, USNMENT01751896, USNMENT01751897, USNMENT01751898). 1; same locality and host; 29 Dec. 1961; RML 44275; (USNMENT01751899).

***finleyi*, *Euschoengastia* Crossley, 1955: 289****Holotype (L)**

USA • Colorado State, Mesa County; 6 Nov. 1949; ex *Neotoma cinerea* (Ord) (Rodentia: Cricetidae); KU 7010; (USNMENT01751900).

**Paratypes (L)**

USA • 1; same locality and date; ex *Neotoma mexicana* Baird (Rodentia: Cricetidae); KU 7013; (USNMENT01751901). 2; same locality; 7 Nov. 1949; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); KU 7020; (USNMENT01751902, USNMENT01751903). 1; same data; KU 7022; (USNMENT01751904).

***finleyi*, *Trombicula* (*Neotrombicula*) Kardos, 1954: 88****Holotype (L)**

USA • Colorado State, Dolores County; 18 Oct. 1949; ex *Neotoma cinerea* (Ord) (Rodentia: Cricetidae); USNM 4001; (USNMENT01751905).

***fisheri*, *Microtrombicula* (*Scapuscutala*) Webb and Loomis, 1971: 323****Holotype (L)**

MEXICO • Baja California Sur State, Sierra de La Laguna; 9 Jul. 1967; ex *Peromyscus truei* (Shufeldt) (Rodentia: Cricetidae); R. M. Davis coll.; RMD 670709; (USNMENT01751906).

***fissa*, *Crotonasis* Brennan and Yunker, 1966a: 230****Holotype (L)**

PANAMA • Panama province, Panama City, Summit Botanical Gardens; 28 Aug. 1961; ex *Liomys adspersus* (Peters) (= *Heteromys adspersus*) (Rodentia: Heteromyidae); RML 43471; (USNMENT01751907).

**Paratypes (L)**

PANAMA • 3; same data as holotype; (USNMENT01751908, USNMENT01751909, USNMENT01751910). 1; same locality and host; 27 Dec. 1961; RML 44255; (USNMENT01751911).

***fitchi*, *Trombicula* Loomis, 1954: 928****Holotype (L)**

USA • Kansas State, Barber County; 10 Apr. 1949; ex *Myotis velifer* (J.A. Allen) (Chiroptera: Vespertilionidae); KU 3181; (USNMENT01751912).

**Partypes (L)**

USA • 1; same data as holotype; KU 3183; (USNMENT01751913). 1; same data; KU 3185; (USNMENT01751914). 1; same data; KU 3188; (USNMENT01751915). 1; same data; KU 3196; (USNMENT01751916).

***fitzsimonsi*, *Phrynarctus* Lawrence, 1949: 463****Paratype (L)**

SOUTH AFRICA • 1; Western Cape Province, Jonkersberg; no date; ex *Heleophryne regis* Hewitt (Anura: Heleophrynidae); NM 4873; (USNMENT01751917).

***flagellifera*, *Trombicula* Traub and Audy, 1954a: 46****Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 17 Jul. 1951; ex *Crocidura* sp. (Eulipotyphla: Soricidae); R. Traub coll.; USNM 2101; (USNMENT01751918).

**Paratypes (L)**

MALAYSIA • 2; same locality; 27 May 1952; ex *Hylomys suillus* Müller (Eulipotyphla: Erinaceidae); (USNMENT01751919, USNMENT01751920). 9; same locality and host; 16 Jul. 1951; (USNMENT01751921, USNMENT01751922, USNMENT01751923, USNMENT01751924, USNMENT01751925, USNMENT01751926, USNMENT01751927, USNMENT01751928, USNMENT01751929). 2; same locality; 19 Jul. 1951; ex *Nannosciurus whiteheadi* Thomas (= *Exilisciurus whiteheadi*) (Rodentia: Sciuridae); (USNMENT01751930, USNMENT01751931).

***flagellisetula*, *Perissopalla* Brennan and White, 1960: 347****Holotype (L)**

USA • Alabama State, Clarke County; 25 Aug. 1953; ex *Pipistrellus subflavus* F. Cuvier (= *Perimyotis subflavus*) (Chiroptera: Vespertilionidae); RML 34951; (USNMENT01751932).

**Paratypes (L)**

USA • 5; same data as holotype; (USNMENT01751933, USNMENT01751934, USNMENT01751935, USNMENT01751936, USNMENT01751937). 1; Alabama State, Bibb County; 8 Jan. 1953; same host; RML 35034; (USNMENT01751938).

***fletcheri*, *Gahrliepia* Gater, 1932: 161****Paratypes (L)**

MALAYSIA • 3; Selangor State, Kuala Lumpur; 15 May 1929; ex *Rattus rattus diardi* (Jentink) (Rodentia: Muridae); USNM 1056; (USNMENT01751939, USNMENT01751940, USNMENT01751941).

***flochi*, *Euschoengastia* Brennan and Jones, 1960: 503**

**Holotype (L)**

TRINIDAD AND TOBAGO • Tunapuna–Piarco Region, Tunapuna City, Maingot Road; 29 May 1956; ex *Rattus rattus* (L.) (Rodentia: Muridae); RML 33885; (USNMENT01751942).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 3; same data as holotype; (USNMENT01751943, USNMENT01751944, USNMENT01751945). 1; same locality and host; 19 Jan. 1956; RML 33833; (USNMENT01751946). 7; Sangre Grande Region, Rio Grande stream; 13 Jun. 1956; same host; RML 34026; (USNMENT01751947, USNMENT01751948, USNMENT01751949, USNMENT01751950, USNMENT01751951, USNMENT01751952, USNMENT01751953). 2; same locality and host; 25 Jun. 1956; RML 34042; (USNMENT01751954, USNMENT01751955). 8; same locality and host; 28 Jun. 1956; RML 34045; (USNMENT01751956, USNMENT01751957, USNMENT01751958, USNMENT01751959, USNMENT01751960, USNMENT01751961, USNMENT01751962, USNMENT01751963).

***foliaceus*, *Trombiculindus* Traub and Evans, 1951: 262**

**Holotype (L)**

MYANMAR • Kachin State, Shing Bwi Yang; 13 Jan. 1945; ex *Crocidura* sp. (Eulipotyphla: Soricidae); USATC 646; (USNMENT01751964).

**Paratypes (L)**

MYANMAR • 2; same data as holotype; (USNMENT01751965, USNMENT01751966). 1; same data; USATC 560; (USNMENT01751967). 1; same locality and host; 9 Mar. 1945; USATC 757; (USNMENT01751968).

***folius*, *Xenodontacarus* Loomis and Goff, 1973: 116**



**Holotype (L)**

MEXICO • Sinaloa State, Santa Lucía; 12 Sep. 1964; ex *Peromyscus boylii* (Baird) (Rodentia: Cricetidae); RBL 641209; (USNMENT01751969).

***forbesi*, *Guntheria* (*Guntheria*) Goff, 1983g: 565****Paratypes (L)**

PAPUA NEW GUINEA • 3; Southern Highlands Province; 14 May 1973; ex *Pogonomys forbesi* Thomas (= *Chiruromys forbesi*) (Rodentia: Muridae); BPBM 12937; (USNMENT01751970, USNMENT01751971, USNMENT01751972).

***fragibarba*, *Trombicula* Brennan and Jones, 1960: 517****Holotype (L)**

TRINIDAD AND TOBAGO • Sangre Grande Region; 31 Jan. 1956; ex *Amazona amazonica* (L.) (Psittaciformes: Psittacidae); RML 33808; (USNMENT01751973).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 12; same data as holotype; (USNMENT01751974, USNMENT01751975, USNMENT01751976, USNMENT01751977, USNMENT01751978, USNMENT01751979, USNMENT01751980, USNMENT01751981, USNMENT01751982, USNMENT01751983, USNMENT01751984, USNMENT01751985). 7; same locality and host; 16 Feb. 1956; RML 33805; (USNMENT01751986, USNMENT01751987, USNMENT01751988, USNMENT01751989, USNMENT01751990, USNMENT01751991, USNMENT01751992). 1; same locality and host; 24 Jan. 1956; RML 33837; (USNMENT01751993). 4; Sangre Grande Region, Rio Grande stream; 2 Sep. 1956; ex “unidentified rat” (Rodentia); RML 34166; (USNMENT01751994, USNMENT01751995, USNMENT01751996, USNMENT01751997). 4; Sangre Grande Region; La Cumaca; 5 May 1954; ex *Rhipidomys couesi* (J.A. Allen and Chapman) (Rodentia: Cricetidae); RML 33627; (USNMENT01751998, USNMENT01751999, USNMENT01752000, USNMENT01752001).

***frigipes*, *Crotiscus* Brennan, 1957: 678**

**Holotype (L)**

PERU • Puno Department, Sandia Province, Limbani District; 1 Sep. 1951; ex *Neotomys ebriosus* Thomas (Rodentia: Cricetidae); RML 31561; (USNMENT01752002).

**Paratypes (L)**

PERU • 14; same data as holotype; (USNMENT01752003, USNMENT01752004, USNMENT01752005, USNMENT01752006, USNMENT01752007, USNMENT01752008, USNMENT01752009, USNMENT01752010, USNMENT01752011, USNMENT01752012, USNMENT01752013, USNMENT01752014, USNMENT01752015, USNMENT01752016). 4; same locality and host; 25 Jul. 1951; RML 31556; (USNMENT01752017, USNMENT01752018, USNMENT01752019, USNMENT01752020). 6; same locality and host; 31 Aug. 1951; RML 31599; (USNMENT01752021, USNMENT01752022, USNMENT01752023, USNMENT01752024, USNMENT01752025, USNMENT01752026). 2; same data; RML 31559; (USNMENT01752027, USNMENT01752028). 8; same locality; 19 Jun. 1951; ex *Phyllotis pictus* Thomas (= *Auliscomys pictus*) (Rodentia: Cricetidae); RML 31555; (USNMENT01752029, USNMENT01752030, USNMENT01752031, USNMENT01752032, USNMENT01752033, USNMENT01752034, USNMENT01752035, USNMENT01752036). 2; same locality; 22 Sep. 1951; ex *Chinchillula sahamae* Thomas (Rodentia: Cricetidae); RML 31547; (USNMENT01752037, USNMENT01752038). 2; same locality and host; 11 Jun. 1951; RML 31549; (USNMENT01752039, USNMENT01752040).

***frimbriata*, *Gahrliopia* (*Gahrliopia*) Traub and Morrow, 1955: 10****Holotype (L)**

MYANMAR • Kachin State, Shing Bwi Yang City, Ledo Road; 30 Apr. 1945; ex *Rattus flavipectus yunnanensis* (Milne-Edwards) (= *Rattus tanezumi* [Temminck]) (Rodentia: Muridae); USNM 2155; (USNMENT01752041).

**Paratypes (L)**

MYANMAR • 15; same data as holotype; (USNMENT01752042, USNMENT01752043, USNMENT01752044, USNMENT01752045, USNMENT01752046, USNMENT01752047, USNMENT01752048, USNMENT01752049,

USNMENT01752050,                   USNMENT01752051,                   USNMENT01752052,  
 USNMENT01752053,                   USNMENT01752054,                   USNMENT01752055,  
 USNMENT01752056).

***frittsi*, *Trombicula* Wharton, 1945a: 282**

**Syntypes (L)**

PAPUA NEW GUINEA • 6; Bougainville Island, Cape Torokina; 31 Aug. 1944; ex *Gehyra oceanica* (Lesson) (Squamata: Gekkonidae); USNM 1500; (USNMENT01752057, USNMENT01752058,                   USNMENT01752059,                   USNMENT01752060, USNMENT01752061, USNMENT01752062).

***frondifera*, *Euschoengastia* Gould, 1956: 53**

**Holotype (L)**

USA • California State, Los Angeles County; 8 Dec. 1940; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); RML 25866; (USNMENT01752063).

**Paratypes (L)**

USA • 5; same data as holotype; (USNMENT01752064, USNMENT01752065, USNMENT01752066, USNMENT01752067, USNMENT01752068).

***frondosa*, *Euschoengastia* Brennan and Jones, 1961b: 183**

**Holotype (L)**

PERU • Puno Department, Sandia Province, Limbani District; 11 Aug. 1951; ex *Phyllotis phaeus* Osgood (= *Phyllotis osilae* J. A. Allen) (Rodentia: Cricetidae); RML 31557; (USNMENT01752069).

**Paratypes (L)**

PERU • 5; same data as holotype; (USNMENT01752070, USNMENT01752071, USNMENT01752072, USNMENT01752073, USNMENT01752074).

***frondosum*, *Leptotrombidium* (*Trombiculindus*) Traub and Nadchatram, 1967b: 420**

**Holotype (L)**

MALAYSIA • Pahang State, Cameron Highlands District, Mount Batu Brinchang; 3 Jun. 1959; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); RT B 51041; (USNMENT01752075).

**Paratypes (L)**

MALAYSIA • 1; same data as holotype; (USNMENT01752076). 3; same data; RT B 51037; (USNMENT01752076, USNMENT01752077, USNMENT01752078).

***fuji, Trombicula (Leptotrombidium) Kuwata, Berge and Philip, 1950: 80***

**Holotype (L)**

JAPAN • Yamanashi Province, Mount Fuji; 30 Oct. 1948; ex *Apodemus speciosus* (Temminck) (Rodentia: Muridae); USNM 1892; (USNMENT01752079).

**Paratypes (L)**

JAPAN • 5; same data as holotype; (USNMENT01752080, USNMENT01752081, USNMENT01752082, USNMENT01752083, USNMENT01752084).

***fujigmo, Trombicula Philip and Fuller, 1950: 53***

**Paratypes (L)**

MYANMAR • 2; Kachin State, Myitkyina; 9 Apr. 1945; ex *Crocidura vorax* (G. Allen) (Eulipotyphla: Soricidae); USATC 939; (USNMENT01752085, USNMENT01752086). 1; same locality; 10 Mar. 1945; ex *Crocidura* sp. (Eulipotyphla: Soricidae); USATC 748; (USNMENT01752087). 1; same locality; 21 Mar. 1945; ex *Rattus* sp. (Rodentia: Muridae); USATC 797; (USNMENT01752088).

***fullbergae, Neoschoengastia Brennan, 1948: 465***

**Holotype (L)**

USA • Montana State, Ravalli County; 15 Jul. 1947; ex *Odocoileus hemionus* (Rafinesque) (Cetartiodactyla: Cervidae); (USNMENT01752089).

**Paratypes (L)**

USA • 7; same data as holotype; (USNMENT01752090, USNMENT01752091, USNMENT01752092, USNMENT01752093, USNMENT01752094, USNMENT01752095, USNMENT01752096).

***fulleri*, *Trombicula* Ewing, 1945: 64****Lectotype (L)**

MALAYSIA • Kachin State, Shaduzup; 7 Jul. 1944; ex “unidentified shrew” (Eulipotyphla: Soricidae); H. S. Fuller coll.; USNM 1485; (USNMENT01752097).

**Paralectotypes (L)**

MALAYSIA • 5; same data as lectotype; (USNMENT01752098, USNMENT01752099, USNMENT01752100, USNMENT01752101, USNMENT01752102).

***fundata*, *Fonsecia* (*Parasecia*) Brennan, 1969b: 664****Holotype (L)**

BRAZIL • Pará State, Belém, Utinga State Park, 5 Jan. 1968; ex *Caluromys philander* L. (Didelphimorphia: Didelphidae); RML 49323; (USNMENT01752103).

**Paratype (L)**

BRAZIL • 6; same data as holotype; (USNMENT01752104, USNMENT01752105, USNMENT01752106, USNMENT01752107, USNMENT01752108, USNMENT01752109).

***furmani panamensis*, *Sasacarus* Reed and Brennan, 1975: 31****Holotype (L)**

PANAMA • Panama province, Panama; 13 Apr. 1962; ex *Proechimys semispinosus* Tomes (Rodentia: Echimyidae); C. M. Keenan coll.; RML 44965; (USNMENT01752110).

**Paratypes (L)**

PANAMA • 2; same locality and host; 16 Sep. 1961; RML 44105; (USNMENT01752111, USNMENT01752112). 1; same locality and host; 7 Jan. 1961; RML 35276; (USNMENT01752113). 2; Colón province, Piña; 13 Dec. 1960; same host; RML 40125; (USNMENT01752114, USNMENT01752115). 1; same locality; 7 Feb. 1962; ex *Tylomys watsoni* Thomas (Rodentia: Cricetidae); RML 44401; (USNMENT01752116).

***furmani*, *Chatia* Hoffmann, 1954: 17****Holotype (L)**

MEXICO • Oaxaca State, Monte Albán; 15 Aug. 1953; ex *Baiomys musculus* (Merriam) (Rodentia: Cricetidae); (USNMENT01752117).

***furmani, Euschoengastia Gould, 1956: 63***

**Holotype (L)**

USA • California State, Imperial County; 21 Jan. 1951; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); (USNMENT01752118).

**Paratypes (L)**

USA • 9; same data as holotype; (USNMENT01752119, USNMENT01752120, USNMENT01752121, USNMENT01752122, USNMENT01752123, USNMENT01752124, USNMENT01752125, USNMENT01752126, USNMENT01752127). 2; California State, Monterey County, Hastings Natural History Reservation; 6 Nov. 1950; ex *Perognathus californicus* Merriam (= *Chaetodipus californicus*) (Rodentia: Heteromyidae); RML 28309; (USNMENT01752128, USNMENT01752129). 2; same locality and host; 17 Oct. 1950; RML 28279; (USNMENT01752130, USNMENT01752131). 5; same locality and host; 2 Nov. 1950; RML 28299; (USNMENT01752132, USNMENT01752133, USNMENT01752134, USNMENT01752135, USNMENT01752136). 2; California State, Los Angeles County, Palos Verdes Estates; 24 Jan. 1951; ex *Reithrodontomys megalotis* (Baird) (Rodentia: Cricetidae); (USNMENT01752137, USNMENT01752138).

***fuscicornis, Ectonyx Brennan, 1960a: 88***

**Holotype (L)**

MEXICO • Puebla State; 8 Sep. 1950; ex *Liomys irroratus* (Gray) (= *Heteromys irroratus*) (Rodentia: Heteromyidae); G. W. Wharton coll.; RML 35178; (USNMENT01752139).

**Paratypes (L)**

MEXICO • 5; same data as holotype; (USNMENT01752140, USNMENT01752141, USNMENT01752142, USNMENT01752143, USNMENT01752144).

***gagarini, Euschoengastia Brennan, 1962: 618***

**Holotype (L)**

MEXICO • Guerrero State; 2 Sep. 1950; ex *Liomys irroratus* (Gray) (= *Heteromys irroratus*) (Rodentia: Heteromyidae); G. W. Wharton coll.; RML 35524; (USNMENT01752145).

**Paratype (L)**

MEXICO • 1; same data as holotype; (USNMENT01752146).

***galei*, *Vergrandia* Yunker and Jones, 1961: 997**

**Holotype (L)**

PANAMA • Panama province, Chilibre City, Chilibrillo caves; 8 Aug. 1962; ex *Chilonycteris rubiginosa* Wagner (= *Pteronotus (Phyllodia) parnellii rubiginosus*) (Chiroptera: Mormoopidae); RML 36602; (USNMENT01752147).

**Paratype (L)**

PANAMA • 1; same data as holotype; (USNMENT01752148).

***galli*, *Acomatacarus* Ewing, 1946a: 25**

**Syntypes (L)**

USA • 4; Texas State, Uvalde County; 13 Jan. 1943; ex *Gallus gallus domesticus* (L.) (Galliformes: Phasianidae); USNM 1516; (USNMENT01752149, USNMENT01752150, USNMENT01752151, USNMENT01752152).

***galliardi*, *Leptotrombidium* Vercammen-Grandjean and Taufflieb, 1959: 248**

**Paratypes (L)**

MOROCCO • 5; Casablanca Province; 14 Jun. 1956; ex *Oryctolagus cuniculus* (L.) (Lagomorpha: Leporidae); (USNMENT01752153, USNMENT01752154, USNMENT01752155, USNMENT01752156, USNMENT01752157).

***gammonsii*, *Gahrliopia* (*Schoengastiella*) Traub and Evans, 1953: 100**

**Holotype (L)**

INDIA • Assam State, Ledo; 25 Oct. 1945; ex *Rattus flavipectus yunnanensis* (Milne-Edwards) (= *Rattus tanezumi* [Temminck]) (Rodentia: Muridae); USNM 2072; (USNMENT01752158).

***gardellai*, *Neotrombicula* Kardos, 1961: 501****Holotype (L)**

NORTH KOREA • South P'yöngan Province, Ch'ör-hyön; 16 Sep. 1953; ex *Apodemus agrarius* (Pallas) (Rodentia: Muridae); USNM 2238; (USNMENT01752159).

**Paratypes (L)**

NORTH KOREA • 7; same data as holotype; (USNMENT01752160, USNMENT01752161, USNMENT01752162, USNMENT01752163, USNMENT01752164, USNMENT01752165, USNMENT01752166). 1; same locality and host; 17 Sep. 1953; (USNMENT01752167). SOUTH KOREA • 7; Gangwon-do Province, Ch'unch'ön; 10 Sep. 1953; ex *Apodemus peninsulae* (Thomas) (Rodentia: Muridae); (USNMENT01752168, USNMENT01752169, USNMENT01752170, USNMENT01752171, USNMENT01752172, USNMENT01752173, USNMENT01752174). 2; same locality and host; 25 Sep. 1953; (USNMENT01752175, USNMENT01752176). 3; same locality and date; ex *Clethrionomys rufocanus* (Sundevall) (= *Myodes rufocanus*) (Rodentia: Cricetidae); (USNMENT01752177, USNMENT01752178, USNMENT0175210279); 9; Seoul, Seoul Forest; 16 Sep. 1954; ex *Eutamias sibiricus* (Laxmann) (Rodentia: Sciuridae); (USNMENT01752180, USNMENT01752181, USNMENT01752182, USNMENT01752183, USNMENT01752184, USNMENT01752185, USNMENT01752186, USNMENT01752187, USNMENT01752188).

***garfieldi*, *Hexidionis* Goff and McKown, 1997:438****Holotype (L)**

USA • Texas State, Nueces County, Corpus Christi; Feb. 1996; ex *Felis catus* (L.) (Carnivora: Felidae); (USNMENT01752189).

**Paratypes (L)**

USA • 12; same data as holotype; (USNMENT01752190, USNMENT01752191, USNMENT01752192, USNMENT01752193, USNMENT01752194, USNMENT01752195, USNMENT01752196, USNMENT01752197, USNMENT01752198, USNMENT01752199, USNMENT01752200, USNMENT01752201).



***gateri*, *Leeuwenhoekia* Radford, 1942: 70****Paratypes (L)**

SOUTH AFRICA • 2; Gauteng Province, Holfontein; 18 Oct. 1938; ex *Tatera brantsii* (Smith) (= *Gerbilliscus brantsii*) (Rodentia: Muridae); D. H. S. Davis coll.; USNM 1562; (USNMENT01752202, USNMENT01752203).

***gateri*, *Leptotrombidium* (*Trombiculindus*) Traub and Nadchatram, 1967b: 430****Holotype (L)**

MALAYSIA • Kedah State; 11 Mar. 1959; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae) R. Traub coll.; RT B50192; (USNMENT01752204).

**Paratypes (L)**

MALAYSIA • 7; same data as holotype; (USNMENT01752205, USNMENT01752206, USNMENT01752207, USNMENT01752208, USNMENT01752209, USNMENT01752210, USNMENT01752211).

***geckobius*, *Acomatacarus* Lawrence, 1949: 454****Paratype (L)**

NAMIBIA • 1; Huab River Valley, Damaraland Camp; no date; ex *Pachydactylus bicolor* (Squamata: Gekkonidae); (USNMENT01752212).

***geikiensis*, *Chiroptella* (*Neosomia*) Goff, 1979b: 93****Paratypes (L)**

AUSTRALIA • 2; Western Australia State, Kimberley Region, Danggu Gorge National Park; 8 Oct. 1976; ex *Rhinonictoris aurantius* (Gray) (= *Rhinonictoris aurantia*) (Chiroptera: Hipposideridae; (USNMENT01752213, USNMENT01752214).

***gemina*, *Gahrliopia* (*Gahrliopia*) Traub and Morrow, 1955: 23****Holotype (L)**

MALAYSIA •; Kachin State, Myitkyina; 22 May 1945; ex *Rattus rattus sladeni* (Anderson) (= *Rattus tanezumi* [Temminck]) (Rodentia: Muridae); USATC 1035; (USNMENT01752215).

**Paratypes (L)**

MALAYSIA • 5; same data as holotype; (USNMENT01752216, USNMENT01752217, USNMENT01752218, USNMENT01752219, USNMENT01752220). 2; same data; USATC 1040; (USNMENT01752221, USNMENT01752222). 1; same locality; 23 Apr. 1945; ex *Rattus rattus fulvescens* Gray (= *Niviventer fulvescens*) (Rodentia: Muridae); USATC 955; (USNMENT01752223). 1; same data; USATC 952; (USNMENT01752224). 1; same locality; 24 Jan. 1945; ex “unidentified rat” (Rodentia); USATC 552; (USNMENT01752225). 1; same data; USATC 550; (USNMENT01752226). 1; Kachin State; Shing Bwi Yang; 8 May 1945; ex *Rattus rattus sladeni* (Anderson) (= *Rattus tanezumi* [Temminck]) (Rodentia: Muridae); USATC 992; (USNMENT01752227). 1; Kachin State, Shaduzup; 2 Sep. 1944; ex *Tupaia belangeri versurae* Thomas (= *Tupaia belangeri* (Wagner) (Eulipotyphla: Soricidae); USATC 915; (USNMENT01752228).

***gemitacula, Trombicula (Leptotrombidium) Traub, Morrow and Lipovsky, 1958: 145***

**Holotype (L)**

SOUTH KOREA • Gyeonggi Province, Munsan; 6 Nov. 1953; ex *Apodemus peninsulae* (Thomas) (Rodentia: Muridae); RT B-25912; (USNMENT01752229).

**Paratypes (L)**

SOUTH KOREA • 1; same data as holotype; (USNMENT01752230). 8; same locality; 17 Oct. 1953; ex *Apodemus agrarius* (Pallas) (Rodentia: Muridae); (USNMENT01752231, USNMENT01752232, USNMENT01752233, USNMENT01752234, USNMENT01752235, USNMENT01752236, USNMENT01752237, USNMENT01752238).

***gentryi, Leptotrombidium (Leptotrombidium) Nadchatram and Upham, 1966a: 110***

**Holotype (L)**

MALAYSIA • Kelantan State; 16 May 1965; “in a rat-hole”; (USNMENT01752239).

**Paratypes (L)**

MALAYSIA • 4; same data as holotype; (USNMENT01752240, USNMENT01752241, USNMENT01752242, USNMENT01752243).

***geophis, Oaxacarus* Goff and Spicer, 1980: 242**

**Paratypes (L)**

MEXICO • 3; Oaxaca State, Mixes District; 9 Apr. 1979; ex *Geophis anocularis* Dunn (Squamata: Colubridae); BPBM 11562; (USNMENT01752244, USNMENT01752245, USNMENT01752246).

***gerrhosauri, Schoengastia* Lawrence, 1949: 426**

**Paratype (L)**

SOUTH AFRICA • 1; KwaZulu-Natal Province, Kranskop; no date; ex *Gerrhosaurus flavigularis* Wiegmann (Squamata: Gerrhosauridae); NM 4833; (USNMENT01752247).

***gettmani, Neoschoengastia* Goff, 1984c: 258**

**Holotype (L)**

USA • Midway Atoll, Sand Island; 3 Apr. 1983; ex *Diomedea immutabilis* Rothschild (= *Phoebastria immutabilis*) (Procellariiformes: Diomedidae); A. Gettman coll.; BMBP 13033; (USNMENT01752248).

**Paratypes (L)**

USA • 4; same data as holotype; (USNMENT01752249, USNMENT01752250, USNMENT01752251, USNMENT01752252).

***gibberum, Polylopadium (Polylopadium)* Brennan, 1969c: 868**

**Holotype (L)**

COLOMBIA • Cauca Department, Saija River; 24 May 1958; ex *Proechimys* sp. (Rodentia: Echimyidae); von Sneidern coll.; RML 49956; (USNMENT01752253).

***gigantica, Schoutedenichia (Schoutedenichia)* Vercammen-Grandjean, 1965: 686**

**Holotype (L)**

MADAGASCAR • Toamasina; 4 Mar. 1952; ex *Rattus rattus alexandrinus* E. Geoffrey (= *Rattus rattus*) (L.) (Rodentia: Muridae); V. J. Tipton coll.; (USNMENT01752254).

**Paratypes (L)**

MADAGASCAR • 2; same data as holotype; (USNMENT01752255; USNMENT01762018).

***gigarara*, *Siseca* Brown, 1997c: 170**

**Paratype (L)**

PHILIPPINES • 1; Mindanau Island, Camiguin Province, Mount Mambajao; 20 May 1967; ex *Crateromys schedenbergi* (Meyer) (Rodentia: Muridae); USNM 126660; (USNMENT01752256).

***glenni*, *Whartonia* Brennan, 1962: 618**

**Holotype (L)**

MEXICO • Morelos State; 18 Aug. 1950; ex *Balantiopteryx plicata* Peters (Chiroptera: Emballonuridae); RML 35475; (USNMENT01752257).

**Paratypes (L)**

MEXICO • 11; same data as holotype; (USNMENT01752258, USNMENT01752259, USNMENT01752260, USNMENT01752261, USNMENT01752262, USNMENT01752263, USNMENT01752264, USNMENT01752265, USNMENT01752266, USNMENT01752267, USNMENT01752268).

***globosa*, *Ascoschoengastia (Laurentella)* Nadchatram and Domrow, 1964: 30**

**Holotype (L)**

MALAYSIA • Selangor State, Hulu Langat District; 6 Sep. 1960; ex *Rattus cremoriventer* Miller (= *Niviventer cremoriventer*) (Rodentia: Muridae); IMR 72643; (USNMENT01752269).

**Paratypes (L)**

MALAYSIA • 1; same data; IMR 72646; (USNMENT01752270). 1; same data; IMR 72639; (USNMENT01752271).

***goilala, Ascoschoengastia (Laurentella) Nadchatram, 1970a: 14*****Paratypes (L)**

PAPUA NEW GUINEA • 3; Southern Highlands Province; 10 Dec. 1967; ex *Melomys* sp. (Rodentia: Muridae); BPBM 8243; (USNMENT01752272, USNMENT01752273, USNMENT01752274).

***goodpasteri, Trombicula (Neotrombicula) Brennan and Wharton, 1950: 180*****Syntype (L)**

USA • 1; Ohio State, Clermont County, Stonelick Creek; 4 Mar. 1948; ex *Pitymys* sp. (Rodentia: Cricetidae); USNM 1841; (USNMENT01752275).

***gouldi, Cheladonta (Cheladonta) Lakshana, 1969: 136*****Holotype (L)**

THAILAND • Ubon Ratchathani Province, Sirindhorn District, Chong Mek; 14 Jan. 1965; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); J. E. Sacanlon and K. Thonglongya coll.; SMRL 4348; (USNMENT01752276).

***gouldi, Walchia Hoffmann, 1954: 20*****Holotype (L)**

MEXICO • Chiapas State, Pan-American Highway; 9 Sep. 1953; ex *Peromyscus mexicanus* (Saussure) (Rodentia: Cricetidae); (USNMENT01752277).

***granulata, Gahrlipeia (Gahrlipeia) Traub and Morrow, 1955: 50*****Holotype (L)**

MALAYSIA • Sabah State, Mount Trusmadi; 18 Jul. 1953, ex *Rattus alticola* (Thomas) (= *Maxomys alticola*) (Rodentia: Muridae); USNM 2171; (USNMENT01752278).

**Paratypes (L)**

MALAYSIA • 4; Mount Kinabalu, Sabah State; 12 Aug. 1953; same host; RT B-19206; (USNMENT01752279, USNMENT01752280, USNMENT01752281, USNMENT01752282); 1; same locality and host; 19 Aug. 1953; RT B-19291; (USNMENT01762019).

***gressitti, Ascochoengastia (Laurentella) Nadchatram and Domrow, 1964: 34*****Holotype (L)**

LAOS • Xieng Khouang Province; 28 Aug. 1960; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); IMR 103083; (USNMENT01752283).

**Paratypes (L)**

LAOS • 3; same data as holotype; (USNMENT01752284, USNMENT01752285, USNMENT01752286).

***gressitti, Trombicula (Cotrombicula) Nadchatram and Wilson, 1965: 220*****Paratypes (L)**

INDONESIA • 2; Yapen Island; 29 Oct. 1962; ex *Aselliscus tricuspidatus* (Temminck) (Chiroptera: Hipposideridae); N. Wilson coll.; BPM 4026; (USNMENT01752287, USNMENT01752288).

***guangdongensis, Trombigastiai Goff, Baccus and Cleveland, 1987: 149*****Holotype (L)**

CHINA • Guangdong Province; 26 May 1986; ex *Hipposideros bicolor* (Temminck) (Chiroptera: Hipposideridae); (USNMENT01752289).

**Paratypes (L)**

CHINA • 6; same data as holotype; (USNMENT01752290, USNMENT01752291, USNMENT01752292, USNMENT01752293, USNMENT01752294, USNMENT01752295).

***guapayae, Trombicula Brennan and Jones, 1964a: 309*****Holotype (L)**

COLOMBIA • Meta Department; 7 Mar. 1959; ex *Myoprocta* sp. (Rodentia: Dasyproctidae); RML 34905; (USNMENT01752296).

**Paratypes (L)**

COLOMBIA • 3; same data as holotype; (USNMENT01752297, USNMENT01752298, USNMENT01752299).

***guatemalensis*, *Pseudoschoengastia* Brennan, 1952a: 136****Holotype (L)**

GUATEMALA • Chimaltenango Department, Acatenango; 27 Feb. 1951; ex *Sylvilagus floridanus* (J.A. Allen) (Lagomorpha: Leporidae); RML 29908; (USNMENT01752300).

**Paratypes (L)**

GUATEMALA • 4; same data as holotype; (USNMENT01752301, USNMENT01752302, USNMENT01752303, USNMENT01752304).

***guntheri*, *Neoschoengastia* Radford, 1942: 76****Lectotype (L)**

USA • Colorado State, Conejos County, Antonito; 9 Sep. 1931; ex *Ochotona* sp. (Lagomorpha: Ochotonidae); RML 20882; (USNMENT01752305).

**Paralectotypes (L)**

USA • 4; same data as lectotype; (USNMENT01752306, USNMENT01752307, USNMENT01752308, USNMENT01752309).

***guptai*, *Neotrombicula* Nadchatram, 1979: 75****Paratype (L)**

INDIA • 1; Uttar Pradesh State, Chamoli District; Dec. 1973; ex “unidentified rodent” (Rodentia); (USNMENT01752310).

***gurneyi*, *Trombicula* Ewing, 1937: 169****Syntypes (L)**

USA • 6; Maryland State, Prince George County, Patuxent River, Priest Bridge; 24 Apr. 1937; ex *Eumeces fasciatus* L. (= *Plestiodon fasciatus*) (Squamata: Scincidae); A. B. Gurney coll.; USNM 1262; (USNMENT01752311, USNMENT01752312, USNMENT01752313, USNMENT01752314, USNMENT01752315, USNMENT01752316).

***gurneyi campestris*, *Trombicula* Loomis, 1955: 258**

**Paratype (L)**

USA • 3; Kansas State, Rawlins County; 7 Aug. 1949; ex *Citellus tridecemlineatus* Mitchill (= *Ictidomys tridecemlineatus*) (Rodentia: Sciuridae); R. B. Loomis and R. E. Elbel coll.; (USNMENT01752317, USNMENT01752318, USNMENT01752319).

***guyanensis*, *Schoengastia* Floch and Abonnenc, 1941: 13****Paratypes (L)**

FRENCH GUIANA • 3; Comté River; 1941; ex *Canis lupus familiaris* L. (Carnivora: Canidae); H. Floch coll.; (USNMENT01752320, USNMENT01752321, USNMENT01752322).

***gygis*, *Toritrombicula* Brennan and Amerson, 1971: 1314****Holotype (L)**

KIRIBATI • Phoenix Islands; 29 May 1965; ex *Gygis alba* (Sparrman) (Charadriiformes: Laridae); A. B. Amerson coll.; RML 45774; (USNMENT01752323).

**Paratypes (L)**

KIRIBATI • 4; same data as holotype; (USNMENT01752324, USNMENT01752325, USNMENT01752326, USNMENT01752327).

***gymnodactyla*, *Eutrombicula* Womersley and Kohls, 1947: 3****Paratypes (L)**

INDONESIA • 2; West Papua Province, Sausapor; 26 Aug. 1944; ex *Gymnodactylus louisidensis* De Vis (= *Cyrtodactylus louisidensis*) (Squamata: Gekkonidae); M. Kohls coll.; (USNMENT01752328, USNMENT01752329).

***gymnodactyli*, *Trombicula* Ewing, 1925c: 145****Syntypes (L)**

INDIA • 3; Himachal Pradesh State, Kullu Valley; May 1874; ex *Gymnodactylus* sp. (Squamata: Gekkonidae); USNM 955; (USNMENT01752330, USNMENT01752331, USNMENT01752332).

***haddowi*, *Schoengastia* Radford, 1953a: 210**



**Syntypes (L)**

UGANDA • 3; Kaabong District; 1952; ex *Procavia capensis* Storr (Hyracoidea: Procaviidae); (USNMENT01752333, USNMENT01752334, USNMENT01752335).

***hakei*, *Trombicula* Radford, 1946b: 249****Paratypes (L)**

INDIA • 3; Manipur State, Imphal West District; 10 May 1945; ex *Coluber radiatus* Boie (= *Coelognathus radiatus*) (Squamata: Colubridae); USNM 1569; (USNMENT01752336, USNMENT01752337, USNMENT01752338).

***halidasys*, *Trombicula* (*Leptotrombidium*) Traub, Morrow and Lipovsky, 1958: 155****Holotype (L)**

SOUTH KOREA • Seoul; 7 Nov. 1953; ex *Apodemus agrarius* (Pallas) (Rodentia: Muridae); USNM 2234; (USNMENT01752339).

**Paratypes (L)**

SOUTH KOREA • 8; same data as holotype; (USNMENT01752340, USNMENT01752341, USNMENT01752342, USNMENT01752343, USNMENT01752344, USNMENT01752345, USNMENT01752346, USNMENT01752347).

***hamata*, *Dolosia* Domrow and Nadchatram, 1962: 578****Holotype (L)**

MALAYSIA • Sarawak State; 3 Sep. 1958; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); (USNMENT01752348).

**Paratype (L)**

MALAYSIA • 1; same data as holotype; (USNMENT01752349).

***hamiltoni*, *Eushchoengastia* Brennan, 1947: 251****Holotype (L)**

USA • New York State, Orange County, Middletown; 12 Feb. 1947; ex *Eptesicus fuscus* (Beauvois) (Chiroptera: Vespertilionidae); W. G. Hamilton coll.; RML 23542; (USNMENT01752350).

**Paratypes (L)**

USA • 15; same data as holotype; (USNMENT01752351, USNMENT01752352, USNMENT01752353, USNMENT01752354, USNMENT01752355, USNMENT01752356, USNMENT01752357, USNMENT01752358, USNMENT01752359, USNMENT01752360, USNMENT01752361, USNMENT01752362, USNMENT01752363, USNMENT01752364, USNMENT01752365). 4; New York State, Columbia County, Germantown; 17 Mar. 1946; ex *Myotis leibii* (Audubon and Bachman) (Chiroptera: Vespertilionidae); RML 22340; (USNMENT01752366, USNMENT01752367, USNMENT01752368, USNMENT01752369).

***handleyi*, *Hoffmannina* Brennan and Jones, 1961a: 112**

**Holotype (L)**

PANAMA • Chiriquí province; 4 May 1960; ex *Peromyscus nudipes* Goodwin (= *Peromyscus mexicanus* [Saussure]) (Rodentia: Cricetidae); V. J. Tipton and C. M. Keenan coll.; RML 35965; (USNMENT01752370).

**Paratypes (L)**

PANAMA • 4; same data as holotype; (USNMENT01752371, USNMENT01752372, USNMENT01752373, USNMENT01752374). 8; same data; RML 35963; (USNMENT01752375, USNMENT01752376, USNMENT01752377, USNMENT01752378, USNMENT01752379, USNMENT01752380, USNMENT01752381, USNMENT01752382). 1; same locality and host; 9 Feb. 1960; RML 35925; (USNMENT01752383). 7; same locality and host; 12 Feb. 1960; RML 35930; (USNMENT01752384, USNMENT01752385, USNMENT01752386, USNMENT01752387, USNMENT01752388, USNMENT01752389, USNMENT01752390). 2; same data; RML 35928; (USNMENT01752391, USNMENT01752392). 2; same data; RML 35929; (USNMENT01752393, USNMENT01752394). 1; same data; RML 35920; (USNMENT01752395). 2; same

locality and host; 13 Feb. 1960; RML 35933; (USNMENT01752396, USNMENT01752397). 1; same data; RML 35924; (USNMENT01752398). 2; same locality and host; 14 Feb. 1960; RML 35938; (USNMENT01752399, USNMENT01752400). 3; same data; RML 35939; (USNMENT01752401, USNMENT01752402, USNMENT01752403). 2; same data; RML 35941; (USNMENT01752404, USNMENT01752405). 1; same locality and host, 31 Jan. 1960; RML 35919; (USNMENT01752406). 3; same locality; 2 Feb. 1960; ex *Peromyscus* sp. (Rodentia: Cricetidae); RML 35863; (USNMENT01752407, USNMENT01752408, USNMENT01752409). 4; same locality and host; 1 Feb. 1960; RML 35861; (USNMENT01752410, USNMENT01752411, USNMENT01752412, USNMENT01752413). 6; same data; RML 35862; (USNMENT01752414, USNMENT01752415, USNMENT01752416, USNMENT01752417, USNMENT01752418, USNMENT01752419). 1; same locality and host, 5 Feb. 1960; RML 35866; (USNMENT01752420). 1; same locality and host, 8 Feb. 1960; RML 35867; (USNMENT01752421). 1; same locality and host, 14 Feb. 1960; RML 35872; (USNMENT01752422). 5; same locality and host, 31 Jan. 1960; RML 35859; (USNMENT01752423, USNMENT01752424, USNMENT01752425, USNMENT01752426, USNMENT01752427). 5; same data; RML 35857; (USNMENT01752428, USNMENT01752429, USNMENT01752430, USNMENT01752431, USNMENT01752432). 1; same locality and host; 30 Jan. 1960; RML 35855; (USNMENT01752433). 1; same data; RML 35854; (USNMENT01752434). 3; same locality; 4 May 1960; ex *Scotinomys teguina* Alston (Rodentia: Cricetidae); RML 35966; (USNMENT01752435, USNMENT01752436, USNMENT01752437). 2; same data; RML 35964; (USNMENT01752438, USNMENT01752439). 2; same data; RML 35967; (USNMENT01752440, USNMENT01752441). 1; same locality; 12 Feb. 1960; ex *Reithrodontomys mexicanus* (Saussure) (Rodentia: Cricetidae); RML 35927; (USNMENT01752442). 1; same locality; 14 Feb. 1960; ex *Reithrodontomys* sp. (Rodentia: Cricetidae); RML 35876; (USNMENT01752443). 1; same locality; 31 Jan. 1960; ex *Heteromys desmarestianus* Gray (Rodentia: Heteromyidae); RML 35858; (USNMENT01752444).

***hanseni, Leptotrombidium (Leptotrombidium) Traub and Lakshana, 1966: 282*****Holotype (L)**

THAILAND • Chiang Mai Province, Chiang Dao District; 12 Nov. 1962; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); SMRL 1840; (USNMENT01752445).

**Paratypes (L)**

THAILAND • 5; same locality and host; 16 Nov. 1962; SMRL 1962; (USNMENT01752446, USNMENT01752447, USNMENT01752448, USNMENT01752449, USNMENT01752450). 1; same locality and host; 17 Nov. 1962; SMRL 1981; (USNMENT01752451). 1; same locality; 14 Nov. 1962; ex *Crocidura horsfieldii* (Tomes) (Eulipotyphla: Soricidae); SMRL 1908; (USNMENT01752452). 4; same locality; 17 Nov. 1962; ex *Rattus rattus* (Rodentia: Muridae); SMRL 1977; (USNMENT01752453, USNMENT01752454, USNMENT01752455, USNMENT01752456). 1; same locality and date; ex *Rattus niviventer* Hodgson (= *Niviventer niviventer*) (Rodentia: Muridae); SMRL 1955; (USNMENT01752457). 2; same locality; 16 Nov. 1962; ex *Pellorneum ruficeps* Swainson (Passeriformes: Pellorneidae). SMRL 1960; (USNMENT01752458, USNMENT01752459).

***hanseni, Walchiella Nadchatram and Lakshana, 1965: 332*****Holotype (L)**

THAILAND • Chiang Mai Province, Doi Suthep; 21 May 1962; ex *Rattus* sp. (Rodentia: Muridae); SMRL 893; (USNMENT01752460).

***haramotoi, Hoffmannina Brennan and Goff, 1977b: 912*****Holotype (L)**

MEXICO • Chiapas State; 1937; ex *Liomys* sp. (Rodentia: Heteromyidae); RML 11479; (USNMENT01752461).

**Paratypes (L)**

MEXICO • 3; same data as holotype; (USNMENT01752462, USNMENT01752463, USNMENT01752464).

***hardyi, Delmohius Brennan and Goff, 1978a: 542***

**Holotype (L)**

VENEZUELA • Falcón State, Coro; 30 Jul. 1972; ex *Marmosa robinsoni* Bangs (Didelphimorphia: Didelphidae); RML 53454; (USNMENT01752465).

**Paratypes (L)**

VENEZUELA • 2; same data as holotype; (USNMENT01752466, USNMENT01752467).

***hardyorum, Euschoengastia* Wrenn and Somerby, 1974: 5****Holotype (L)**

USA • California State, Inyo County, Death Valley National Park; 2 Nov. 1962; ex *Dipodomys microps* (Merriam) (Rodentia: Heteromyidae); R. Hardy coll.; RBL 621105; (USNMENT01752468).

**Paratype (L)**

USA • 1; same data as holotype; (USNMENT01752469).

***harperi, Trombicula* Ewing, 1928: 79****Syntypes (L)**

USA • 2; New York State, Essex County, Heart Lake; 1 Aug. 1926; ex *Napaeozapus insignis* (Miller) (Rodentia: Dipodidae); F. Harper coll.; USNM 983; (USNMENT01752470, USNMENT01752471).

***harrisoni, Traubacarus* Audy and Nadchatram, 1957b: 197****Paratype (L)**

MALAYSIA • 1; Selangor State, Gombak District, Bukit Lagong, Batu caves; 25 Jun. 1956; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); CORU 44323; (USNMENT01752472).

***hayesi, Crotiscus* Brennan, 1957: 679****Holotype (L)**

PERU • Puno Department, Sandia Province, Limbani District; 12 Jul. 1951; ex *Lagidium peruanum* Meyen (= *Lagidium viscacia* [Molina]) (Rodentia: Chinchillidae); RML 31562; (USNMENT01752473).

**Paratypes (L)**

PERU • 2; same data as holotype; (USNMENT01752474; USNMENT01762020).

***hegeneri, Hannemania Hyland, 1956: 177*****Holotype (L)**

USA • Florida State, Sarasota County; 22 Oct. 1952; ex *Rana pipiens* Schreber (= *Lithobates pipens*) (Anura: Ranidae); K. E. Hyland coll.; (USNMENT01752475).

**Paratypes (L)**

USA • 1; same locality and host; 20 Oct. 1952; (USNMENT01752476). 1; same locality; 4 Jan. 1951; ex *Rana sphenocephala* Cope (= *Lithobates sphenocephalus*) (Anura: Ranidae); (USNMENT01752477). 1; same locality and host; 2 Aug. 1951; (USNMENT01752478).

***heidemani, Neosomia Brown, 1997b: 150*****Holotype (L)**

PHILIPPINES • Leyte Province, Leyte Island; 18 Mar. 1987; ex *Rhinolophus inops* Andersen (Chiroptera: Rhinolophidae); H. Klompen coll.; HK 87-0318; (USNMENT01752479).

**Paratype (L)**

PHILIPPINES • 1; same data as holotype; (USNMENT01752480).

***helata, Gahrliepia (Schoengastiella) Traub and Evans, 1953: 93*****Holotype (L)**

MYANMAR • Kachin State, Shing Bwi Yang; 10 Jan. 1945; ex *Crocidura vorax* (G. Allen) (Eulipotyphla: Soricidae); USNM 2068; (USNMENT01752481).

**Paratypes (L)**

MYANMAR • 3; same data as holotype; (USNMENT01752482, USNMENT01752483, USNMENT01752484).

***hendricksoni, Vercammenia Audy and Nadchatram, 1957a: 97*****Paratypes (L)**

MALAYSIA • 2; Pahang State, Kuala Tahan, Pahang National Park; 31 Mar. 1956; ex *Rana macrodon* Duméril and Bibron (= *Limnonectes macrodon*) (Anura: Dicroglossidae); (USNMENT01752485, USNMENT01752486).

***herniosa*, *Euschoengastia* Brennan and Jones, 1961b: 184**

**Holotype (L)**

PERU • Puno Department, Sandia Province, Limbani District; 4 Jun. 1951; ex *Lagidium peruanum* Meyen (= *Lagidium viscacia* [Molina]) (Rodentia: Chinchillidae); RML 31563; (USNMENT01752487).

**Paratypes (L)**

PERU • 16; same data as holotype; (USNMENT01752488, USNMENT01752489, USNMENT01752490, USNMENT01752491, USNMENT01752492, USNMENT01752493, USNMENT01752494, USNMENT01752495, USNMENT01752496, USNMENT01752497, USNMENT01752498, USNMENT01752499, USNMENT01752500, USNMENT01752501, USNMENT01752502, USNMENT01752503). 22; same locality and host; 12 Jul. 1951; RML 31562; (USNMENT01752504, USNMENT01752505, USNMENT01752506, USNMENT01752507, USNMENT01752508, USNMENT01752509, USNMENT01752510, USNMENT01752511, USNMENT01752512, USNMENT01752513, USNMENT01752514, USNMENT01752515, USNMENT01752516, USNMENT01752517, USNMENT01752518, USNMENT01752519, USNMENT01752520, USNMENT01752521, USNMENT01752522, USNMENT01752523, USNMENT01752524, USNMENT01752525).

***hertigi*, *Euschoengastia* Brennan and Jones, 1964a: 308**

**Paratypes (L)**

PARAGUAY • 16; Caaguazú Department, Sommerfeld Colony; 3 Mar. 1950; ex *Dasyprocta* sp. (Rodentia: Dasyproctidae); M. Hertig coll.; RML 43427; (USNMENT01752526, USNMENT01752527, USNMENT01752528, USNMENT01752529, USNMENT01752530, USNMENT01752531,

USNMENT01752532, USNMENT01752533, USNMENT01752534,  
 USNMENT01752535, USNMENT01752536, USNMENT01752537,  
 USNMENT01752538, USNMENT01752539, USNMENT01752540,  
 USNMENT01752541). 8; same locality; 11 Mar. 1950; ex “unidentified opossum”  
 (Didelphimorphia: Didelphidae); RML 44504; (USNMENT01752542,  
 USNMENT01752543, USNMENT01752544, USNMENT01752545,  
 USNMENT01752546, USNMENT01752547, USNMENT01752548,  
 USNMENT01752549).

***hertigi, Shunsennia* Traub, Morrow and Lipovksy, 1958: 162**

**Paratypes (L)**

SOUTH KOREA • 1; Seoul; 14 Apr. 1954; ex *Apodemus agrarius* (Pallas) (Rodentia: Muridae); RT B 28040; (USNMENT01752550). 1; same locality and host; 24 Feb. 1954; RT B 27265; (USNMENT01752551). 1; same locality and host; 11 Jul. 1953; RT B 25948; (USNMENT01752552). 1; same locality; 14 Apr. 1954; ex *Apodemus peninsulae* (Thomas) (Rodentia: Muridae); RT B 28044; (USNMENT01752553). 1; same locality and host; 16 Feb. 1954; RT B 27196; (USNMENT01752554).

***heteromyicola, Euschoengastia* Wrenn and Loomis, 1974: 248**

**Holotype (L)**

USA • California State, Riverside County, Joshua Tree National Park; 12 Nov. 1966; ex *Dipodomys merriami* Mearns (Rodentia: Heteromyidae); J. P. Webb coll.; JPW 661112; (USNMENT01752555).

**Paratype (L)**

USA • 1; same data as holotype; (USNMENT01752556).

***heterosetosa, Guntheria* Goff, 1982c: 147**

**Paratypes (L)**

PAPUA NEW GUINEA • 4; Sandaun Province; 27 Jun. 1963; ex *Melomys rufescens* (Alston) (Rodentia: Muridae); BPBM 12414; (USNMENT01752557, USNMENT01752558, USNMENT01752559, USNMENT01752560).



***hexasternala*, *Rudnicula* Brown, 1997b: 161****Paratypes (L)**

PHILIPPINES • 1; Leyte Province, Leyte Island; 18 Mar. 1987; ex *Rhinolophus inops* Andersen (Chiroptera: Rhinolophidae); P. D. Heideman coll.; (USNMENT01752561). 1; Biliran Province, Maripipi Island; 17 Apr. 1987; ex *Hipposideros obscurus* (Peters) (Chiroptera: Hipposideridae); (USNMENT01752562). 1; Biliran Province, Biliran Island; 27 Apr. 1984; ex *Ptenochirus minor* Yoshiyuki (Chiroptera: Pteropodidae); L. R. Heaney coll.; (USNMENT01762021).

***heynemani*, *Neoschoengastia* Nadchatram and Upham, 1966b: 347****Holotype (L)**

MALAYSIA • Selangor State, Petaling District, Sungai Buloh; 19 Aug. 1965; “in soil”; (USNMENT01752563).

**Paratypes (L)**

MALAYSIA • 1; Kelantan State, Kota Bharu District, Kota Bharu; 19 Jul. 1965; “in soil”; (USNMENT01752564). 2; “in soil” of the same locality; 21 Aug. 1965; (USNMENT01752565, USNMENT01752566).

***higae*, *Teratothrix* Goff, 1981d: 248****Holotype (L)**

COSTA RICA • Puntarenas Province, Palma Sur; 8 May 1967; ex *Nectomys* sp. (Rodentia: Cricetidae); Smiths coll.; (USNMENT01752567)

**Paratype (L)**

COSTA RICA • 1; same data as holotype; (USNMENT01752568).

***hirsuta*, *Gateria* Radford, 1946: 249****Paratypes (L)**

INDIA • 2; Manipur State, Imphal West District, Kanglatongbi; 22 Jun. 1945; ex *Suncus caeruleus* (Kerr) (= *Suncus murinus* L.) (Eulipotyphla: Soricidae); C. D. Radford coll.; USNM 1571; (USNMENT01752569, USNMENT01752570).

***hirsuta*, *Hannemania* Ewing, 1931: 17****Lectotype (L)**

USA • California State, Alameda County, Berkeley; 1 Oct. 1929; ex *Perognathus californicus* Merriam (= *Chaetodipus californicus*) (Rodentia: Heteromyidae); USNM 1027; (USNMENT01752571).

**Paralectotypes (L)**

USA • 3; same data as lectotype; (USNMENT01752572, USNMENT01752573, USNMENT01752574).

***hirsuta*, *Neoschoengastia* Boshell and Kerr, 1942: 19****Lectotype (L)**

COLOMBIA • Meta Department, Restrepo; 16 Jul. 1937; ex *Proechimys chrysaеolus* (Thomas) (Rodentia: Echimyidae); Moyano coll.; USNM 1821; (USNMENT01752575).

**Paralectotypes (L)**

COLOMBIA • 16; same data as lectotype; (USNMENT01752576, USNMENT01752577, USNMENT01752578, USNMENT01752579, USNMENT01752580, USNMENT01752581, USNMENT01752582, USNMENT01752583, USNMENT01752584, USNMENT01752585, USNMENT01752586, USNMENT01752587, USNMENT01752588, USNMENT01752589, USNMENT01752590, USNMENT01752591).

***hirtipectoralis*, *Helenicula* Nadchatram and Traub, 1971: 585****Paratypes (L)**

PAKISTAN • 2; Balochistan Province, Ziarat District, Ziarat; 7 Nov. 1963; ex *Meriones* sp. (Rodentia: Muridae); (USNMENT01752592, USNMENT01752593). 2; same locality and host; 10 Oct. 1963; (USNMENT01752594, USNMENT01752595). 1; same locality; 22 Oct. 1963; ex *Meriones shawi* Duvernoy (Rodentia: Muridae); (USNMENT01752596).

***hispida*, *Vargatula* Brennan and Yunker, 1966a: 225****Holotype (L)**

PANAMA • Panama Province, Paraíso, 12 Feb. 1962; ex *Dasypus novemcinctus* L. (Cingulata: Dasypodidae); RML 44425; (USNMENT01752597).

**Paratypes (L)**

PANAMA • 4; same data as holotype; (USNMENT01752598, USNMENT01752599, USNMENT01752600, USNMENT01752601). 1; same locality and host; 27 Feb. 1962; (USNMENT01752602).

***hoffmannae*, *Euschoengastia* Gould, 1956: 52**

**Holotype (L)**

USA • California State, San Bernadino County, Big Bear Lake, Camp Osito Rancho; 22 May 1951; ex *Citellus lateralis* Say (= *Callospermophilus lateralis*) (Rodentia: Sciuridae); (USNMENT01752603).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01752604, USNMENT01752605).

***hoffmannae*, *Pseudoschoengastia* Brennan, 1960b: 486**

**Holotype (L)**

MEXICO • Michoacán State; 9 Aug. 1959; ex *Blarina* sp. (Eulipotyphla: Soricidae), G. W. Wharton coll.; RML 35445; (USNMENT01752606).

**Paratypes (L)**

MEXICO • 3; same data as holotype; (USNMENT01752607, USNMENT01752608, USNMENT01752609). 1; same locality; 10 Aug. 1950; ex *Liomys pictus* (Thomas) (= *Heteromys pictus*) (Rodentia: Heteromyidae); RML 35459; (USNMENT01752610).

***hominis*, *Trombicula* Ewing, 1933: 5**

**Syntype (L)**

PANAMA • 1; Los Santos Province, Los Santos District, Agua Buena; 6 May 1931; ex *Homo sapiens* (L.) (Primata: Hominidae); L. H. Dunn coll.; USNM 1065; (USNMENT01752611).

***homophilis*, *Eutrombicula* Lawrence, 1949: 441**

**Paratype (L)**

SOUTH AFRICA • 1; Mpumalanga province, Ehlanzeni District, Nelspruit; Feb. 1939; ex *Homopholis walbergii* (Smith) (Squamata: Gekkonidae); NM 2373; (USNMENT01752612).

***hoogstraali, Trombicula* Radford, 1954: 297****Holotype (L)**

YEMEN • Ta'izz; 1951; ex *Rattus rattus* (L.) (Rodentia: Muridae); H. Hoogstraal coll.; (USNMENT01752613).

***hooperi, Doloisia* Domrow and Nadchatram, 1962: 581****Holotype (L)**

LAOS • Xieng Khouang Province; 26 Aug. 1960; ex *Rattus* sp. (Rodentia: Muridae. RML 102281; (USNMENT01752614).

**Paratypes (L)**

LAOS • 3; same data as holotype; (USNMENT01752615, USNMENT01752616, USNMENT01752617). 5; same data; RML 102278; (USNMENT01752618, USNMENT01752619, USNMENT01752620, USNMENT01752621, USNMENT01752622). 5; same data; RML 102283; (USNMENT01752623, USNMENT01752624, USNMENT01752625, USNMENT01752626, USNMENT01752627).

***hoplai, Trombicula (Euschoengastoides)* Loomis, 1954: 924****Paratypes (L)**

USA • 1; Kansas State, Barber County; 27 Jul. 1952; ex *Cynomys ludovicianus* (Ord) (Rodentia: Sciuridae) USNM 3135; (USNMENT01752628). 1; same data; USNM 3145; (USNMENT01752629). 1; same data; USNM 3148; (USNMENT01752630).

***hoplodactyla, Microtrombicula* Goff, Loomis and Ainsworth, 1987: 388****Paratypes (L)**

NEW ZEALAND • 22; Wellington; no date; ex “unidentified gecko” (Squamata: Gekkonidae); R. Ainsworth coll.; (USNMENT01752631, USNMENT01752632, USNMENT01752633, USNMENT01752634, USNMENT01752635, USNMENT01752636, USNMENT01752637, USNMENT01752638, USNMENT01752639, USNMENT01752640, USNMENT01752641, USNMENT01752642, USNMENT01752643, USNMENT01752644, USNMENT01752645, USNMENT01752646, USNMENT01752647, USNMENT01752648, USNMENT01752649, USNMENT01752650, USNMENT01752651, USNMENT01752652).

***huberti, Gahrliepia (Walchia) Upham and Nadchatram, 1968: 197***

**Holotype (L)**

MALAYSIA • Selangor State; 27 Apr. 1962; “recovered from black plate”; (USNMENT01752653).

***hungerfordi, Pseudoschoengastia Lipovsky, 1951: 95***

**Paratype (L)**

USA • 5; Kansas State, Douglas County; 14 Jul. 1949; ex *Sylvilagus floridanus* (J.A. Allen) (Lagomorpha: Leporidae); (USNMENT01752654, USNMENT01752655, USNMENT01752656, USNMENT01752657, USNMENT01752658).

***huxsolli, Schoengastia (Schoengastia) Nadchatram, Goff and Thanalukshumi, 1980:***

**270**

**Paratype (L)**

THAILAND • 1; Kanchanaburi Province; 2 Mar. 1965; ex *Rattus rattus* (L.) (Rodentia: Muridae); BPBM 111508; (USNMENT01752659).

***hylae, Trombicula Ewing, 1925c: 146***

**Holotype (L)**

USA • California State, San Diego County, Barrett Dam; 31 Mar. 1925; ex *Hyla arenicolor* Cope (= *Pseudacris cadaverina*) (Anura: Hylidae); USNM 956; (USNMENT01752660).

***hypoderma*, *Schoengastiella* (*Jadiniella*) Vercammen-Grandjean, 1956c: 354**

**Paratypes (L)**

DEMOCRATIC REPUBLIC OF THE CONGO • 5; Sud-Kivu Province, Bukavu; no date; ex *Mastomys coucha* (Smith) (Rodentia: Muridae); (USNMENT01752661, USNMENT01752662, USNMENT01752663, USNMENT01752664, USNMENT01752665).

***hypodermata*, *Trombicula* (*Trombicula*) Nadchatram and Traub, 1966: 46**

**Holotype (L)**

INDIA • Punjab Province, Lahore District; 30 Sep. 1963; ex *Tatera indica* (Hardwicke) (Rodentia: Muridae); (USNMENT01752666).

**Paratypes (L)**

INDIA • 1; same locality and host; 17 Sep. 1963; (USNMENT01752667). 3; same locality; 26 Sep. 1963; ex *Nesokia* sp. (Rodentia: Muridae); (USNMENT01752668, USNMENT01752669, USNMENT01752670).

***hypopsia*, *Pseudoschoengastia* Brennan and Jones, 1959: 426**

**Holotype (L)**

MEXICO • Chiapas State; 26 Aug. 1953; ex *Baiomys musculus* (Merriam, 1892) (Rodentia: Cricetidae); RML 34931; (USNMENT01752671).

***hyracis*, *Herpetecarus* (*Herpetecarus*) Vercammen-Grandjean, 1966: 638**

**Holotype (L)**

KENYA • Nairobi County, Nairobi, Koma Rock; 14 Sep. 1965; ex *Heterohyrax syriacus* Schreber (= *Heterohyrax brucei* [Gray]) (Hyracoidea: Procaviidae); (USNMENT01752672).

***hystricosus, Aitkenius* Brennan and Reed, 1973a: 532****Holotype (L)**

VENEZUELA • Apure State; 28 Jan. 1968; ex *Proechimys semispinosus* Tomes (Rodentia: Echimyidae); Smithsonian Army coll.; RML 55454; (USNMENT01752673).

***icomi, Colicus* Brennan, 1970a: 271****Holotype (L)**

BRAZIL • Amapa State, Serra do Navio; 12 Feb. 1968; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); T. H. G. Aitken coll.; RML 49342; (USNMENT01752674).

**Paratypes (L)**

BRAZIL • 9; same data as holotype; (USNMENT01752675, USNMENT01752676, USNMENT01752677, USNMENT01752678, USNMENT01752679, USNMENT01752680, USNMENT01752681, USNMENT01752682, USNMENT01752683). 6; same locality and host; 9 Mar. 1968; RML 49360; (USNMENT01752684, USNMENT01752685, USNMENT01752686, USNMENT01752687, USNMENT01752688, USNMENT01752689). 14; same locality and host; 13 Dec. 1967; RML 48878; (USNMENT01752690, USNMENT01752691, USNMENT01752692, USNMENT01752693, USNMENT01752694, USNMENT01752695, USNMENT01752696, USNMENT01752697, USNMENT01752698, USNMENT01752699, USNMENT01752700, USNMENT01752701, USNMENT01752702, USNMENT01752703). 4; same data; RML 48879; (USNMENT01752704, USNMENT01752705, USNMENT01752706, USNMENT01752707).

***ignota, Trombicula* Brennan, 1971b: 214****Holotype (L)**

BRAZIL • Pará State, Belém; 4 Jan. 1968; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); T. H. G. Aitken coll.; RML 49322; (USNMENT01752708).

**Paratypes (L)**

BRAZIL • 3; same data as holotype; (USNMENT01752709, USNMENT01752710, USNMENT01752711). 1; same locality and host; 7 Dec. 1967; RML 48876; (USNMENT01752712).

***ilesi, Pentagonella Radford, 1948b: 214***

**Paratype (L)**

ENGLAND • 1; North West England Region, Manchester; Belle Vue Zoological Gardens; 16 Apr. 1947; ex *Dendroaspis viridis* (Hallowell) (Squamata: Elapidae); G. Tiles coll.; (USNMENT01752713).

***imbricatum, Leptotrombidium (Trombiculindus) Traub and Nadchatram, 1967b: 439***

**Holotype (L)**

MALAYSIA • Kedah State, Sungai Teliang stream; 29 Oct. 1965; “in a hole near to border of the stream”; R. W. Upham coll.; USATC 473; (USNMENT01752714).

**Paratypes (L)**

THAILAND • 5; Chanthaburi Province, Namtok Phlio National Park, Prew Waterfall; 25 to 30 Apr. 1958; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); T. C. Maa coll.; (USNMENT01752715, USNMENT01752716, USNMENT01752717, USNMENT01752718, USNMENT01752719).

***imperfecta, Trombicula Brennan and Jones, 1954: 186***

**Holotype (L)**

USA • New Mexico State, Santa Fe County; 9 Jul. 1952; ex *Perognathus flavus* Baird (Rodentia: Heteromyidae); RML 30687; (USNMENT01752720).

**Paratypes (L)**

USA • 15; same data as holotype; (USNMENT01752721, USNMENT01752722, USNMENT01752723, USNMENT01752724, USNMENT01752725, USNMENT01752726, USNMENT01752727, USNMENT01752728, USNMENT01752729, USNMENT01752730, USNMENT01752731, USNMENT01752732, USNMENT01752733, USNMENT01752734, USNMENT01752735).



***improcera, Ascoschoengastia (Laurentella) Nadchatram, 1970a: 19*****Paratypes (L)**

PAPUA NEW GUINEA • 2; Chimbu Province; 26 Nov. 1967; ex *Melomys* sp. (Rodentia: Muridae); BPBM 8245; (USNMENT01752736, USNMENT01752737). 2; same locality and host; 25 Nov. 1967; (USNMENT01752738, USNMENT01752739).

***inca, Doloisia Brennan and Jones, 1961b: 177*****Holotype (L)**

PERU • Cuzco Department, Cuzco City, Quince Mil Community; 8 Aug. 1953; ex *Oryzomys keaysi* J.A. Allen (= *Nephelomys keaysi*) (Rodentia: Cricetidae); RML 33554; (USNMENT01752740).

**Paratypes (L)**

PERU • 2; same data as holotype; (USNMENT01752741, USNMENT01752742).

***incae, Sasacarus Goff, 1982b: 60*****Holotype (L)**

PERU • Cuzco Department, Cuzco; 17 Jul. 1953; ex *Lestoros inca* (Thomas) (Paucituberculata: Caenolestidae); (USNMENT01752743).

***incomitata, Intercutestrix Brennan and Reed, 1974a: 187*****Holotype (L)**

COLOMBIA • Cauca Department, Saija River; 22 May 1958; ex *Hoplomys gymnurus* Thomas (Rodentia: Echimyidae); von Sneidern coll.; RML 49957; (USNMENT01752744).

***inconspicuus, Comatacarus Reed, 1973: 315*****Holotype (L)**

USA • Utah State, Utah County, Provo Canyon; 6 Apr. 1972; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); (USNMENT01752745).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01752746, USNMENT01752747). 2; Utah State, Utah County, Pleasant Grove; 11 Nov. 1961; same host; (USNMENT01752748, USNMENT01752749; USNMENT01762022).

***indica*, *Odontacarus* Nadchatram and Joshee, 1966: 446**

**Holotype (L)**

INDIA • Maharashtra State, Vihar Mumbai Suburban District, Bhaudup Hills, Bhandup; 17 Jan. 1960; ex *Hemidactylus brooky* Gray (Squamata: Gekkonidae); (USNMENT01752750).

**Paratype (L)**

INDIA • 1; same data as holotype; (USNMENT01752751).

***indicella*, *Euschoengastia* Traub and Audy, 1954b: 77**

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 31 Jul. 1951; ex *Chiropodomys legatus* Thomas (= *Chiropodomys major*) (Rodentia: Muridae); USNM 2111; (USNMENT01752752).

**Paratypes (L)**

MALAYSIA • 20; same data as holotype; (USNMENT01752753, USNMENT01752754, USNMENT01752755, USNMENT01752756, USNMENT01752757, USNMENT01752758, USNMENT01752759, USNMENT01752760, USNMENT01752761, USNMENT01752762, USNMENT01752763, USNMENT01752764, USNMENT01752765, USNMENT01752766, USNMENT01752767, USNMENT01752768, USNMENT01752769, USNMENT01752770, USNMENT01752771, USNMENT01752772).

***inevicta*, *Pseudoschoengastia* Brennan, 1960b: 487**

**Holotype (L)**

MEXICO • Puebla State; 8 Sep. 1950; ex *Baiomys musculus* (Merriam) (Rodentia: Cricetidae); RML 35484; (USNMENT01752773).

**Paratypes (L)**

MEXICO • 6; same data as holotype; (USNMENT01752774, USNMENT01752775, USNMENT01752776, USNMENT01752777, USNMENT01752778, USNMENT01752779). 1; Michoacán State; 9 Aug. 1950; ex *Blarina* sp. (Eulipotyphla: Soricidae); RML 35455; (USNMENT01752780).

***inexcitus*, *Colicus* Goff and Brennan, 1978c: 565**

**Holotype (L)**

VENEZUELA • Amazonas State, San Juan de Manapiare; 7 Jul. 1967; ex *Dasyprocta fuliginosa* Wagler (Rodentia: Dasyproctidae); Smithsonian Army coll.; RML 53071; (USNMENT01752781).

**Paratypes (L)**

VENEZUELA • 5; same data as holotype; (USNMENT01752782, USNMENT01752783, USNMENT01752784, USNMENT01752785, USNMENT01752786).

***inflata*, *Neotrombiucula* (*Digenualae*) Mitchell and Nadchatram, 1966: 71**

**Paratypes (L)**

INDIA • 1; Madhya Pradesh State, Kanha National Park; 23 Dec. 1964; ex *Golunda ellioti* Gray (Rodentia: Muridae); (USNMENT01752787). 1; same locality; 26 Dec. 1964; ex *Mus musculus* L. (Rodentia: Muridae); (USNMENT01752788).

***insessus*, *Perates* Brennan and Dalmat, 1960: 187**

**Paratypes (L)**

GUATEMALA • 3; Escuintla Department; 6 Aug. 1951; ex *Chilonycteris rubiginosa* Wagner (= *Pteronotus* (*Phyllodia*) *parnellii rubiginosus*) (Chiroptera: Mormoopidae); RML 34058; (USNMENT01752789, USNMENT01752790, USNMENT01752791).

***insolita*, *Euschoengastia* Brennan and Jones, 1961b: 186**

**Holotype (L)**

PERU • Puno Department, Sandía Province, Limbani District; 11 Aug. 1951; ex *Phyllotis phaeus* Osgood (= *Phyllotis osilae* J. A. Allen) (Rodentia: Cricetidae); RML 31557; (USNMENT01752792).

**Paratypes (L)**

PERU • 4; same data as holotype; (USNMENT01752793, USNMENT01752794, USNMENT01752795, USNMENT01752796). 20; same data; RML 31577; (USNMENT01752797, USNMENT01752798, USNMENT01752799, USNMENT01752800, USNMENT01752801, USNMENT01752802, USNMENT01752803, USNMENT01752804, USNMENT01752805, USNMENT01752806, USNMENT01752807, USNMENT01752808, USNMENT01752809, USNMENT01752810, USNMENT01752811, USNMENT01752812, USNMENT01752813, USNMENT01752814, USNMENT01752815, USNMENT01752816).

***insolitum*, *Leptotrombidium* (*Leptotrombidium*) Nadchatram and Upham, 1966a: 105****Holotype (L)**

MALAYSIA •; Pahang State, Cameron Highlands District; 24 Feb. 1965; ex *Rattus alticola* (Thomas) (= *Maxomys alticola*) (Rodentia: Muridae); (USNMENT01752817).

***insolli*, *Trombicula* Philip and Traub, 1950: 32****Holotype (L)**

MALAYSIA • Selangor State, Gombak District, Batu caves; 4 Apr. 1948; ex *Eonycteris spelaea* (Dobson) (Chiroptera: Pteropodidae); R. Traub and H. Ley coll.; USNM 1866; (USNMENT01752818).

**Paratypes (L)**

MALAYSIA • 1; same data as holotype; (USNMENT01752819). 2; same locality and host; 28 Mar. 1948; (USNMENT01752820; USNMENT01762023).

***insularis*, *Trombicula* Ewing, 1925: 260****Syntypes (L)**

DOMINICAN REPUBLIC • 6; Santo Domingo; no date; ex *Anolis cybotes* Cope (Squamata: Dactyloidae); USNM 891; (USNMENT01752821, USNMENT01752822, USNMENT01752823, USNMENT01752824, USNMENT01752825, USNMENT01752826).

***intermedia*, *Microtrombicula (Scapuscutala)* Webb and Loomis, 1971: 323****Holotype (L)**

MEXICO • Sonora State; 9 Sep. 1963; ex *Peromyscus eremicus* (Baird) (Rodentia: Cricetidae); W. J. Wrenn coll.; WJW 630409; (USNMENT01752827).

***intermedia*, *Traubacarus* Audy and Nadchatram, 1957b: 195****Paratypes (L)**

MALAYSIA • 1; Selangor State, Gombak District, Bukit Lagong, Batu caves; 15 Nov. 1955; ex *Rattus rajah* Thomas (= *Maxomys rajah*) (Rodentia: Muridae); CORU 43656; (USNMENT01752828). 1; same data; CORU 43644; (USNMENT01762024).

***intermedius*, *Vatacarus (Iguanacarus)* Vercammen-Grandjean and Watkins, 1965a: 275****Holotype (L)**

ECUADOR • Galápagos Islands, Santa Cruz Island; 24 Feb. 1964; ex *Amblyrhynchus cristatus* Bell (Squamata: Iguanidae); (USNMENT01752829).

***intranasalis*, *Vatacarus (Iguanacarus)* Vercammen-Grandjean, 1965b: 272****Holotype (L)**

ECUADOR • Galápagos Islands, Santa Fé Island; 24 Feb. 1964; ex *Amblyrhynchus cristatus* Bell (Squamata: Iguanidae); (USNMENT01752830).

***intrinseca*, *Pseudoschoengastia* Brennan, 1960b: 488****Holotype (L)**

MEXICO • Puebla State, stratovolcano Popocatepetl; 28 Oct. 1950; ex *Neotomodon alstoni* Merriam (Rodentia: Cricetidae); G. W. Wharton coll.; RML 35515; (USNMENT01752831).

**Paratypes (L)**

MEXICO • 2; same data as holotype; (USNMENT01752832, USNMENT01752833).

***ipeani, Perisopalla Brennan, 1969a: 429*****Holotype (L)**

BRAZIL • Para State, Belém; 20 Mar. 1969; ex *Carollia perspicillata* (L.) (Chiroptera: Phyllostomidae); T. H. G. Aitken coll.; RML 49366; (USNMENT01752834).

**Paratypes (L)**

BRAZIL • 4; same data as holotype; (USNMENT01752835, USNMENT01752836, USNMENT01752837, USNMENT01752838). 4; same locality and host; 6 Mar. 1968; RML 49355; (USNMENT01752839, USNMENT01752840, USNMENT01752841, USNMENT01752842). 4; Para State; Belém, Guamá Ecological Research Area; 15 Feb. 1968; same host; RML 49343; (USNMENT01752843, USNMENT01752844, USNMENT01752845, USNMENT01752846).

***iranensis, Doloisia Goff, 1983i: 670*****Holotype (L)**

IRAN • Lorestan Province, Khorramabad; 1 May 1964; ex *Cricetulus migratorius* (Pallas) (Rodentia: Cricetidae); R. G. Tuck coll.; (USNMENT01752847).

***irregulare, Leptotrombidium (Leptotrombidium) Traub and Nadchatram, 1967a: 9*****Holotype (L)**

PAKISTAN • Mansehra District, Kaghan Valley, 28 Jul. 1964; ex *Hyperacrius fertilis* (True) (Rodentia: Cricetidae); (USNMENT01752848).

**Paratypes (L)**

PAKISTAN • 2; same locality and host; 16 Aug. 1964; (USNMENT01752849, USNMENT01752850). 1; same locality and host; 22 Jul. 1964; (USNMENT01752851).

***irritans tropica, Trombicula Ewing, 1925a: 258*****Syntypes (L)**

VENEZUELA • 6; Mérida State, Chama River; no date; ex *Anadia bitaeniata* Boulenger (Squamata: Gymnophthalmidae); USNM 889; (USNMENT01752853, USNMENT01752854, USNMENT01752855, USNMENT01752856, USNMENT01752857, USNMENT01752858).

***irwingi*, *Pseudoshoesngastia* (*Perissopalla*) Vercammen-Grandjean, 1964: 303****Holotype (L)**

GUATEMALA • Petén Department, Flores, Tikal; 20 Jul. 1961; ex *Balantiopteryx plicata* Peters (Chiroptera: Emballonuridae); M. Irwin coll.; (USNMENT01752859).

**Paratypes (L)**

GUATEMALA • 2; same data as holotype; (USNMENT01752860, USNMENT01752861).

***isonychia*, *Gahrlepiea* (*Walchia*) Nadchatram and Traub, 1964a: 71****Holotype (L)**

LAOS • Xieng Khouang Province; 26 Aug. 1960; ex *Rattus niviventer* Hodgson (= *Niviventer niviventer*) (Rodentia: Muridae); IMR 101973; (USNMENT01752862).

**Paratypes (L)**

LAOS • 1; same locality and host; 22 Aug. 1960; IMR 103784; (USNMENT01752863). 1; same data; IMR 103187; (USNMENT01752864). 1; same locality and host; 18 Aug. 1960; IMR 104884; (USNMENT01752865).

***israelensis*, *Neoschoengastia* Goff, 1986: 245****Holotype (L)**

ISRAEL • Jerusalem District, Beit Shemesh; 26 Aug. 1984; ex *Capra hircus* (L.) (Cetartiodactyla: Bovidae); (USNMENT01752866).

**Paratypes (L)**

ISRAEL • 4; same data as holotype; (USNMENT01752867, USNMENT01752868, USNMENT01752869, USNMENT01752870). 17; same locality and host; 12 Aug. 1984; (USNMENT01752871, USNMENT01752872, USNMENT01752873, USNMENT01752874, USNMENT01752875, USNMENT01752876, USNMENT01752877, USNMENT01752878, USNMENT01752879, USNMENT01752880, USNMENT01752881, USNMENT01752882, USNMENT01752883, USNMENT01752884, USNMENT01752885, USNMENT01752886, USNMENT01752887). 5; same locality; 5 Jul. 1984; ex *Ovis aries*

(L.) (Cetartiodactyla: Bovidae); (USNMENT01752888, USNMENT01752889, USNMENT01752890, USNMENT01752891, USNMENT01752892). 6; Nir Etzion; 23 Jul. 1984; ex *Gazella gazella* (Pallas) (Cetartiodactyla: Bovidae); (USNMENT01752893, USNMENT01752894, USNMENT01762025, USNMENT01762026, USNMENT01762027, USNMENT01762028).

***jacalae, Microtrombicula Loomis and Webb, 1972: 159***

**Holotype (L)**

MEXICO • Hidalgo State, Jacala; 30 Jun. 1970; ex *Peromyscus levipes* Merriam (Rodentia: Cricetidae); E. M. Fisher coll.; EMF 70-329; (USNMENT01752895).

**Paratype (L)**

MEXICO • 1; same data as holotype; (USNMENT01752896).

***jadini, Traubacarus Audy and Nadchatram, 1957b: 207***

**Paratypes (L)**

MALAYSIA • 1; Pahang State, Raub District, Fraser's Hill; 12 Apr. 1956; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); CORU 44127; (USNMENT01752897). 1; same locality and host; 11 Apr. 1956; CORU 43276; (USNMENT01752898).

***jamesoni, Trombicula Brennan, 1948: 476***

**Holotype (L)**

USA • New York State, Tompkins County; 6 Dec. 1949; ex *Blarina brevicauda* (Say) (Eulipotyphla: Soricidae); E. W. Jameson coll.; (USNMENT01752899)

**Paratypes (L)**

USA • 1; same locality and host; 12 Jul. 1949; (USNMENT01752900). 1; same locality and host; 7 Jul. 1949; (USNMENT01752901). 1; same locality and host; 28 May 1949; (USNMENT01752902). 1; same locality and host; 23 Nov. 1949; (USNMENT01752903). 4; same locality; 6 Dec. 1949; ex *Soricinereus* Kerr (Eulipotyphla: Soricidae); (USNMENT01752904, USNMENT01752905, USNMENT01752906,



USNMENT01752907). 2; same locality; 7 Jul. 1949; ex *Sorfumeus* G.M. Miller (Eulipotyphla: Soricidae); (USNMENT01752908, USNMENT01752909).

***jellisoni*, *Eutrombicula* Brennan and Jones, 1964b: 698**

**Holotype (L)**

ARGENTINA • Buenos Aires Province, Azul; 8 Mar. 1962; ex “unidentified dove” (Columbiformes: Columbidae); RML 38096; (USNMENT01752910).

**Paratypes (L)**

ARGENTINA • 4; same data as holotype; (USNMENT01752911, USNMENT01752912, USNMENT01752913, USNMENT01752914). 2; same locality; 22 Feb. 1962; ex *Rattus* sp. (Rodentia: Muridae); RML 38143; (USNMENT01752915, USNMENT01752916).

***jenkinsi*, *Eutrombicula* Brennan and Reed, 1974b: 700**

**Holotype (L)**

VENEZUELA • Trujillo State; 25 Jan. 1966; ex *Thomasomys lugens* (Thomas) (= *Aepeomys lugens*) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 48918; (USNMENT01752917).

**Paratypes (L)**

VENEZUELA • 1; same data as holotype; (USNMENT01752918). 1; same locality and host; 26 Jan. 1966; RML 48924; (USNMENT01752919). 2; same locality; 29 Jan. 1966; ex *Oryzomys minutus* Tomes (= *Microrozomys minutus*) (Rodentia: Cricetidae); RML 49032; (USNMENT01752920, USNMENT01752921). 2; Mérida State; 13 Mar. 1966; ex *Thomasomys laniger* (Thomas) (Rodentia: Cricetidae); RML 52773; (USNMENT01752922, USNMENT01752923).

***jessiamae*, *Trombicula* (*Trombicula*) Gould, 1956: 47**

**Holotype (L)**

USA • California State, Riverside County; 10 Oct. 1949; ex *Neotoma* sp. (Rodentia: Cricetidae); (USNMENT01752924)

**Paratypes (L)**

USA • 4; same data as holotype; (USNMENT01752925, USNMENT01752926, USNMENT01752927, USNMENT01752928). 1; same locality and date; ex *Sigmodon hispidus* Say and Ord (Rodentia: Cricetidae); (USNMENT01752929).

***jewetti, Trombicula (Neotrombicula) Brennan and Wharton, 1950: 182***

**Holotype (L)**

USA • California State, Plumas County; 11 Dec. 1978; ex *Clethrionomys californicus* (Merriam) (= *Myodes californicus*) (Rodentia: Cricetidae); RML 25972; (USNMENT01752930).

**Paratypes (L)**

USA • 8; same locality; 10 Mar. 1949; ex *Microtus longicaudus* (Merriam) (Rodentia: Cricetidae); RML 26550; (USNMENT01752931, USNMENT01752932, USNMENT01752933, USNMENT01752934, USNMENT01752935, USNMENT01752936, USNMENT01752937, USNMENT01752938).

***johnsoni, Euschoengastia Yunker and Brennan, 1964: 194***

**Holotype (L)**

BOLIVIA • Beni Department, San Joaquin; Jul. 1963; ex *Calomys callosus* (Rengger) (Rodentia: Cricetidae); M. L. Kuns coll.; RML 39040; (USNMENT01752939).

**Paratypes (L)**

BOLIVIA • 3; same data as holotype; (USNMENT01752940, USNMENT01752941, USNMENT01752942). 2; Beni Department, Pantanal; 3 Jul. 1963; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); (USNMENT01752943, USNMENT01752944).

***johnstoni, Carebareia Goff and Brennan, 1977a: 507***

**Holotype (L)**

VENEZUELA • Falcón State; 25 Jul. 1968; ex *Marmosa robinsoni* Bangs (Didelphimorphia: Didelphidae); Smithsonian Army coll.; RML 53544; (USNMENT01752945).

**Paratypes (L)**

VENEZUELA • 2; same data as holotype ; (USNMENT01752946, USNMENT01752947).

***jojosti, Vanidicus* Brennan, 1973: 109**

**Holotype (L)**

VENEZUELA • Monagas State; 8 Jul. 1967; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); Smithsonian Army coll.; RML 52532; (USNMENT01752948).

**Paratypes (L)**

VENEZUELA • 3; same data as holotype; (USNMENT01752949, USNMENT01752950, USNMENT01752951).

***jonesae, Trombicula* Brennan, 1952b: 60**

**Holotype (L)**

USA • Illinois State, Urbana County; 21 Oct. 1948; ex *Peromyscus* sp. (Rodentia: Cricetidae); RML 25912; (USNMENT01752952).

**Paratypes (L)**

USA • 13; same data as holotype; (USNMENT01752953, USNMENT01752954, USNMENT01752955, USNMENT01752956, USNMENT01752957, USNMENT01752958, USNMENT01752959, USNMENT01752960, USNMENT01752961, USNMENT01752962, USNMENT01752963, USNMENT01752964, USNMENT01752965). 12; same locality and host; 20 Oct. 1948; RML 25911; (USNMENT01752966, USNMENT01752967, USNMENT01752968, USNMENT01752969, USNMENT01752970, USNMENT01752971, USNMENT01752972, USNMENT01752973, USNMENT01752974, USNMENT01752975, USNMENT01752976, USNMENT01752977).

***jonesi, Euschoengastia* Lipovsky and Loomis, 1954: 407**

**Paratypes (L)**

USA • 4; Kansas State, Cowley County; 7 Mar. 1953; ex *Peromyscus leucopus* (Rafinesque) (Rodentia: Cricetidae); (USNMENT01752978, USNMENT01752979, USNMENT01752980, USNMENT01752981).

***kajutekrii*, *Trombicula* Joshee, 1964: 46****Holotype (L)**

INDIA • Maharashtra State, Mumbai Suburban District, Bhandup; 26 Nov. 1959; ex *Rattus rattus* (Rodentia: Muridae); (USNMENT01752982).

**Paratype (L)**

INDIA • 1; same data as holotype; (USNMENT01752983).

***kalaharica*, *Ascoschoengastia* Lawrence, 1949: 434****Paratype (L)**

BOTSWANA • 1; Kaotwe Pan; no date; ex *Ichnotropis squamulosa* Peters (= *Meroles squamulosus*) (Squamata: Lacertidae); (USNMENT01752984).

***kalrata*, *Gahrliopia* (*Schoengastiella*) Traub and Evans, 1953: 98****Holotype (L)**

INDIA • Jammu and Kashmir State, Ganderbal District, Sonamarg; Aug. 1949; ex *Rattus rattoides* Hodgson (= *Rattus pyctoris*) (Rodentia: Muridae); S. L. Kalra coll.; USNM 2071; (USNMENT01752985).

**Paratypes (L)**

INDIA • 6; same data as holotype; (USNMENT01752986, USNMENT01752987, USNMENT01752988, USNMENT01752989, USNMENT01752990, USNMENT01752991).

***kanhaensis*, *Schoengastia* Mitchell and Nadchatram, 1966: 75****Paratypes (L)**

INDIA • 2; Madhya Pradesh State, Kanha National Park; 1 Nov. 1964; ex *Mabuya dissimilis* Boulenger (*Eutropis dissimilis* [Hallowell]) (Squamata: Scincidae); G. B. Schallet coll.; (USNMENT01752992, USNMENT01752993).

***kansai*, *Trombicula* (*Trombiculindus*) Jameson and Sasa, 1953: 247****Holotype (L)**

JAPAN • Kansai Region, Kyoto City, Ohara area; 8 Mar. 1952; ex *Urotrichus talpoides* Temminck (Eulipotyphla: Talpidae); E.W. Jameson Jr. coll.; (USNMENT01752994).

**Paratypes (L)**

JAPAN • 3; same locality and host; 13 Apr. 1952; (USNMENT01752995, USNMENT01752996, USNMENT01752997). 1; same locality and host; 11 Jun. 1952; (USNMENT01752998). 1; same locality and host; 1 May 1952; (USNMENT01752999). 1; same locality and host; 2 May 1952; (USNMENT01757000). 3; same locality and host; 23 Apr. 1952; (USNMENT01757001, USNMENT01757002, USNMENT01757003).

***kansasensis*, *Trombicula* Loomis, 1955: 260****Paratypes (L)**

USA • 3; Kansas State, Douglas County; 17 Oct. 1950; ex *Pituophis catenifer* (Blainville) (Squamata: Colubridae); (USNMENT01757004, USNMENT01757005, USNMENT01757006).

***kardosi*, *Trombicula* Loomis, 1954: 929****Holotype (L)**

USA • Kansas State, Douglas County; 28 Nov. 1951; ex *Sciurus niger* L. (Rodentia: Sciuridae); R. B. Loomis coll.; USNM 3151; (USNMENT01757007).

**Paratypes (L)**

USA • 1; same data as holotype; USNM 3152; (USNMENT01757008). 1; same data; USNM 3157; (USNMENT01757009). 1; same data; USNM 3153; (USNMENT01757010). 1; same data; USNM 3155; (USNMENT01757011).

***karinensis*, *Gahrliopia* (*Walchia*) Goff, 1984b: 137****Holotype (L)**

MYANMAR • Karen Hills; no date; ex *Talpa leucura* Blyth (= *Parascaptor leucura*) (Eulipotyphla: Talpidae); (USNMENT01757012).

**Paratype (L)**

MYANMAR • 1; same data as holotype; (USNMENT01757013).

***keechongi*, *Trombicula* (*Sasatrombicula*) Nadchatram and Mitchell, 1965: 71****Paratypes (L)**

SOLOMON ISLANDS • 3; Buka Agricultural Station; 6 to 10 Dec. 1959; ex *Hipposideros* sp. (Chiroptera: Hipposideridae); T. C. Maa coll.; (USNMENT01757014, USNMENT01757015, USNMENT01757016).

***keegani*, *Acomatacarus* Radford, 1953b: 242**

**Paratype (L)**

PHILIPPINES • 1; Samar Island; 4 Jun. 1948; ex *Centropus melanops* Lesson (Cuculiformes: Cuculidae); H. L. Keegan coll.; (USNMENT01757017).

***keenani*, *Trombicula* Brennan and Jones, 1961a: 119**

**Holotype (L)**

PANAMA • Chiriquí province; 13 Feb. 1960; ex *Peromyscus nudipes* Goodwin (= *Peromyscus mexicanus* [Saussure]) (Rodentia: Cricetidae); RML 35934; (USNMENT01757018).

**Paratypes (L)**

PANAMA • 1; same data as holotype; (USNMENT01757019). 3; same data; RML 35936; (USNMENT01757020, USNMENT01757021, USNMENT01757022). 1; same locality and host; 14 Feb. 1960; RML 35937; (USNMENT01757023). 5; same data; RML 35942; (USNMENT01757024, USNMENT01757025, USNMENT01757026, USNMENT01757027, USNMENT01757028). 1; same data; RML 35941; (USNMENT01757029). 1; same data; RML 35944; (USNMENT01757030). 3; same locality and host; 12 Feb. 1960; RML 35930; (USNMENT01757031, USNMENT01757032, USNMENT01757033). 7; same data; RML 35928; (USNMENT01757034, USNMENT01757035, USNMENT01757036, USNMENT01757037, USNMENT01757038, USNMENT01757039, USNMENT01757040). 1; same data; RML 35929; (USNMENT01757041). 8; same locality and host; 3 Feb. 1960; RML 35921; (USNMENT01757042, USNMENT01757043, USNMENT01757044, USNMENT01757045, USNMENT01757046, USNMENT01757047, USNMENT01757048, USNMENT01757049). 1; same data; RML 35933; (USNMENT01757050). 1; same locality and host; 4 May 1960; RML 35965; (USNMENT01757051). 11; same locality; 13

Feb. 1960; ex *Peromyscus* sp. (Rodentia: Cricetidae); RML 35871; (USNMENT01757052, USNMENT01757053, USNMENT01757054, USNMENT01757055, USNMENT01757056, USNMENT01757057, USNMENT01757058, USNMENT01757059, USNMENT01757060, USNMENT01757061, USNMENT01757062). 3; same locality and host; 30 Jan. 1960; RML 35854; (USNMENT01757063, USNMENT01757064, USNMENT01757065). 3; same data; RML 35857; (USNMENT01757066, USNMENT01757067, USNMENT01757068). 3; same locality, 14 Feb. 1960; ex *Oryzomys* sp. (Rodentia: Cricetidae); RML 35873; (USNMENT01757069, USNMENT01757070, USNMENT01757071). 2; same locality and date; ex *Oryzomys flavescens* Waterhouse (= *Oligoryzomys flavescens*) (Rodentia: Cricetidae); RML 35943; (USNMENT01757072, USNMENT01757073). 3; same locality; 12 Feb. 1960; ex *Reithrodontomys mexicanus* (Saussure) (Rodentia: Cricetidae); RML 35927; (USNMENT01757074, USNMENT01757075, USNMENT01757076). 1; same locality; 13 Feb. 1960; ex *Scotinomys teguina* Alston (Rodentia: Cricetidae); RML 35935; (USNMENT01757077). 1; same locality and host; 4 May 1960; RML 35966; (USNMENT01757078). 2; same data; RML 35967; (USNMENT01757079, USNMENT01757080). 3; same locality; 12 Feb. 1960; ex *Sciurus granatensis* Humboldt (Rodentia: Sciuridae); RML 35931; (USNMENT01757081, USNMENT01757082, USNMENT01757083). 1; same locality; 4 Feb. 1960; ex *Sciurus* sp. (Rodentia: Sciuridae); RML 35865; (USNMENT01757084).

***kethleyi*, *Guntheria* Goff, 1979a: 88**

**Paratypes (L)**

AUSTRALIA • 2; Western Australia State, Kimberley Region, Napier Downs; 31 Aug. 1976; ex *Zyzomys argurus* (Thomas) (Rodentia: Muridae); WAM 791580; (USNMENT01757085, USNMENT01757086).

***kianjoei*, *Leptotrombidium* (*Lorillatum*) Nadchatram and Traub, 1964b: 269**

**Holotype (L)**

VIETNAM • Lam Dong Province, Blao; 25 Oct. 1960; ex *Tupaia* sp. (Scandentia: Tupaiidae); (USNMENT01757087).

**Paratype (L)**

VIETNAM • 1; same locality and host; 16 Oct. 1960; (USNMENT01757088).

***kittii*, *Ascochoengastia (Laurentella)* Domrow and Nadchatram, 1964: 479****Holotype (L)**

THAILAND • Udon Thani Province, Ban Chang; 4 Apr. 1962; ex *Rattus rattus* (Rodentia: Muridae); SMRL 708; (USNMENT01757089).

**Paratype (L)**

THAILAND • 2; same data as holotype; (USNMENT01757090, USNMENT01757091).

***knighti*, *Trombicula* Radford, 1954: 299****Holotype (L)**

YEMEN • Ta'izz; 1951; ex *Rhinolophus clivosus* Cretzschmar (Chiroptera: Rhinolophidae); H. Hoogstraal coll.; (USNMENT01757092).

***kofordi*, *Odontacarus* Brennan and Jones, 1961: 175****Holotype (L)**

PERU • Puno Department, Sandia Province, Limbani District; 11 Jun. 1951; ex *Chinchillula sahamae* Thomas (Rodentia: Cricetidae); RML 31551; (USNMENT01757093).

**Paratypes (L)**

PERU • 2; same data as holotype; (USNMENT01757094, USNMENT01757095). 1; same data; RML 31550; (USNMENT01757096). 3; same locality and host; 10 Jun. 1951; RML 31548; (USNMENT01757097, USNMENT01757098, USNMENT01757099). 1; same locality and host; 19 Jun. 1951; RML 31553; (USNMENT01757100). 1; same locality; 19 Jun. 1951; ex *Neotomys ebriosus* Thomas (Rodentia: Cricetidae); RML 31554; (USNMENT01757101). 2; same locality; 14 Jun. 1951; ex *Punomys lemminus* Osgood (Rodentia: Cricetidae); RML 31552; (USNMENT01757102, USNMENT01757103). 2; Puno Department, Caccachara Valley; 24 Apr. 1952; ex *Abrocoma cinerea* Thomas (Rodentia: Abrocomidae); RML 15355; (USNMENT01757104, USNMENT01757105).



***kohlsi*, *Neoschoengastia* Philip and Woodward, 1946: 159****Paratypes (L)**

PHILIPPINES • 23; Occidental Mindoro Province, Mindoro Island, San Jose; 2 Apr. 1945; *Rattus* sp. (Rodentia: Muridae); USNM 1526; (USNMENT01757106, USNMENT01757107, USNMENT01757108, USNMENT01757109, USNMENT01757110, USNMENT01757111, USNMENT01757112, USNMENT01757113, USNMENT01757114, USNMENT01757115, USNMENT01757116, USNMENT01757117, USNMENT01757118, USNMENT01757119, USNMENT01757120, USNMENT01757121, USNMENT01757122, USNMENT01757123, USNMENT01757124, USNMENT01757125, USNMENT01757126, USNMENT01757127, USNMENT01757128).

***kohlsi*, *Neoschoengastia* Brennan, 1951: 579****Holotype (L)**

USA • Montana State, Granite County; 17 Jul. 1950; ex *Petrochelidon pyrrhonota* Vieillot (Passeriformes: Hirundinidae); RML 27727; (USNMENT01757129).

**Paratypes (L)**

USA • 6; same data as holotype; (USNMENT01757130, USNMENT01757131, USNMENT01757132, USNMENT01757133, USNMENT01757134, USNMENT01757135). 5; same locality and host; 20 Jul. 1950; RML 27728; (USNMENT01757136, USNMENT01757137, USNMENT01757138, USNMENT01757139, USNMENT01757140).

***koomori*, *Trombicula* Sasa and Jameson, 1954: 316****Holotype (L)**

JAPAN • Kansai Region, Kyoto City, Ohara; 26 Aug. 1952; ex *Rhinolophus ferrumequinum* (Schreber) (Chiroptera: Rhinolophidae); J. Mc Clenden and Y. Shogaki coll.; (USNMENT01757141).

**Paratype (L)**

JAPAN • 1; same data as holotype; (USNMENT01757142).

***koongi*, *Trombicula* Domrow, 1962b: 41****Paratypes (L)**

MALAYSIA • 4; Selangor State, Hulu Langat District; 8 Mar. 1957; ex *Megaderma spasma* L. (Chiroptera: Megadermatidae); (USNMENT01757143, USNMENT01757144, USNMENT01757145, USNMENT01757146).

***koreaensis*, *Euschoengastia* Jameson and Toshioka, 1954: 14****Holotype (L)**

NORTH KOREA • Gwandong Region, Gyeonggi Province, Cheorwon County; 15 Nov. 1951; ex *Rattus rattus* (Rodentia: Muridae); (USNMENT01757147).

***kramisi*, *Polylopadium* Brennan and Jones, 1961a: 113****Holotype (L)**

PANAMA • Panama province, Panama City, Summit Botanical Gardens; 21 Sep. 1954; ex *Liomys adspersus* (Peters) (= *Heteromys adspersus*) (Rodentia: Heteromyidae); RML 35267; (USNMENT01757148).

**Paratypes (L)**

PANAMA • 19; same data as holotype; (USNMENT01757149, USNMENT01757150, USNMENT01757151, USNMENT01757152, USNMENT01757153, USNMENT01757154, USNMENT01757155, USNMENT01757156, USNMENT01757157, USNMENT01757158, USNMENT01757159, USNMENT01757160, USNMENT01757161, USNMENT01757162, USNMENT01757163, USNMENT01757164, USNMENT01757165, USNMENT01757166, USNMENT01757167). 12; Panama province, Panama City, Curundú; 8 Jul. 1954; same host; RML 35292; (USNMENT01757168, USNMENT01757169, USNMENT01757170, USNMENT01757171, USNMENT01757172, USNMENT01757173, USNMENT01757174, USNMENT01757175, USNMENT01757176, USNMENT01757177, USNMENT01757178, USNMENT01757179). 3; Panama province, Panama City, Panama

State Forest; 21 Dec. 1954; same host; RML 35230; (USNMENT01757180, USNMENT01757181, USNMENT01757182).

***krishnani, Ascoschoengastia (Laurentella) Nadchatram and Domrow, 1964: 30***

**Holotype (L)**

MALAYSIA • Selangor State, Hulu Langat District; 6 Apr. 1956; ex *Iomys horsfieldi* (Waterhouse) (Rodentia: Sciuridae); IMR 42969; (USNMENT01757183).

**Paratypes (L)**

MALAYSIA • 1; same data as holotype; IMR 48005; (USNMENT01757184). 1; same data; IMR 48004; (USNMENT01757185).

***kritochoeta, Gahrlepiea (Walchia) Traub and Evans, 1957: 313***

**Holotype (L)**

THAILAND • Nakhon Ratchasima Province, Pak Chong District; 3 Feb. 1953; ex *Rattus rattus* L. (Rodentia: Muridae); E. Elbell coll.; USNM 2432; (USNMENT01757186).

**Paratypes (L)**

THAILAND • 2; same data as holotype; (USNMENT01757187, USNMENT01757188).

***kromani, Odontacarus Goff and Loomis, 1973: 333***

**Holotype (L)**

USA • California State, San Diego County, Jacumba Hot Springs; 12 Mar. 1961; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); (USNMENT01757189).

***kulumadouensis, Whartonia Goff, 1980d: 494***

**Paratypes (L)**

PAPUA NEW GUINEA • 2; Woodlark Island, Kulumadau; 15 Nov. 1956; ex *Dobsonia pannietensis* (De Vis) (Chiroptera: Pteropodidae); (USNMENT01757190, USNMENT01757191).

***kundini, Leptotrombidium (Leptotrombidium) Nadchatram and Upham, 1966a: 110***

**Holotype (L)**

MALAYSIA • Pahang State, Kuantan; 20 Aug. 1965; “rat’s hole”; (USNMENT01757192).

**Paratype (L)**

MALAYSIA • 1; same data as holotype; (USNMENT01757193).

***kunsi*, *Euschoengastia* Yunker and Brennan, 1964: 193**

**Holotype (L)**

BOLIVIA • Beni Department, San Joaquin; 21 May 1963; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); C. E. Yunker coll.; RML 39000; (USNMENT01757194).

**Paratypes (L)**

BOLIVIA • 27; same data as holotype; (USNMENT01757195, USNMENT01757196, USNMENT01757197, USNMENT01757198, USNMENT01757199, USNMENT01757200, USNMENT01757201, USNMENT01757202, USNMENT01757203, USNMENT01757204, USNMENT01757205, USNMENT01757206, USNMENT01757207, USNMENT01757208, USNMENT01757209, USNMENT01757210, USNMENT01757211, USNMENT01757212, USNMENT01757213, USNMENT01757214, USNMENT01757215, USNMENT01757216, USNMENT01757217, USNMENT01757218, USNMENT01757219, USNMENT01757220, USNMENT01757221).

***kyongkiensis*, *Microtrombicula* Ah, 1964: 191**

**Holotype (L)**

SOUTH KOREA • Mount Gwanak; 19 May 1963; ex *Pipistrellus abramus* (Temminck) (Chiroptera: Vespertilionidae); A. S. Ah coll.; (USNMENT01757222).

***lacerta*, *Euschoengastia* Brennan, 1948: 468**

**Holotype (L)**

USA • California State, Santa Cruz County; 15 Aug. 1945; ex *Sceloporus occidentalis* Baird and Girard (Squamata: Phrynosomatidae); (USNMENT01757223).

**Paratypes (L)**

USA • 3; same data as holotype; (USNMENT01757224, USNMENT01757225, USNMENT01757226).

***lacerticola*, *Trombicula* Loomis, 1964: 13****Holotype (L)**

USA • California State, Riverside County, Joshua Tree National Park; 11 Jul. 1961; ex *Uta stansburiana* Baird and Girard (Squamata: Phrynosomatidae); WJW 610711; (USNMENT01757227).

**Paratypes (L)**

USA • 3; same data as holotype; (USNMENT01757228, USNMENT01757229, USNMENT01757230).

***lacertillae*, *Trombicula* Boshell and Kerr, 1942: 10****Syntypes (L)**

COLOMBIA • 3; Bolivar Department, Simití; 17 Sep. 1937; ex “unidentified lizard” (Squamata); USNM 53011; (USNMENT01757231, USNMENT01757232, USNMENT01757233). 1; Bolivar Department, San Juan Nepomuceno; 16 Sep. 1937; same host. USNM 3001; (USNMENT01757234).

***lachesis*, *Fonsecia* Brennan, 1970d: 808****Holotype (L)**

BOLIVIA • Beni Department; 20 Apr. 1964; ex *Lachesis muta* (L.) (Squamata: Viperidae). RML 50193; (USNMENT01757235)

**Paratypes (L)**

BOLIVIA • 4; same data as holotype; (USNMENT01757236, USNMENT01757237, USNMENT01757238, USNMENT01757239).

***laciniata*, *Gahrliopia* (*Gahrliopia*) Traub and Morrow 1955: 37****Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 25 Aug. 1953; ex *Rattus alticola* (Thomas) (= *Maxomys alticola*) (Rodentia: Muridae); RT B 19365; (USNMENT01757240).

**Paratypes (L)**

MALAYSIA • 4; same data as holotype; (USNMENT01757241, USNMENT01757242, USNMENT01757243, USNMENT01757244). 38; same locality and host; 30 Aug. 1953; RT B 19370; (USNMENT01757245, USNMENT01757246, USNMENT01757247, USNMENT01757248, USNMENT01757249, USNMENT01757250, USNMENT01757251, USNMENT01757252, USNMENT01757253, USNMENT01757254, USNMENT01757255, USNMENT01757256, USNMENT01757257, USNMENT01757258, USNMENT01757259, USNMENT01757260, USNMENT01757261, USNMENT01757262, USNMENT01757263, USNMENT01757264, USNMENT01757265, USNMENT01757266, USNMENT01757267, USNMENT01757268, USNMENT01757269, USNMENT01757270, USNMENT01757271, USNMENT01757272, USNMENT01757273, USNMENT01757274, USNMENT01757275, USNMENT01757276, USNMENT01757277, USNMENT01757278, USNMENT01757279, USNMENT01757280, USNMENT01757281, USNMENT01757282). 8; same locality and host; 31 Aug. 1953; RT B 19428; (USNMENT01757283, USNMENT01757284, USNMENT01757285, USNMENT01757286, USNMENT01757287, USNMENT01757288, USNMENT01757289, USNMENT01757290). 11; same data; RT B 19432; (USNMENT01757291, USNMENT01757292, USNMENT01757293, USNMENT01757294, USNMENT01757295, USNMENT01757296, USNMENT01757297, USNMENT01757298, USNMENT01757299, USNMENT01757300, USNMENT01757301). 1; same locality and host; 16 Aug. 1951; RT B 9002; (USNMENT01757302). 17; same locality and host; 20 Aug. 1953; RT B 19319; (USNMENT01757303, USNMENT01757304, USNMENT01757305, USNMENT01757306, USNMENT01757307, USNMENT01757308, USNMENT01757309, USNMENT01757310, USNMENT01757311, USNMENT01757312, USNMENT01757313, USNMENT01757314, USNMENT01757315, USNMENT01757316, USNMENT01757317,

USNMENT017572318, USNMENT017572319). 2; same locality and host; 1 Sep. 1953; RT B 19459; (USNMENT01757320, USNMENT017572321). 10; same locality; 30 Aug. 1953; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); RT B 19414; (USNMENT01757322, USNMENT017572323, USNMENT017572324, USNMENT017572325, USNMENT017572326, USNMENT017572327, USNMENT017572328, USNMENT017572329, USNMENT017572330, USNMENT01762029).

***lacunosa*, *Neoschoengastia* Gater, 1932: 156**

**Paratype (L)**

MALAYSIA • 1; Selangor State, Petaling District, Sungai Buloh; 23 Jul. 1930; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); USNM 1053; (USNMENT01757331).

***lanceolata*, *Euschoengastia* Brennan and Beck, 1955: 13**

**Holotype (L)**

USA • Utah State, Washington County, Grafton; 17 Dec. 1950; ex *Peromyscus eremicus* (Baird) (Rodentia: Cricetidae); RML 28268; (USNMENT01757332).

**Paratypes (L)**

USA • 9; same data as holotype; (USNMENT01757333, USNMENT01757334, USNMENT01757335, USNMENT01757336, USNMENT01757337, USNMENT01757338, USNMENT01757339, USNMENT01757340, USNMENT01757341). 5; Utah State, Washington County, Berry Springs; 19 Dec. 1950; same host; RML 26270; (USNMENT01757342, USNMENT01757343, USNMENT01757344, USNMENT01757345, USNMENT01757346). 1; Utah State, Washington County, Rockville; 18 Dec. 1950; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); RML 28268; (USNMENT01757347).

***landazuri*, *Trombicula* Boshel and Kerr, 1942: 14**

**Syntypes (L)**

COLOMBIA • 1; Bolivar Department, San Juan Nepomuceno; 10 Sep. 1937; ex *Agouti paca* L. (= *Cuniculus paca*) (Rodentia: Cuniculidae); USNM 698; (USNMENT01757348).  
1; Meta Department, Restrepo; 6 Oct. 1937; ex *Proechimys chrysaolus* (Thomas) (Rodentia: Echimyidae); USNM 1900; (USNMENT01757349).

***lanei*, *Euschoengastia* Brennan and Beck, 1955: 14**

**Holotype (L)**

USA • Utah State, Box Elder County, Lucin; 10 Oct. 1952; ex *Reithrodontomys megalotis* (Baird) (Rodentia: Cricetidae. RML 31172; (USNMENT01757350).

**Paratypes (L)**

USA • 9; same data as holotype; (USNMENT01757351, USNMENT01757352, USNMENT01757353, USNMENT01757354, USNMENT01757355, USNMENT01757356, USNMENT01757357, USNMENT01757358, USNMENT01757359). 5; same locality and date; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); RML 31183; (USNMENT01757360, USNMENT01757361, USNMENT01757362, USNMENT01757363, USNMENT01757364). 4; same locality and host; 11 Oct. 1952; RML 31184; (USNMENT01757365, USNMENT01757366, USNMENT01757367, USNMENT01757368). 5; same data; RML 31176; (USNMENT01757369, USNMENT01757370, USNMENT01757371, USNMENT01757372, USNMENT01757373). 5; Utah State, Uintah County, Jensen; 8 Nov. 1952; same host; RML 31188; (USNMENT01757374, USNMENT01757375, USNMENT01757376, USNMENT01757377, USNMENT01757378).

***lasiurus*, *Parasecia* Goff and Gettinger, 1991: 401**

**Holotype (L)**

BRAZIL • Federal District, Brasilia; 29 Jan. 1984; ex *Bolomys lasiurus* (Lund) (= *Necromys lasiurus*) (Rodentia: Cricetidae); (USNMENT01757379).

***lasiurus*, *Serratacarus* Goff and Whitaker, 1984b: 166**

**Holotype (L)**



BRAZIL • Minas Gerais State; National Park of Serra da Canastra; Fazenda das Pedras; 27 Jul. 1979; ex *Zygodontomys lasiurus* Lund (= *Necromys lasiurus*) (Rodentia: Cricetidae); (USNMENT01757380).

***latchmani*, *Euschoengastia* Brennan and Yunker, 1964: 311**

**Holotype (L)**

USA • California State, Sonara County; 13 Feb. 1963; ex *Equus caballus* L. (Perissodactyla: Equidae); RML 38601; (USNMENT01757381).

**Paratypes (L)**

USA • 6; same data as holotype; (USNMENT01757382, USNMENT01757383, USNMENT0175784, USNMENT01757385, USNMENT01757386, USNMENT01757387). 3; same locality, 21 Feb. 1963; ex *Lepus californicus* Gray (Lagomorpha: Leporidae); RML 38581; (USNMENT01757388, USNMENT01757389, USNMENT01757390). 1; same locality and host; 16 Apr. 1963; RML 38597; (USNMENT01757391). 6; same data; RML 38625; (USNMENT01757392, USNMENT01757393, USNMENT01757394, USNMENT01757395, USNMENT01757396, USNMENT01757397). 1; same locality; 19 Feb. 1963; ex *Zonotrichia coronata* Pallas (= *Zonotrichia atricapilla* [Gmelin]) (Passeriformes: Passerellidae); RML 38582; (USNMENT01757398). 8; California State, Nevada County, Grass Valley; 20 Jan. 1952; ex *Canis lupus familiaris* L. (Carnivora: Canidae); RML 34624; (USNMENT01757399, USNMENT01757400, USNMENT01757401, USNMENT01757402, USNMENT01757403, USNMENT01757404, USNMENT01757405, USNMENT01757406).

***latens*, *Microtrombicula* Traub and Nadchatram, 1966a: 312**

**Paratype (L)**

PAKISTAN • 1; Khyber-Pakhtunkhwa Province, Mansehra District District, Shogran; 31 Jun. 1964; ex *Rattus* sp. (Rodentia: Muridae); (USNMENT01757407).

***laticuta*, *Beamerella* Goff and Brennan, 1978b: 534**

**Holotype (L)**

COLOMBIA • Santander Department, Macaregua Cave; 8 Aug. 1967; ex *Mormoops megalophylla* (Peters) (Chiroptera: Mormoopidae); RML 50028; (USNMENT01757408).

**Paratype (L)**

COLOMBIA • 1; Santander Department, San Gil; 18 Sep. 1967; same host; RML 47659; (USNMENT01757409).

***lawrencei*, *Acomatacarus* Radford, 1948b: 216**

**Paratypes (L)**

SOUTH AFRICA • 4; Eastern Cape Province, Grahamstown City, Glen Craig; 24 May 1939; ex *Thallomys namaquensis grahami* (Roberts) (= *Micaelamys namaquensis* (A. Smith) (Rodentia: Muridae); (USNMENT01757410, USNMENT01757411, USNMENT01757412, USNMENT01757413).

***leberi*, *Teratothrix* Goff, 1981d: 244**

**Holotype (L)**

PERU • Cuzco Department, Cuzco; 17 Jul. 1953; ex *Lestoros inca* (Thomas) (Paucituberculata: Caenolestidae); FMNH 75587; (USNMENT01757414).

**Paratypes (L)**

PERU • 6; same data as holotype; (USNMENT01757415, USNMENT017574016, USNMENT01757417, USNMENT01757418, USNMENT01757419, USNMENT01757420).

***leechi*, *Ascoschoengastia* (*Laurentella*) Domrow, 1962d: 590**

**Holotype (L)**

LAOS • Xieng Khouang Province; 27 Aug. 1960; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); (USNMENT01757421).

***leegoffi*, *Eutrombicula* Brennan and Reed, 1974b: 702**

**Holotype (L)**

VENEZUELA • Trujillo State; 21 Jan. 1966; ex *Oryzomys albigularis* (Tomes) (= *Nephomys albigularis*) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 48905; (USNMENT01757422).

**Paratypes (L)**

VENEZUELA • 1; same data as holotype; (USNMENT01757423). 2; same data; RML 49915; (USNMENT01757424, USNMENT01757425). 5; same locality and host; 18 Jan. 1966; RML 48897; (USNMENT01757426, USNMENT01757427, USNMENT01757428, USNMENT01757429, USNMENT01757430). 9; same locality and host; 26 Jan. 1966; RML 48896; (USNMENT0175743, USNMENT01757432, USNMENT01757433, USNMENT01757434, USNMENT01757435, USNMENT01757436, USNMENT01757437, USNMENT01757438, USNMENT01757439). 3; same locality and host; 20 Jan. 1966; RML 48901; (USNMENT01757440, USNMENT01757441, USNMENT01757442). 9; same data; RML 48902; (USNMENT01757443, USNMENT01757444, USNMENT01757445, USNMENT01757446, USNMENT01757447, USNMENT01757448, USNMENT01757449, USNMENT01757450, USNMENT01757451). 1; same locality and host; 28 Jan. 1966; RML 49027; (USNMENT01757452). 12; same locality; 26 Jan. 1966; ex *Oryzomys* sp. (Rodentia: Cricetidae); RML 48923; (USNMENT01757453, USNMENT01757454, USNMENT01757455, USNMENT01757456, USNMENT01757457, USNMENT01757458, USNMENT01757459, USNMENT01757460, USNMENT01757461, USNMENT01757462, USNMENT01757463, USNMENT01757464).

***lepidodactylus*, *Microtrombicula* (*Eltonella*) Brown, 1999: 22****Paratype (L)**

PHILIPPINES • 1; Guimaras Province, Buenavista, Santo Rosario; 15 May 1968; ex *Leptodactylus* sp. (Anura: Leptodactylidae); R. B. Gonzales coll.; BPBM 126963; (USNMENT01757465).

***lepismatum*, *Leptotrombidium* (*Trombiculindus*) Traub and Nadchatram, 1967b: 426****Holotype (L)**

MALAYSIA • Pahang State Cameron, Highlands District; 24 Sep. 1957; ex *Rattus rattus fulvescens* Gray (= *Niviventer fulvescens*) (Rodentia: Muridae); R. Traub coll.; RT B46727; (USNMENT01757466).

**Paratype (L)**

MALAYSIA • 1; same locality; 4 Jan. 1957; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); RT B49814; (USNMENT01757467).

***leprochaeta*, *Herpetacarus* Nadchatram and Kethley, 1974: 583****Paratype (L)**

THAILAND • 1; Nakhon Ratchasima Province; 25 Aug. 1969; ex *Riopa bowringi* Dunn (= *Lygosoma bowringii* [Günther]) (Squamata: Scincidae); IMR 111162; (USNMENT01757468).

***lewthwaitei*, *Walchia* Gater, 1932: 170****Paratype (L)**

MALAYSIA • 1; Selangor State Kuala Lumpur; Aug. 1927; ex *Rattus rattus diardi* (Jentink) (Rodentia: Muridae); USNM 1062; (USNMENT01757469).

***leytensis*, *Rudnicula* Brown, Goff and Nadchatram, 1988: 17****Paratypes (L)**

PHILIPPINES • 1; Eastern Visayas Province, Mount Lobi; 29 May 1964; ex *Ptenochirus jagori* (Peters) (Chiroptera: Pteropodidae); (USNMENT01757470). 3; same locality and host; 5 Jun. 1964; (USNMENT01757471, USNMENT01757472, USNMENT01757473).

***libani*, *Riedlinia (Trombigastia)* Vercammen-Grandjean, 1968: 59****Holotype (L)**

LEBANON • Jbeil District, Amsheet; 13 Oct. 1960; ex *Myotis blythii* (Tomes) (Chiroptera: Vespertilionidae); (USNMENT01757474).

***libertatis*, *Euschoengastia* Brennan and Dalmat, 1960: 189****Holotype (L)**

GUATEMALA • Chimaltenango Department, Acatenango; 28 Apr. 1951; ex *Neotoma* sp. (Rodentia; Cricetidae); RML 29917; (USNMENT01757475).

**Paratypes (L)**

GUATEMALA • 18; same data as holotype; (USNMENT01757476, USNMENT01757477, USNMENT01757478, USNMENT01757479, USNMENT01757480, USNMENT01757481, USNMENT01757482, USNMENT01757483, USNMENT01757484, USNMENT01757485, USNMENT01757486, USNMENT01757487, USNMENT01757488, USNMENT01757489, USNMENT01757490, USNMENT01757491, USNMENT01757492, USNMENT01757493).

***libita*, *Hoffmannina* Brennan and Goff, 1977b: 911**

**Holotype (L)**

PANAMA • Chiriquí province; 2 May 1960; ex *Reithrodontomys sumichrasti* (Saussure) (Rodentia; Cricetidae); RML 40668; (USNMENT01757494).

**Paratypes (L)**

PANAMA • 5; same data as holotype; (USNMENT01757495, USNMENT01757496, USNMENT01757497, USNMENT01757498, USNMENT01757499). 2; same locality; 5 May 1961; ex *Peromyscus nudipes* Goodwin (= *Peromyscus mexicanus* [Saussure]) (Rodentia: Cricetidae); RML 40896; (USNMENT01757500, USNMENT01757501). 2; same locality and host; 3 May 1961; RML 40810; (USNMENT01757502, USNMENT01757503). 5; same locality and date; ex *Reithrodontomys creper* Bangs (Rodentia: Cricetidae); RML 40813; (USNMENT01757504, USNMENT01757505, USNMENT01757506, USNMENT01757507, USNMENT01757508).

***limi*, *Leptotrombidium* (*Trombiculindus*) Traub and Nadchatram, 1967b: 432**

**Holotype (L)**

MALAYSIA • Pahang State, Cameron Highlands District, Mount Batu Brinchang; 8 Jan. 1958; ex *Rattus rattus fulvescens* Gray (= *Niviventer fulvescens*) (Rodentia: Muridae); R. Traub coll.; RT B 47226; (USNMENT01757509).

**Paratypes (L)**

MALAYSIA • 4; same data as holotype; (USNMENT01757510, USNMENT01757511, USNMENT01757512, USNMENT01757513).

***linsdalei*, *Acomatacarus* Brennan and Jones, 1954: 160****Holotype (L)**

USA • California State, Monterey County, Hastings Natural History Reservation; 3 Sep. 1950; ex *Perognathus californicus* Merriam (= *Chaetodipus californicus*) (Rodentia: Heteromyidae); RML 28169; (USNMENT01757514).

**Paratypes (L)**

USA • 19; same data as holotype; (USNMENT01757515, USNMENT01757516, USNMENT01757517, USNMENT01757518, USNMENT01757519, USNMENT01757520, USNMENT01757521, USNMENT01757522, USNMENT01757523, USNMENT01757524, USNMENT01757525, USNMENT01757526, USNMENT01757527, USNMENT01757528, USNMENT01757529, USNMENT01757530, USNMENT01757531, USNMENT01757532, USNMENT01757533). 3; same locality and host; 26 Aug. 1950; RML 28165; (USNMENT01757534, USNMENT01757535, USNMENT01757536). 3; same locality and host; 27 Aug. 1959; RML 28166; (USNMENT01757537, USNMENT01757538, USNMENT01757539). 2; same locality and host; 3 Sep. 1953; RML 32543; (USNMENT01757540, USNMENT01757541). 1; same data; RML 32540; (USNMENT01757542).

***liomys*, *Trombicula* Brennan and Jones, 1961a: 121****Holotype (L)**

PANAMA • Panama province, Panama City, Curundú; 8 Jul. 1954; ex *Liomys adspersus* (Peters) (= *Heteromys adspersus*) (Rodentia: Heteromyidae); RML 35292; (USNMENT01757543).

**Paratypes (L)**

PANAMA • 3; Panama province, Panama City, Corozal; 21 Oct. 1954; same host; RML 35255; (USNMENT01757544, USNMENT01757545, USNMENT01757546).

***liota*, *Gahriepia* (*Schoengastiella*) Traub and Evans, 1953: 89****Holotype (L)**

INDIA • Assam State, Ledo City, Stillwell Road; 28 Aug. 1945; ex *Suncus* sp. (Eulipotyphla: Soricidae); USATC 3561; (USNMENT01757547)

**Paratypes (L)**

INDIA • 1; same locality and host; 29 Aug. 1945; USATC 3579; (USNMENT01757548). 1; same locality and host; 7 Sep. 1945; USATC 3662; (USNMENT01757549). 1; Assam State, Ledo City, Ledo Road; 27 Jul. 1945; ex *Anourosorex* sp. (Eulipotyphla: Soricidae); USATC 2044; (USNMENT01757550).

***lipoglana, Euschoengastia* Brenna and Jones, 1960: 504**

**Holotype (L)**

TRINIDAD AND TOBAGO • Sangre Grande Region, Mount Tamana; 13 Jun. 1955; ex *Mormoops tumidiceps* Miller (= *Mormoops megalophylla*) (Chiroptera: Mormoopidae); RML 33680; (USNMENT01757551).

***lipovskyana, Trombicula (Eutrombicula)* Wolfenbarger, 1952: 660**

**Paratypes (L)**

USA • 3; Kansas State, Douglas County; 15 Jul. 1948; ex *Passer domesticus* L. (Passeriformes: Passeridae); L. J. Lipovsky coll.; (USNMENT01757552, USNMENT01757553, USNMENT01757554) 2; same locality; 25 Jul. 1948; ex *Colinus virginianus* (L.) (Galliformes: Odontophoridae); (USNMENT01757555, USNMENT01757556).

***lipovskyi, Trombicula (Neotrombicula)* Brennan and Wharton, 1950: 177**

**Syntype (L)**

USA • 1; Kansas State, Norton County; 25 Oct. 1946; ex *Peromyscus* sp. (Rodentia: Cricetidae); USNM 1838; (USNMENT01757557).

***lobiensis, Walchiella* Brown and Goff, 1988a: 219**

**Paratype (L)**

PHILIPPINES • 1; Leyte Province, Leyte Island; 6 Jul. 1964; ex *Rattus everetti* (Günther) (Rodentia: Muridae); (USNMENT01757558).

***longicalcar, Trombicula* Brennan and Jones, 1960: 517****Holotype (L)**

TRINIDAD AND TOBAGO • Sangre Grande Region, Melajo Forest Reserve; 24 Apr. 1956; ex *Amazona amazonica* L. (Psittaciformes: Psittacidae); RML 33916; (USNMENT01757559).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 5; same locality and host; 6 Mar. 1956; RML 33802; (USNMENT01757560, USNMENT01757561, USNMENT01757562, USNMENT01757563, USNMENT01757564). 4; same locality and host; 24 Apr. 1956; RML 33916; (USNMENT01757565, USNMENT01757566, USNMENT01757567, USNMENT01757568). 7; same locality; 8 Oct. 1956; ex *Sciurus granatensis* Humboldt (Rodentia: Sciuridae); RML 34171; (USNMENT01757569, USNMENT01757570, USNMENT01757571, USNMENT01757572, USNMENT01757573, USNMENT01757574, USNMENT01757575). 1; Sangre Grande Region, Rio Grande stream; 16 Jul. 1956; ex *Pseustes sulphureus* Wagler (Squamata: Colubridae); RML 34144; (USNMENT01757576). 2; Princes Town, Tabaquite Road; 18 Mar. 1956; ex *Desmodus rotundus* (É. Geoffroy) (Chiroptera: Phyllostomidae); RML 34685; (USNMENT01757577, USNMENT01757578). 2; La Brea; 14 Apr. 1958, same host; RML 34776; (USNMENT01757579, USNMENT01757580).

***longidentata, Gahrliepia (Walchia)* Nadchatram and Traub, 1964a: 70****Holotype (L)**

LAOS • Xieng Khouang Province; 28 Aug. 1960; ex *Tamiops rodolphii* (Milne-Edwards) (Rodentia: Sciuridae); IMR 101769; (USNMENT01757581).

**Paratypes (L)**

LAOS • 1; same locality and date; ex *Rattus niviventer* Hodgson (= *Niviventer niviventer*) (Rodentia: Muridae); IMR 106919; (USNMENT01757582). 1; same data; IMR 106916; (USNMENT01757583). 1; same locality and date; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); IMR 103703; (USNMENT01757584).



***longipes*, *Neoschoengastia* Nadchatram, 1967a:142****Holotype (L)**

THAILAND • Nan Province, Ban Pha Hang; 13 Dec. 1961; ex *Saxicola ferrea* Gray (Passeriformes: Muscicapidae); SMRL V181; (USNMENT01757585).

***longiseta*, *Eutrombicula* Brennan and Reed, 1974b: 702****Holotype (L)**

VENEZUELA • Mérida State; 12 Apr. 1966; ex *Oryzomys minutus* Tomes (= *Microrizomys minutus*) (Rodentia: Cricetidae); RML 48146; (USNMENT01757586).

**Paratypes (L)**

VENEZUELA • 1; same data as holotype; RML 47429; (USNMENT01757587). 1; same locality; 10 Apr. 1966; ex *Thomasomys lugens* (Thomas) (= *Aepeomys lugens*) (Rodentia: Cricetidae); RML 48144; (USNMENT01757588).

***longispina*, *Ascoschoengastia* Radford, 1948b: 219****Paratypes (L)**

SOUTH AFRICA • 2; Eastern Cape Province, Grahamstown City, Glen Craig, South Africa; 24 May 1939; ex *Thallomys namaquensis grahami* (Roberts) (= *Micaelamys namaquensis* (A. Smith) (Rodentia: Muridae), G. Theiler coll.; USNM 129; (USNMENT01757589, USNMENT01757590). 1; same locality and host; 15 May 1939; USNM 111. (USNMENT01757591).

***longispina*, *Brennanella* Radford, 1954: 303****Holotype (L)**

YEMEN • Ta'izz; 1951; ex *Rhinolophus clivosus* Cretzschmar (Chiroptera: Rhinolophidae); USNM 6203; (USNMENT01757592).

***longitarsala*, *Euschoengastia* Powder and Loomis, 1962: 205****Holotype (L)**

USA • California State, Riverside County, Snow Creek; 9 May 1959; ex *Uta stansburiana* Baird and Girard (Squamata: Phrynosomatidae); R. B. Loomis coll.; RBL 590509; (USNMENT01757593).

**Paratypes (L)**

USA • 3; same data as holotype; (USNMENT01757594, USNMENT01757595, USNMENT01757596).

***loomisi, Euschoengastia* Crossley and Lipovsky, 1954: 243**

**Paratypes (L)**

USA • 3; Kansas State, Barber County; 26 Jul. 1952; ex *Sylvilagus floridanus* (J.A. Allen) (Lagomorpha: Leporidae); (USNMENT01757597, USNMENT01757598, USNMENT01757599).

***loomisi, Microtrombicula* Ah, 1964: 189**

**Holotype (L)**

SOUTH KOREA • Gyeonggi Province; 19 May 1963; ex *Pipistrellus abramus* (Temminck) (Chiroptera: Vespertilionidae); (USNMENT01757600).

**Paratype (L)**

SOUTH KOREA • 1; same data as holotype; (USNMENT01757601).

***loomisi, Schoegastia* Goff, 1981e: 366**

**Paratypes (L)**

PAPUA NEW GUINEA • 5; Central Province, Murray Pass; 4 Nov. 1965; ex *Sphenomorphus* sp. (Squamata: Scincidae); J. Selacek coll.; BPBM 12088; (USNMENT01757602, USNMENT01757603, USNMENT01757604, USNMENT01757605, USNMENT01757606).

***loomisi, Trombicula (Neotrombicula)* Kardos, 1954: 85**

**Holotype (L)**

USA • Colorado State, Yuma County; 2 Nov. 1952; ex *Reithrodontomys megalotis* (Baird) (Rodentia: Cricetidae); USNM 5803; (USNMENT01757607).

**Paratypes (L)**

USA • 1; same data as holotype; USNM 5802; (USNMENT01757608). 1; same locality and date; ex *Mus musculus* (L.) (Rodentia: Muridae); USNM 5805; (USNMENT01757609). 1; same data; USNM 5806; (USNMENT01757610).

***lorentzi, Gahrliopia (Walchia) Goff, 1984d: 524*****Holotype (L)**

PAPUA NEW GUINEA • Madang Province; 15 Feb. 1974; ex *Melomys lorentzii* (Jentink) (= *Paramelomys lorentzii*) (Rodentia: Muridae); BPBM 13089; (USNMENT01757611).

**Paratypes (L)**

PAPUA NEW GUINEA • 8; same data as holotype; (USNMENT01757612, USNMENT01757613, USNMENT01757614, USNMENT01757615, USNMENT01757616, USNMENT01757617, USNMENT01757618, USNMENT01757619).

***lukoschusi, Austracarus Goff, 1983e: 335*****Holotype (L)**

SOUTH AFRICA • Western Cape Province, Diep River; 29 May 1980; ex *Myosorvarius* (Smuts) (Eulipotyphla: Soricidae); (USNMENT01757620).

**Paratypes (L)**

SOUTH AFRICA • 11; same data as holotype; (USNMENT01757621, USNMENT01757622, USNMENT01757623, USNMENT01757624, USNMENT01757625, USNMENT01757626, USNMENT01757627, USNMENT01757628, USNMENT01757629, USNMENT01757630, USNMENT01757631).

***lukoschusi, Cotrombicula Goff, 1983b: 71*****Paratypes (L)**

AUSTRALIA • 9; Western Australia State, Kimberley Region, Napier Downs; 2 Sep. 1976; ex *Taphozous georgianus* Thomas (Chiroptera: Emballonuridae); (USNMENT01757632, USNMENT01757633, USNMENT01757634,

USNMENT01757635, USNMENT01757636, USNMENT01757637,  
USNMENT01757638, USNMENT01757639, USNMENT01757640).

***lukoschusi*, *Eutrombicula* Brennan and Reed, 1974b: 702**

**Holotype (L)**

VENEZUELA •; Táchira State, San Cristóbal; 5 Mar. 1968; ex *Thomasomys hylophilus* Osgood (Rodentia: Cricetidae); Smithsonian Army coll.; RML 53639; (USNMENT01757641).

**Paratypes (L)**

VENEZUELA • 1; same data as holotype; (USNMENT01757642). 7; same locality and host; 2 Mar. 1968; RML 53210; (USNMENT01757643, USNMENT01757644, USNMENT01757645, USNMENT01757646, USNMENT01757647, USNMENT01757648, USNMENT01757649). 1; same data; RML 55918; (USNMENT01757650). 2; same locality and host; 6 Mar. 1968; RML 53656; (USNMENT01757651, USNMENT01757652). 1; same locality and host; 7 Mar. 1968; RML 53657; (USNMENT01757653). 1; same locality and host; 8 Mar. 1968; RML 53629; (USNMENT01757654). 3; same locality and host; 9 Mar. 1968; RML 55930; (USNMENT01757655, USNMENT01757656, USNMENT01757657). 2; same locality and host; 11 Mar. 1968; RML 53221; (USNMENT01757658, USNMENT01757659). 1; same locality and host, 17 Mar. 1968; RML 53227; (USNMENT01757660). 1; same locality and host, 19 Mar. 1968. RML 55939; (USNMENT01757661).

***lukoschusi*, *Trombiculindus* Goff, 1987a: 101**

**Holotype (L)**

NEPAL • Central Nepal, Kyangjin Gompa; 7 Nov. 1975; ex *Soriculus caudatus* (Horsfield) (= *Episoriculus caudatus*) (Eulipotyphla: Soricidae); (USNMENT01757662).

**Paratypes (L)**

NEPAL • 16; same data as holotype; (USNMENT01757663, USNMENT01757664, USNMENT01757665, USNMENT01757666, USNMENT01757667, USNMENT01757668, USNMENT01757669, USNMENT01757670, USNMENT01757671, USNMENT01757672, USNMENT01757673,

USNMENT01757674, USNMENT01757675, USNMENT01757676,  
USNMENT01757677, USNMENT01757678).

***lumsdeni, Eutrombicula Radford, 1953a: 212***

**Syntypes (L)**

UGANDA • 4; Kaabong District; 1952; ex *Procavia capensis* Storr (Hyracoidea: Procaviidae); A. J. Haddow coll.; (USNMENT01757679, USNMENT01757680, USNMENT01757681, USNMENT01757682).

***luteodema, Euschoengastia Brennan, 1948: 470***

**Holotype (L)**

USA • Montana State, Ravalli County; 30 Jul. 1945; ex *Marmota* sp. (Rodentia: Sciuridae); RML 21926; (USNMENT01757683).

**Paratypes (L)**

USA • 6; same data as holotype; (USNMENT01757684, USNMENT01757685, USNMENT01757686, USNMENT01757687, USNMENT01757688, USNMENT01757689). 6; same locality and host; 2 May 1945; RML 21800; (USNMENT01757690, USNMENT01757691, USNMENT01757692, USNMENT01757693, USNMENT01757694, USNMENT01757695). 5; same locality and host; 17 May 1945; RML 21817; (USNMENT01757696, USNMENT01757697, USNMENT01757698, USNMENT01757699, USNMENT01757700). 3; same locality; 27 Mar. 1946; ex *Tamiasciurus* sp. (Rodentia: Sciuridae); RML 2254; (USNMENT01757701, USNMENT01757702, USNMENT01757703). 1; same locality; 10 May 1945; ex *Citellus columbianus* Ord (= *Urocitellus columbianus*) (Rodentia: Sciuridae); RML 21809; (USNMENT01757704). 4; Idaho State, Camas County. 30 Jun. 1945; ex “unidentified marmot” (Rodentia: Sciuridae); RML 21851; (USNMENT01757705, USNMENT01757706, USNMENT01757707, USNMENT01757708).

***lutui, Kymocta Goff, Whitaker and Dietz, 1983: 185***

**Holotype (L)**

BRAZIL • Minas Gerais State, National Park of Serra da Canastra, Fazenda das Pedras; 30 Apr. 1979; ex *Zygodontomys lasiurus* Lund (= *Necromys lasiurus*) (Rodentia: Cricetidae); BPBM 12712; (USNMENT01757709).

**Paratypes (L)**

BRAZIL • 2; same locality and host; 29 May 1979; (USNMENT01757710, USNMENT01757711). 2; same locality and host; 27 Jun. 1979; (USNMENT01757712, USNMENT01757713). 1; Minas Gerais State, São Roque de Minas; 29 Aug. 1979; same host; (USNMENT01757714).

***lygosomae*, *Acomatacarus* Dumbleton, 1946: 410**

**Paratype (L)**

NEW ZEALAND • 1; Waitaki District, Weston City, Meek's Hill; 19 Oct. 1913; ex *Lygosoma grande* Gray (= *Oligosoma grande*) (Squamata: Scincidae); G. Garrow coll.; (USNMENT01757715).

***lynni*, *Schoengastia* Ewing, 1942: 487**

**Holotype (L)**

JAMAICA • Blue Mountain Peak; no date; ex “unidentified frog” (Anura); Lynn coll.; USNM 1412; (USNMENT01757716).

**Paratype (L)**

JAMAICA • 1; same data as holotype; (USNMENT01757717).

***maai*, *Whartonia* Nadchatram and Wilson, 1965: 224**

**Paratype (L)**

INDONESIA • 1; West Papua Province, Kebar Valley; 17 Jan. 1962; ex *Rousettus amplexicaudatus* (É. Geoffroy Saint-Hilaire) (Chiroptera: Pteropodidae); BPBM 4028; (USNMENT01757718).

***mabuyana*, *Acomatacarus* Lawrence, 1949: 456**

**Paratype (L)**

ZIMBABWE • 1; Bulawayo District; no date; ex *Mabuya varia* Loveridge (= *Trachylepis brauni* [Tornier]) (Squamata: Scincidae); NM 4807; (USNMENT01757719).

***mabuyana*, *Schoengastia* Lawrence, 1949: 423**

**Paratype (L)**

ZIMBABWE • 1; Harare Province, Chishawasha; no date; ex *Mabuya striata* V. FitzSimons and Brain (= *Trachylepis striata* [W. Peters]) (Squamata: Scincidae); SAM 8713; (USNMENT01757720).

***macacaphilus*, *Leptotrombidium* (*Leptotrombidium*) Brown, 1992: 284**

**Paratype (L)**

PHILIPPINES • 1; Mindanau Island, Masawan; 27 Dec. 1961; ex *Macaca fascicularis philippinensis* (I. Geoffroy) (Primates: Cercopithecidae); (USNMENT01757721).

***macarenae*, *Quadrasetta* Brennan and Jones, 1964a: 308**

**Holotype (L)**

COLOMBIA • Meta Department; 21 Apr. 1957; ex *Oryzomys albigularis* (Tomes) (= *Nephelomys albigularis*) (Rodentia: Cricetidae); RML 34899; (USNMENT01757722).

***mackenziei*, *Euschoengastia* Yunker and Brennan, 1964: 193**

**Holotype (L)**

BOLIVIA • Beni Department, San Joaquin; 2 Jul. 1963; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); M. L. Kuns coll.; RML 39035; (USNMENT01757723).

**Paratypes (L)**

BOLIVIA • 3; same data as holotype; (USNMENT01757724, USNMENT01757725, USNMENT01757726). 3; same locality and host; 1 Jul. 1963; (USNMENT01757727, USNMENT01757728, USNMENT01757729). 1; same locality and host; 30 Jul. 1963; C. E. Yunker coll.; (USNMENT01757730) 5; same locality; Mar. to Jul. 1963; ex *Calomys callosus* (Rengger) (Rodentia: Cricetidae); (USNMENT01757731, USNMENT01757732, USNMENT01757733, USNMENT01757734, USNMENT01757735).

***macrochaeta*, *Trombicula* Brennan and Jones, 1961b: 196****Holotype (L)**

PERU • Puno Department, Sandia Province, Limbani District; 31 Aug. 1951; ex *Neotomys ebriosus* Thomas (Rodentia: Cricetidae); RML 31559; (USNMENT01757736).

**Paratypes (L)**

PERU • 1; same data as holotype; (USNMENT01757737).

***macroshenum*, *Leptotrombidium* (*Trombiculindus*) Traub, Nadchatram and Lakshana, 1968: 365****Paratypes (L)**

THAILAND • 2; Kanchanaburi Province; 25 to 30 Apr. 1958; ex *Callosciurus melanogaster* (Thomas) (Rodentia: Sciuridae); (USNMENT01757738, USNMENT01757739). 13; same locality and date; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); (USNMENT01757740, USNMENT01757741, USNMENT01757742, USNMENT01757743, USNMENT01757744, USNMENT01757745, USNMENT01757746, USNMENT01757747, USNMENT01757748, USNMENT01757749, USNMENT01757750, USNMENT01757751, USNMENT01757752).

***macrozota*, *Trombicula* Brennan and Jones, 1960: 518****Holotype (L)**

TRINIDAD AND TOBAGO • Sangre Grande Region, Mount Tamana, Taman Hill Cave; 13 Jun. 1955; ex *Mormoops megalophylla* (Peters) (Chiroptera: Mormoopidae); RML 33680; (USNMENT01757753).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 24; same data as holotype; (USNMENT01757754, USNMENT01757755, USNMENT01757756, USNMENT01757757, USNMENT01757758, USNMENT01757759, USNMENT01757760, USNMENT01757761, USNMENT01757762, USNMENT01757763, USNMENT01757764, USNMENT01757765, USNMENT01757766).



USNMENT01757767, USNMENT01757768, USNMENT01757769,  
 USNMENT01757770, USNMENT01757771, USNMENT01757772,  
 USNMENT01757773, USNMENT01757774, USNMENT01757775,  
 USNMENT01757776, USNMENT01757777). 1; same data; RML 33676;  
 (USNMENT01757778). 22; same locality and host; 12 Jun. 1956; RML 34018;  
 (USNMENT01757779, USNMENT01757780, USNMENT01757781,  
 USNMENT01757782, USNMENT01757783, USNMENT01757784,  
 USNMENT01757785, USNMENT01757786, USNMENT01757787,  
 USNMENT01757788, USNMENT01757789, USNMENT01757790,  
 USNMENT01757791, USNMENT01757792, USNMENT01757793,  
 USNMENT01757794, USNMENT01757795, USNMENT01757796,  
 USNMENT01757797, USNMENT01757798, USNMENT01757799,  
 USNMENT01757800). 30; same locality and host; 20 Nov. 1957; RML 34665;  
 (USNMENT01757801, USNMENT01757802, USNMENT01757803,  
 USNMENT01757804, USNMENT01757805, USNMENT01757806,  
 USNMENT01757807, USNMENT01757808, USNMENT01757809,  
 USNMENT01757810, USNMENT01757811, USNMENT01757812,  
 USNMENT01757813, USNMENT01757814, USNMENT01757815,  
 USNMENT01757816, USNMENT01757817, USNMENT01757818,  
 USNMENT01757819, USNMENT01757820, USNMENT01757821,  
 USNMENT01757822, USNMENT01757823, USNMENT01757824,  
 USNMENT01757825, USNMENT01757826, USNMENT01757827,  
 USNMENT01757828, USNMENT01757829, USNMENT01757830).

***maculata*, *Ascoschoengastia* Goff, 1979f: 533**

**Paratypes (L)**

PAPUA NEW GUINEA • 2; Hela Province, Tari-Pori District, Tari; 21 Sep. 1963; ex  
*Phalanger vestitus* (Milne-Edwards) (Diprotodontia: Phalangeridae); P. Temple coll.;  
 BPBM 11406; (USNMENT01757831, USNMENT01757832).

***mediense*, *Leptotrombidium* (*Leptotrombidium*) Traub and Nadchatram, 1967c: 483**

**Holotype (L)**

MALAYSIA • Sabah State, Mount Trusmadi; 23 Jul. 1953; ex *Crocidura* sp. (Eulipotyphla: Soricidae); (USNMENT01757833).

***magna, Euschoengastia* Farrell, 1956: 167****Syntype (L)**

USA • 1; Pennsylvania State, Union County, Glen Iron; 16 May 1949; ex *Neotoma magister* Baird (Rodentia: Cricetidae); USNM 1992; (USNMENT01757834).

***magnatarsala, Paraschoengastia* Goff, 1982e: 556****Holotype (L)**

VENEZUELA • Barinas State, Altamira; 28 Dec. 1967; ex *Carollia* sp. (Chiroptera: Phyllostomidae); RML 33885; (USNMENT01757835).

**Paratype (L)**

VENEZUELA • 1; same data as holotype; (USNMENT01757836).

***mahaplagensis, Odontacarus* Brown and Goff, 1988a: 217****Paratype (L)**

PHILIPPINES • 1; Leyte Province, Mahaplag; 8 Aug. 1964; ex *Draco* sp. (Squamata: Agamidae); (USNMENT01757837).

***mahuensis, Hoffmannina* Brennan and Goff, 1977b: 909****Holotype (L)**

VENEZUELA • Mérida State; 20 Mar. 1966; ex *Cryptotis thomasi* (Merriam) (Eulipotyphla: Soricidae); RML 51852; (USNMENT01757838).

**Paratypes (L)**

VENEZUELA • 2; same data as holotype; (USNMENT01757839, USNMENT01757840). 3; same locality and host; 21 Mar. 1966; RML 51865; (USNMENT01757841, USNMENT01757842, USNMENT01757843). 1; same data; RML 49056; (USNMENT01757844). 1; same locality; 14 Mar. 1966; ex *Thomasomys laniger* (Thomas) (Rodentia: Cricetidae); RML 49044; (USNMENT01757845). 1; same locality; 16 Mar.

1966; ex *Oryzomys minutus* Tomes (= *Microryzomys minutus*) (Rodentia: Cricetidae); RML 51868; (USNMENT01757846).

***malayanum*, *Leptotrombidium* (*Leptotrombidium*) Nadchatram and Upham, 1966a: 105**

**Holotype (L)**

MALAYSIA • Pahang State, Cameron Highlands District, Mount Batu Brinchang; 1 Dec. 1964; ex *Rattus alticola* (Thomas) (= *Maxomys alticola*) (Rodentia: Muridae); (USNMENT01757847).

***malayensis*, *Neoschoengastia* Gater, 1932: 158**

**Paratype (L)**

MALAYSIA • 1; Selangor State, Petaling District, Sungai Buloh; 24 Jun. 1930; ex *Rattus* sp. (Rodentia: Muridae); USNM 1054; (USNMENT01757848).

***maldiviensis*, *Schoengastia* Radford, 1946a: 48**

**Syntypes (L)**

MALDIVES • 3; Addu Atoll, Gan Island; 22 Nov. 1944; ex *Calotes versicolor* Daudin (Squamata: Agamidae); C. D. Radford coll.; USNM 1574; (USNMENT01757849, USNMENT01757850, USNMENT01757851).

***manjuyodensis*, *Diplectria* Brown, 1997b: 153**

**Paratypes (L)**

PHILIPPINES • 1; Negros Oriental Province; 10 Jun. 1984; ex *Taphozous melanopogon* Temminck (Chiroptera: Emballonuridae); H. Klompen coll.; HK 84-0717; (USNMENT01757852). 1; same locality and host; 17 Feb. 1987; HK 87-0217; (USNMENT01757853).

***manriquei*, *Trombicula* Ewing, 1937: 169**

**Holotype (P)**

COLOMBIA • 1♂; Meta Department; 26 Oct. 1936; “in soil”; J. C. Bequaert coll.; USNM 1261; (USNMENT01757854).

***manueli*, *Parasecia* Brennan and Jones, 1960: 520**

**Holotype (L)**

TRINIDAD AND TOBAGO • Saint Andrew County; 7 Feb. 1957; ex *Zygodontomys brevicauda* J. A. Allen and Chapman (Rodentia: Cricetidae); RML 34190; (USNMENT01757855).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 3; Tunapuna–Piarco Region, Tunapuna City, Maingot Road, Trinidad and Tobago; 19 Oct. 1955; same host; RML 33856; (USNMENT01757856, USNMENT01757857, USNMENT01757858). 6; same locality and host; 3 Oct. 1955; RML 33847; (USNMENT01757859, USNMENT01757860, USNMENT01757861, USNMENT01757862, USNMENT01757863, USNMENT01757864). 3; same locality and host; 4 Oct. 1955; RML 33844; (USNMENT01757865, USNMENT01757866, USNMENT01757867). 8; same data; RML 33846; (USNMENT01757868, USNMENT01757869, USNMENT01757870, USNMENT01757871, USNMENT01757872, USNMENT01757873, USNMENT01757874, USNMENT01757875). 1; same locality and host; 24 Oct. 1955; RML 33848; (USNMENT01757886). 1; same data; RML 33851; (USNMENT01757887). 2; same locality and host; 21 Feb. 1956; RML 35794; (USNMENT01757888, USNMENT01757889). 1; same data; RML 35795; (USNMENT01757890). 1; same locality and host; 13 Feb. 1956; RML 33812; (USNMENT01757891). 1; same locality and host; 19 May 1956; RML 35783; (USNMENT01757892). 6; same data; RML 33856; (USNMENT01757893, USNMENT01757894, USNMENT01757895, USNMENT01757896, USNMENT01757897, USNMENT01757898). 1; same locality and host; 15 Nov. 1955; RML 33864; (USNMENT01757899). 2; same locality and host; 7 Apr. 1956; RML 33896; (USNMENT01757900, USNMENT01757901). 1; same locality and host; 10 Jan. 1956; RML 33858; (USNMENT01757902). 1; same locality and host; 19 May 1956; RML 33857; (USNMENT01757903). 1; same locality and host; 4 Jun. 1955; RML 33665. 1; same locality and host; 13 Jun. 1955; RML 33680; (USNMENT01757904).

***margaretae*, *Guntheria* (*Guntheria*) Goff, 1981c: 112****Paratypes (L)**

PAPUA NEW GUINEA • 2; East Sepik Province, Ambunti-Dreikikier District, Ambunti; 10 May 1963; ex *Melomys platyops* (Thomas) (= *Paramelomys platyops*) (Rodentia: Muridae); BPBM 11905; (USNMENT01757905, USNMENT01757906).

***marginalis*, *Euschoengastia* Wrenn and Somerby, 1974: 7****Holotype (L)**

USA • California State, Riverside County, Joshua Tree National Park; 19 Feb. 1961; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); K. D. Peyton coll.; KDP 610314; (USNMENT01757907).

**Paratype (L)**

USA • 1; same data as holotype; (USNMENT01757908).

***marita*, *Bernia* Allred and Beck, 1966: 43****Holotype (L)**

USA •; Utah State, Tooele County; 24 Jun. 1953; ex *Perognathus longimembris* (Coues) (Rodentia: Heteromyidae); USNM 1365; (USNMENT01757909).

***marmosa*, *Eutrombicula* Brennan and Reed, 1974b: 703****Holotype (L)**

VENEZUELA • Capital District; 26 May 1967; ex *Marmosa fuscata* Thomas (= *Marmosops fuscatus*) (Didelphimorphia: Didelphidae); Smithsonian Army coll.; RML 52628; (USNMENT01757910).

**Paratypes (L)**

VENEZUELA • 9; same data as holotype; (USNMENT01757911, USNMENT01757912, USNMENT01757913, USNMENT01757914, USNMENT01757915, USNMENT01757916, USNMENT01757917, USNMENT01757918, USNMENT01757919).

***marmotae*, *Euschoengastia* Farrell, 1956: 184****Syntypes (L)**

USA • 7; Pennsylvania State, Jefferson County; 19 Apr. 1948; ex *Marmota monax* (L.) (Rodentia: Sciuridae); USNM 1995; (USNMENT01757920, USNMENT01757921, USNMENT01757922, USNMENT01757923, USNMENT01757924, USNMENT01757925, USNMENT01757926).

***marshi*, *Gahrliopia* (*Gahrliopia*) Traub and Morrow, 1957: 175****Holotype (L)**

THAILAND • Khon Kaen Province, Chum Phae District; 1953; ex *Sus scrofa* (L.) (Cetartiodactyla: Suidae); R. E. Elbel coll.; USNM 2442; (USNMENT01757927).

***martini*, *Akodonacarus* Goff and Webb, 1989a: 75****Holotype (L)**

CHILE • Malleco Province, Nahuelbuta National Park; 12 Jan. 1976; ex *Akodon* sp. (Rodentia: Cricetidae); R. E. Martin coll.; REM 1353; (USNMENT017579028).

**Paratypes (L)**

CHILE • 3; same data as holotype; (USNMENT01757929, USNMENT01757930, USNMENT01757931).

***martini*, *Chilacarus* Webb, Bennett and Loomis, 1986: 83****Paratypes (L)**

CHILE • 3; Malleco Province, Nahuelbuta National Park; 13 Jan. 1976; ex *Akodon longipilis* (Waterhouse) (= *Abrothrix longipilis*) (Rodentia: Cricetidae); R. E. Martin coll.; REM 1362; (USNMENT01757932, USNMENT01757933, USNMENT01757934); 1; same locality and host; 11 Jan. 1976; REM 1334; (USNMENT01757935).

***marui*, *Blankaartia* Brennan and Yunker, 1966a: 249****Holotype (L)**

PANAMA • Panama province, Cerro Azul; 29 May 1961; ex *Nycticorax nycticorax* (L.) (Pelecaniformes: Ardeidae); RML 40982; (USNMENT01757936).

**Paratypes (L)**

PANAMA • 1; same data as holotype; (USNMENT01757937). 1; same data; RML 40983; (USNMENT01757938).

***masawanensis, Cheladonta (Susa) Brown, 1998b: 107***

**Paratype (L)**

PHILIPPINES • 1; Zamboanga del Norte Province, Dapitan; no date; ex *Callosciurus mindanensis* Steere (= *Sundasciurus mindanensis*) (Rodentia: Sciuridae); (USNMENT01757939).

***maseri, Euschoengastia Wrenn, 1983: 203***

**Holotype (L)**

USA • Oregon State, Coos County; 14 Oct. 1970; ex *Aplodontia rufa* (Rafinesque) (Rodentia: Aplodontiidae); C. Maser coll.; RML 59946; (USNMENT01757940).

**Paratype (L)**

USA • 1; same data as holotype; (USNMENT01757941).

***masonae, Austracarus Goff, 1983e: 337***

**Holotype (L)**

SOUTH AFRICA • Western Cape Province, Diep River; 29 May 1980; ex *Myosorvarius* (Smuts) (Eulipotyphla: Soricidae); (USNMENT01757942)

**Paratypes (L)**

SOUTH AFRICA • 1; same data as holotype; (USNMENT01757943).

***masoni, Acariscus Ewing, 1943: 60***

**Syntype (L)**

USA • 1; Florida State, Orange County, Orlando; 30 May 1922; ex *Homo sapiens* L. (Primates: Hominidae); A. C. Mason coll.; USNM 1426; (USNMENT01757944).

***masta, Ascoschoengastia Traub and Sundermeyer, 1950: 35***

**Paratypes (L)**

MYANMAR • 5; Kachin State, Myitkyina; 23 Nov. 1944; ex *Rattus rattus* (L.) (Rodentia: Muridae); (USNMENT01757945, USNMENT01757946, USNMENT01757947, USNMENT01757948, USNMENT01757949).

***mastigophorum*, *Leptotrombidium* (*Lorillatum*) Nadchatram, 1963: 474**

**Holotype (L)**

LAOS • Xieng Khouang Province; 19 Aug. 1960; ex *Rattus niviventer* Hodgson (= *Niviventer niviventer*) (Rodentia: Muridae); R. E. Leech and M. Nadchatram coll.; USNM 103921; (USNMENT01757950).

**Paratypes (L)**

LAOS • 1; same data as holotype; USNM 105305; (USNMENT01757951). 1; same data; USNM 103944; (USNMENT01757952).

***mastigophorus*, *Odontacarus* Brennan and Dalmat, 1960: 184**

**Holotype (L)**

GUATEMALA • Chimaltenango Department, Acatenango; 30 Mar. 1951; ex *Gallus gallus domesticus* (L.) (Galliformes: Phasianidae); RML 29888; (USNMENT01757953).

**Paratypes (L)**

GUATEMALA • 2; same data as holotype; (USNMENT01757954, USNMENT01757955). 18; same locality; 27 Feb 1951; ex *Sylvilagus floridanus* (J.A. Allen) (Lagomorpha: Leporidae); RML 29908; (USNMENT01757956, USNMENT01757957, USNMENT01757958, USNMENT01757959, USNMENT01757960, USNMENT01757961, USNMENT01757962, USNMENT01757963, USNMENT01757964, USNMENT01757965, USNMENT01757966, USNMENT01757967, USNMENT01757968, USNMENT01757969, USNMENT01757970, USNMENT01757971, USNMENT01757972, USNMENT01757973). 1; same locality; 25 Apr. 1951; ex *Neotoma* sp. (Rodentia: Cricetidae); RML 29869; (USNMENT01757974).

***matoppoanus*, *Ascoschoengastia* Lawrence, 1949: 435**

**Paratypes (L)**



ZIMBABWE • 2; Matobo District, Matobo National Park; no date; ex *Platysaurus guttatus* A. Smith (Squamata: Cordylidae); NM 4869; (USNMENT01757975, USNMENT01757976).

***maxwelli*, *Leptotrombidium (Trombiculindus)* Traub and Nadchatram, 1967b: 428**

**Holotype (L)**

MALAYSIA • Perak State, Taiping City, Bakit Larut; 21 Mar. 1958; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); R. Traub coll.; RT B 47681; (USNMENT01757977).

**Paratype (L)**

MALAYSIA • 1; same locality; 20 Mar. 1958; ex *Crocidura* sp. (Eulipotyphla: Soricidae); RT B 47634; (USNMENT01757978).

***megaderma*, *Microtrombicula* Brown, 1997b: 154**

**Holotype (L)**

PHILIPPINES • Leyte Province, Leyte Island; 20 Mar. 1987; ex *Megaderma spasma* L. (Chiroptera: Megadermatidae); H. Klompen coll.; HK 87-0321; (USNMENT01757979).

***megastyrax*, *Euschoengastia* Brennan and Jones, 1960: 506**

**Holotype (L)**

TRINIDAD AND TOBAGO • Sangre Grande Region, Caigual; 8 Jan. 1959; ex *Desmodus rotundus* (É. Geoffroy) (Chiroptera: Phyllostomidae); RML 35074; (USNMENT01757980).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 3; same data as holotype; (USNMENT01757981, USNMENT01757982, USNMENT01757983).

***melanesiana*, *Ascoschoengastia (Laurentella)* Nadchatram, 1970a: 10**

**Paratypes (L)**

PAPUA NEW GUINEA • 3; Southern Highlands Province, Lavani Valley; 5 Jan. 1968, ex *Rattus niobe* Thomas (Rodentia: Muridae); (USNMENT01757984, USNMENT01757985, USNMENT01757986).

***melomys*, *Guntheria* (*Guntheria*) Goff, 1981c: 112****Paratype (L)**

INDONESIA • 1; Dogiyai Regency, Papua Province, Moanemani; 16 Aug. 1962; ex *Melomys platyops* (Thomas) (= *Paramelomys platyops*) (Rodentia: Muridae); BPBM 11904; (USNMENT01757987).

***melvini*, *Trisetica* Traub and Evans, 1950b: 356****Holotype (L)**

MYANMAR • Kachin State, Myitkyina; 1 May 1945; “in the ground of a cave”; USATC 1032; (USNMENT01757988).

**Paratype (L)**

MYANMAR • 1; same data as holotype; (USNMENT01757989).

***merga*, *Trombicula* Brennan and Jones, 1960: 522****Holotype (L)**

TRINIDAD AND TOBAGO • Sangre Grande Region, Biche; 20 Jan. 1957; ex *Amazona amazonica* (L.) (Psittaciformes: Psittacidae); RML 34185; (USNMENT01757990).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 3; same data as holotype; (USNMENT01757991, USNMENT01757992, USNMENT01757993).

***mermeriza*, *Pseudoschoengastia* Brennan and Yunker, 1966a: 247****Holotype (L)**

PANAMA • Panama Province, Paraíso; 26 Feb. 1962; ex *Coendou rothschildi* Thomas (= *Coendou quichua*) (Rodentia: Erethizontidae); RML 44508; (USNMENT01757994).

***merrihewi*, *Trombicula* Loomis and Lipovsky, 1954: 51****Paratypes (L)**

USA • 3; Oklahoma State, Woods County; 24 Aug. 1949; ex *Tadarida brasiliensis mexicana* (Saussure) (Chiroptera: Molossidae); KU 3473; (USNMENT01757995, USNMENT01757996, USNMENT01757997).

***mesoamericana, Microtrombicula (Scapuscutala) Webb and Loomis, 1971: 323*****Holotype (L)**

MEXICO • Nayarit State, San Blas; 26 Dec. 1966; ex *Rattus rattus* (L.) (Rodentia: Muridae); C. B. Robbins, R. A. Blake, L. W. Robbins and J. W. LeDuc coll.; CBR 661226; (USNMENT01757998).

***metatarsalis, Ascoschoengastia (Laurentella) Nadchatram, 1970a: 21*****Paratype (L)**

PAPUA NEW GUINEA • 1; Morobe Province, Bulldog Track; 31 Oct. 1967; ex *Melomys* sp. (Rodentia: Muridae); BPBM 8246; (USNMENT01757999).

***mexicana, Trombicula Ewing, 1937: 172*****Lectotype (L)**

MEXICO • San Luis Potosi State; 7 Apr. 1931; ex “unidentified bat” (Chiroptera); R. A. Roberts coll.; USNM 1259; (USNMENT01758000).

***mexicana, Walchiella (Cordiseta) Hoffmann, 1954: 29*****Holotype (L)**

MEXICO • Chiapas State; 7 Sep. 1953; ex *Neotoma ferruginea* Tomes (= *Neotoma mexicana* Baird) (Rodentia: Cricetidae); (USNMENT01758001).

***micheneri, Acomatacarus (Acomatacarus) Greenberg, 1952: 480*****Paratypes (L)**

USA • 2; Colorado State, Rio Blanco County; 29 Aug. 1948; ex *Neotoma cinerea* (Ord) (Rodentia: Cricetidae); R. B. Finley coll.; (USNMENT01758002, USNMENT01758003).

***micheneri, Cheladonta Lipovsky, Crossley and Loomis, 1955: 137*****Paratypes (L)**

USA • 2; Kansas State, Douglas County; 12 Dec. 1949; ex *Sylvilagus floridanus* (J.A. Allen) (Lagomorpha: Leporidae); (USNMENT01758004, USNMENT01758005).

***micheneri*, *Euschoengastia* Gould, 1956: 64****Holotype (L)**

USA • California State, San Luis Obispo County; 23 Oct. 1951; ex *Citellus beecheyi* (Richardson) (= *Otospermophilus beecheyi*) (Rodentia: Sciuridae); J. Poll coll.; (USNMENT01758006).

**Paratypes (L)**

USA • 1; same data as holotype; (USNMENT01758007). 6; California State, San Diego County, San Diego; 16 Jun. 1949; same host; (USNMENT01758008, USNMENT01758009, USNMENT01758010, USNMENT01758011, USNMENT01758012, USNMENT01758013). 2; same locality; 13 Jun. 1949; ex *Rattus norvegicus* (Berkenhout) (Rodentia: Muridae); (USNMENT01758014, USNMENT01758015).

***michiganensis*, *Euschoengastia* Wrenn, 1974: 235****Holotype (L)**

USA • Michigan State, Emmet County; 1 Jul. 1966; ex *Microtus pennsylvanicus* (Ord) (Rodentia: Cricetidae); W. J. Wrenn coll.; WJW 660701; (USNMENT01758016).

***micropelta*, *Gahliepia* (*Walchia*) Traub and Evans, 1954: 311****Holotype (L)**

THAILAND • Phu Khiao District, Chaiyaphum Province; 25 Jan. 1952; ex *Mus* sp. (Rodentia: Muridae); USATC 9905; (USNMENT01758017).

**Paratype (L)**

THAILAND • 1; same locality; 11 Dec. 1952; ex *Rattus* sp. (Rodentia: Muridae); USATC 17530; (USNMENT01758018).

***microti*, *Trombicula* Ewing, 1928: 80****Syntypes (L)**

USA • 6; Wyoming State, Gravel Creek; 13 Aug. 1927; ex *Microtus richardsoni* (DeKay) (Rodentia: Cricetidae); O. J. Murie coll.; USNM 984; (USNMENT01758019,

USNMENT01758020, USNMENT01758021, USNMENT01758022,  
USNMENT01758023, USNMENT01758024).

***micula, Trombicula (Leptotrombidium) Traub and Audy, 1954a: 51***

**Holotype (L)**

MALAYSIA • Sarawak State, Kuching; Nov. 1951; ex *Nannosciurus melanotis* (Müller) (Rodentia: Sciuridae); USNM 2017; (USNMENT01758025).

**Paratypes (L)**

MALAYSIA • 5; same data as holotype; (USNMENT01758026, USNMENT01758027, USNMENT01758028, USNMENT01758029, USNMENT01758030). 2; same locality and date; ex *Callosciurus notatus* (Boddaert) (Rodentia: Sciuridae); (USNMENT01758031, USNMENT01758032).

***midwayensis, Womersia Goff, Sievert and Sileo, 1989: 484***

**Holotype (L)**

USA • Midway Atoll, Sand Island; 11 Jul. 1987; ex *Diomedea immutabilis* Rothschild (= *Phoebastria immutabilis*) (Procellariiformes: Diomedeidae); P. R. Sievert coll.; (USNMENT01758033).

**Paratypes (L)**

USA • 5; same data as holotype; (USNMENT01758034, USNMENT01758035, USNMENT01758036, USNMENT01758037, USNMENT01758038).

***mima, Gahrlepiea (Walchia) Traub and Evans, 1957: 315***

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 21 Aug. 1953; ex *Dremomys everetti* (Thomas) (Rodentia: Sciuridae); R. Traub coll.; USATC 19344; (USNMENT01758039).

**Paratypes (L)**

MALAYSIA • 1; same locality and host; 31 Aug. 1953; USATC 19433; (USNMENT01758040). 1; same locality and host; 12 Aug. 1953; USATC 19200; (USNMENT01758041). 1; same locality and host; 16 Aug. 1953; USATC 19245; (USNMENT01758042).

***mindanensis, Leptotrombidium (Leptotrombidium) Brown, 1992: 286*****Paratype (L)**

PHILIPPINES • 1; Mindanau Island; 24 Dec. 1961; ex *Macaca fascicularis philippinensis* (I. Geoffroy) (Primates: Cercopithecidae); (USNMENT01758043).

***minicolus, Colicus Brennan, 1970a: 272*****Holotype (L)**

COLOMBIA • Cauca Department, Saija River; 31 May 1958; ex *Myotis* sp. (Chiroptera: Vespertilionidae); von Sneidern coll.; RML 49978; (USNMENT01758044).

***minima, Guntherana Nadchatram and Traub, 1969: 265*****Paratype (L)**

PAPUA NEW GUINEA • 2; Morobe Province, Wau; 5 Nov. 1966; ex *Rattus* sp. (Rodentia: Muridae); BPBM 8207; (USNMENT01758045, USNMENT01758046).

***miniopteri, Microtrombicula Ah, 1964: 189*****Holotype (L)**

SOUTH KOREA • Haeundae District, Busan; 4 Jan. 1963; ex *Miniopterus schreibersii japoniae* Thomas (Chiroptera: Miniopteridae); H. S. Ah coll.; (USNMENT01758047).

***mira, Loomisia Brennan and Bronswijk, 1975: 244*****Holotype (L)**

SURINAME • without specific locality; 4 Sep. 1971; ex *Peropteryx* sp. (Chiroptera: Emballonuridae); RML 58556; (USNMENT01758048).

**Paratypes (L)**

SURINAME • 5; same data as holotype; (USNMENT01758049, USNMENT01758050, USNMENT01758051, USNMENT01758052, USNMENT01758053). 19; same locality and host; 18 Aug. 1971; RML 58529; (USNMENT01758054, USNMENT01758055, USNMENT01758056, USNMENT01758057, USNMENT01758058, USNMENT01758059, USNMENT01758060, USNMENT01758061,

USNMENT01758062,                   USNMENT01758063,                   USNMENT01758064,  
 USNMENT01758065,                   USNMENT01758066,                   USNMENT01758067,  
 USNMENT01758068,                   USNMENT01758069,                   USNMENT01758070,  
 USNMENT01758071, USNMENT01758072).

***mirafra*, *Ascoschoengastia* Radford, 1942: 78**

**Paratype (L)**

UGANDA • 1; Kampala Capital City Authority District, Katwe area; 14 Jul. 1939; ex *Mirafra africana tropicalis* Hartert (Passeriformes: Alaudidae); G. H. E. Hopkins coll.; (USNMENT01758073).

***mirandae*, *Quadrasetta* Goff and Brennan, 1977a: 504**

**Holotype (L)**

VENEZUELA • Miranda State, Quebrada Chacaíto River; 18 May 1967; ex *Oryzomys albigularis* (Tomes) (= *Nephelomys albigularis*) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 52518; (USNMENT01758074).

**Paratypes (L)**

VENEZUELA • 5; same data as holotype; (USNMENT01758075, USNMENT01758076, USNMENT01758077, USNMENT01758078, USNMENT01758079).

***mirzai*, *Guntheria* (*Guntheria*) Goff, 1979c: 112**

**Paratypes (L)**

PAPUA NEW GUINEA • 3; Sandaun Province, Telefomin District; 1 Mar. 1970; ex *Melomys rub* Thomas (= *Paramelomys rubex*) (Rodentia: Muridae); A. B. Mirza coll.; BPBM 11408; (USNMENT01758080, USNMENT01758081, USNMENT01758082, USNMENT01758083).

***misonnei*, *Zumptrombicula* Goff, 1983f: 511**

**Holotype (L)**

SOUTH AFRICA • Northern Cape Province, Studer's Pass; 3 Oct. 1980; ex *Aethomys namaquensis* (A. Smith) (= *Micaelamys namaquensis*) (Rodentia: Muridae); (USNMENT01758084).

**Paratypes (L)**

SOUTH AFRICA • 7; Mpumalanga Province, Grootvlei; 2 Oct. 1980; same host; (USNMENT01758085, USNMENT01758086, USNMENT01758087, USNMENT01758088, USNMENT01758089, USNMENT01758090, USNMENT01758091).

***mitchellensis*, *Cotrombicula* Goff, 1983d: 134****Paratypes (L)**

AUSTRALIA • 6; Western Australia State, Kimberley region, Mitchell River National Park, Mitchell Plateau; 23 Oct. 1976; ex *Taphozous georgianus* Thomas (Chiroptera: Emballonuridae); (USNMENT01758092, USNMENT01758093, USNMENT01758094, USNMENT01758095, USNMENT01758096, USNMENT01758097).

***mitchelli*, *Leptotrombidium* (*Leptotrombidium*) Nadchatram, 1970b: 153****Paratype (L)**

NEPAL • 1; Kirat Province, Jhapa District, Terai; 2 Dec. 1965; ex *Suncus murinus* L. (Eulipotyphla: Soricidae); BPBM 8893; (USNMENT01758098).

***monodolfii*, *Intercutestrix* Brennan and Yunker, 1969: 299****Holotype (L)**

VENEZUELA • Bolivar State, 20 Apr. 1968; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); RML 49107; (USNMENT01758099).

**Paratypes (L)**

VENEZUELA • 3; same data as holotype; (USNMENT01758100, USNMENT01758101, USNMENT01758102). 5; same data; RML 49108; (USNMENT01758103, USNMENT01758104, USNMENT01758105, USNMENT01758106, USNMENT01758107). 10; same locality and host; 15 Apr. 1968; RML 49101; (USNMENT01758108, USNMENT01758109, USNMENT01758110, USNMENT01758111, USNMENT01758112, USNMENT01758113, USNMENT01758114, USNMENT01758115, USNMENT01758116, USNMENT01758117). 2; same locality and host; 19 Apr. 1968; RML 49013;



(USNMENT01758118, USNMENT01758119). 7; same data; RML 49104;  
 (USNMENT01758120, USNMENT01758121, USNMENT01758122,  
 USNMENT01758123, USNMENT01758124, USNMENT01758125,  
 USNMENT01758126). 16; same locality and host; 22 Apr. 1968; RML 49111;  
 (USNMENT01758127, USNMENT01758128, USNMENT01758129,  
 USNMENT01758130, USNMENT01758131, USNMENT01758132,  
 USNMENT01758133, USNMENT01758134, USNMENT01758135,  
 USNMENT01758136, USNMENT01758137, USNMENT01758138,  
 USNMENT01758139, USNMENT01758140, USNMENT01758141,  
 USNMENT01758142).

***monops*, *Trombicula* Brennan and Jones, 1960: 524**

**Holotype (L)**

TRINIDAD AND TOBAGO • Sangre Grande Region, Mount Tamana, Taman Hill Cave;  
 20 Nov. 1957; ex *Mormoops tumidiceps* Miller (= *Mormoops megalophylla*) (Chiroptera:  
 Mormoopidae); RML 34665; (USNMENT01758143).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 12; same data as holotype; (USNMENT01758144,  
 USNMENT01758145, USNMENT01758146, USNMENT01758147,  
 USNMENT01758148, USNMENT01758149, USNMENT01758150,  
 USNMENT01758151, USNMENT01758152, USNMENT01758153,  
 USNMENT01758154, USNMENT01758155). 2; same locality and host; 13 Jun. 1955;  
 RML 33680; (USNMENT01758156, USNMENT01758157). 1; same data; RML 33675;  
 (USNMENT01758158).

***montanensis*, *Trombicula* Brennan, 1946a: 441**

**Holotype (L)**

USA • Montana State, Wheatland County; 20 Aug. 1945; ex *Cynomys ludovicianus* (Ord)  
 (Rodentia: Sciuridae); RML 21982; (USNMENT01758159).

**Paratypes (L)**

USA • 11; same data as holotype; (USNMENT01758160, USNMENT01758161, USNMENT01758162, USNMENT01758163, USNMENT01758164, USNMENT01758165, USNMENT01758166, USNMENT01758167, USNMENT01758168, USNMENT01758169, USNMENT01758170). 4; same data; RML 21983; (USNMENT01758171, USNMENT01758172, USNMENT01758173, USNMENT01758174). 4; same locality; 31 Aug. 1945; ex *Sylvilagus nuttallii grangeri* (J. A. Allen) (Lagomorpha: Leporidae); RML 21984; (USNMENT01758175, USNMENT01758176, USNMENT01758177, USNMENT01758178).

***monticola*, *Neoschoengastia* Wharton and Hardcastle, 1946: 301**

**Holotype (L)**

JAPAN • Okinawa Island, Takabannare; 10 Jun. 1945; ex *Monticola solitarius* (L.) (Passeriformes: Muscicapidae) USNM 1795; (USNMENT01758179).

***morlani*, *Odontacarus* Brennan, 1959: 4**

**Holotype (L)**

USA • New Mexico State, Santa Fe County; 28 Oct. 1952; ex *Neotoma micropus* Baird (Rodentia: Cricetidae); RML 31230; (USNMENT01758180).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01758181; USNMENT01762030). 1; same locality and host; 10 Oct. 1952; RML 31261; (USNMENT01758182). 1; same locality; 17 Dec. 1952; ex *Peromyscus leucopus* (Rafinesque) (Rodentia: Cricetidae); RML 31270; (USNMENT01758183).

***morrowae*, *Gahrliopia* (*Walchia*) Traub and Evans, 1957: 308**

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 2 Sep. 1953; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); USATC 19476; (USNMENT01758184).

**Paratypes (L)**

MALAYSIA • 4; same data as holotype; (USNMENT01758185, USNMENT01758186, USNMENT01758187, USNMENT01758188). 3; same locality and host; 27 Aug. 1953; USATC 19376; (USNMENT01758189, USNMENT01758190, USNMENT01758191).

***moucheti*, *Neoschoengastia* Brennan, 1956: 650**

**Holotype (L)**

CAMEROON • without specific locality; 6 Jun. 1955; ex *Francolinus squamatus* (Cassin) (= *Pternistis squamatus*) (Galliformes: Phasianidae); J. Mouchet coll.; RML 33467; (USNMENT01758192).

**Paratypes (L)**

CAMEROON • 11; same data as holotype; (USNMENT01758193, USNMENT01758194, USNMENT01758195, USNMENT01758196, USNMENT01758197, USNMENT01758198, USNMENT01758199, USNMENT01758200, USNMENT01758201, USNMENT01758202, USNMENT01758203).

***multisetosa*, *Acariscus* Ewing, 1943: 65**

**Holotype (L)**

USA • Florida State, Orange County, Christmas; 2 Jan. 1936; ex *Procyon lotor* (L.) (Carnivora: Procyonidae); B. V. Travis coll.; USNM 1427; (USNMENT01758204).

***multisetosa*, *Euschoengastia* Loomis and Somerby, 1966: 216**

**Holotype (L)**

MEXICO • Baja California State, El Rayo; 28 Dec. 1962; ex *Peromyscus truei* (Shufeldt) (Rodentia: Cricetidae); E. L. Sleeper and W. J. Wrenn coll.; WJW 621231; (USNMENT01758205).

**Paratype (L)**

MEXICO • 1; same data as holotype; (USNMENT01758206).

***multisetosa*, *Trombicula* Joshee, 1964: 47**

**Holotype (L)**

INDIA • Maharashtra State, Mumbai Suburban District, Bhandup; 16 Nov. 1959; ex *Rattus rattus* (Rodentia: Muridae); MZ 110447; (USNMENT01758207).

***multisetosa*, Whartonia Goff and Easton, 1991: 251**

**Holotype (L)**

CHINA • Hong Kong; 5 Apr. 1990; ex *Hipposideros pomona* (K. Andersen) (Chiroptera: Hipposideridae; (USNMENT01758208).

**Paratypes (L)**

CHINA • 5; same data as holotype; (USNMENT01758209, USNMENT01758210, USNMENT01758211, USNMENT01758212, USNMENT01758213).

***munchiquensis*, Odontacarus Brennan, 1968b: 679**

**Holotype (L)**

COLOMBIA • Cauca Department, Munchique National Natural Park; 11 May 1967; ex *Oryzomys albigularis* (Tomes) (= *Nephelomys albigularis*) (Rodentia: Cricetidae); Trapido coll.; RML 47752; (USNMENT01758214).

**Paratypes (L)**

COLOMBIA • 5; same locality; 6 May 1967; ex *Thomasomys cinereiventer* J.A. Allen (Rodentia: Cricetidae); RML 47748; (USNMENT01758215, USNMENT01758216, USNMENT01758217, USNMENT01758218, USNMENT01758219). 2; same locality and host; 9 May 1967; RML 47749; (USNMENT01758220, USNMENT01758221).

***munda*, Trombicula Gater, 1932: 149**

**Paratypes (L)**

MALAYSIA • 2; Selangor State, Kuala Lumpur; 4 Oct. 1929; ex *Rattus rattus diardi* (Jentink) (Rodentia: Muridae); USNM 1050; (USNMENT01758223, USNMENT01758224).

***munozii*, Alexfainia Brennan and Yunker, 1966a: 226**

**Holotype (L)**

PANAMA • Coclé province, Penonomé; 8 Feb. 1962; ex *Pteronotus (Chilonycteris) personatus psilotis* (Dobson) (Chiroptera: Mormoopidae); RML 44413; (USNMENT01758225).

**Paratypes (L)**

PANAMA • 3; same data as holotype; (USNMENT01758226, USNMENT01758227, USNMENT01758228). 1; same data; RML 44420; (USNMENT01758229). 1; same locality and host; 30 Jan. 1962; RML 44324; (USNMENT01758230).

***murphyi, Leptotrombidium (Leptotrombidium) Nadchatram, 1970b: 150***

**Paratype (L)**

NEPAL • 1; Rasuwa Province, Langtang National Park, Trishuli River; 5 Nov. 1965; ex *Rattus brunneusculus* (Hodgson) (= *Rattus tanezumi* Temminck) (Rodentia: Muridae); BPBM 8891; (USNMENT01758231).

***mushwerensis, Microtrombicula (Microtrombicula) Vercammen-Grandjean, 1965a: 113***

**Paratype (L)**

DEMOCRATIC REPUBLIC OF THE CONGO • 1; South Kivu Province, Mushweshwe; 19 Mar. 1954; ex *Rattus rattus* (L.) (Rodentia: Muridae); (USNMENT01758232).

***musivum, Polylopadium (Polylopadium) Brennan, 1969c: 870***

**Holotype (L)**

COLOMBIA • Cauca Department, Saija River; 15 Jun. 1958; ex *Proechimys* sp. (Rodentia: Echimyidae); von Sneidern coll.; RML 49983; (USNMENT01758233).

**Paratype (L)**

COLOMBIA • 1; same locality; 23 May 1958; ex *Hopломys gymnurus* Thomas (Rodentia: Echimyidae); RML 49987; (USNMENT01758234).

***mutabilis, Neoschoengastia Gater, 1932: 159***

**Paratype (L)**

MALAYSIA • 1; Selangor State, Petaling District, Sungai Buloh; 23 Jul. 1930; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); USNM 1035; (USNMENT01758235).

***myoproctae, Pseudoschoengastia Fauran, 1960: 6***

**Paratypes (L)**

FRENCH GUIANA • 3; Cayenne Department, Crique Grand Galibi; Apr. 1960; ex *Myoprocta acouchy* (Erxleben) (Rodentia: Dasyproctidae); Tissot coll.; (USNMENT01758236, USNMENT01758237, USNMENT01758238).

***myotis, Trombicula Ewing, 1929a: 294***

**Syntypes (L)**

USA • 3; Maine State, Piscataquis County, Baxter State Park, Mt. Katahdin, Basin Ponds; 23 Mar. 1936; ex *Myotis lucifugus* (Le Conte) (Chiroptera: Vespertilionidae); USNM 991; (USNMENT01758239, USNMENT01758240, USNMENT01758241).

***nadchatrami, Eutrombicula Brennan and Reed, 1974b: 703***

**Holotype (L)**

VENEZUELA • Capital District; 22 Aug. 1965; ex *Oryzomys albigularis* (Tomes) (= *Nephelomys albigularis*) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 48700; (USNMENT01758242).

**Paratypes (L)**

VENEZUELA • 1; same locality and host; 19 Dec. 1965; RML 48887; (USNMENT01758243). 1; same data; RML 45886; (USNMENT01758244). 1; same locality and host; 24 Aug. 1965; RML 48722; (USNMENT01758245). 1; same data; RML 48723; (USNMENT01758246).

***nadchatrami, Microtrombicula (Scapuscutala) Vercammen-Grandjean, 1965c: 45***

**Holotype (L)**

LAOS • Xieng Khouang Province; 25 Aug. 1960; ex *Rattus niviventer* Hodgson (= *Niviventer niviventer*) (Rodentia: Muridae); (USNMENT01758247).

***nadchatrami*, *Schoengastia* Goff, 1981e: 366****Paratype (L)**

PAPUA NEW GUINEA • 1; Western Province, Daru, Oriomo River; 20 Feb. 1964; ex *Talegalla fuscirostris* Salvadori (Galliformes: Megapodiidae); H. W. Clissold coll.; BPBM 12094; (USNMENT01758248).

***nakatae*, *Leptotrombidium* (*Leptotrombidium*) Nadchatram and Traub, 1964a: 68****Holotype (L)**

LAOS • Xieng Khouang Province; 30 Aug. 1960; ex *Rattus bowersi* Anderson (= *Berylmys bowersi*) (Rodentia: Muridae); IMR 105290; (USNMENT01758249).

**Paratype (L)**

LAOS • 1; same locality and host; 24 Aug. 1960; IMR 104910; (USNMENT01758250).

***namaquensis*, *Acomatacarus* Lawrence, 1949: 457****Paratype (L)**

SOUTH AFRICA • 1; Northern Cape Province, Namakwa District, Soebatsfontein; no date; ex *Gerrhosaurus typicus* Smith (Squamata: Gerrhosauridae); NM 4875; (USNMENT01758251).

***namrui*, *Neoschoengastia* Wharton and Hardcastle, 1946: 316****Holotype (L)**

GUAM • 1; Umatac, Facpi Point; 28 Sep. 1945; ex *Pluvialis dominica* Muller (Charadriiformes: Charadriidae); C. A. Woodbury coll.; USNM 1790; (USNMENT01758252).

***nana gordonii*, *Schoutedenichia* (*Nasichia*) Vercammen-Grandjean, 1958: 79****Paratypes (L)**

DEMOCRATIC REPUBLIC OF THE CONGO • 9; South Kivu Province, Shabunda territory; 14 Dec. 1954; ex *Oenomys hypoxanthus* (Pucheran) (Rodentia: Muridae); (USNMENT01758253, USNMENT01758254, USNMENT01758255,

USNMENT01758256, USNMENT01758257, USNMENT01758258,  
USNMENT01758259, USNMENT01758260, USNMENT01762031).

***naniparma, Gahrlepiea (Walchia) Traub and Evans, 1957: 309***

**Holotype (L)**

MALAYSIA • Sarawak State; 17 Dec. 1951; ex *Rattus whiteheadi whiteheadi* Thomas (= *Maxomys whiteheadi*) (Rodentia: Muridae); USATC 24574; (USNMENT01758261).

**Paratypes (L)**

MALAYSIA • 1; same locality and host; 13 Dec. 1951; USATC 24576; (USNMENT01758262).

***napiensis, Zyzomyacarus Goff, 1979a: 84***

**Paratype (L)**

AUSTRALIA • 1; Western Australia State, Kimberley Region, Napier Downs; 31 Aug. 1976; ex *Zyzomys argurus* (Thomas) (Rodentia: Muridae); WAM 791582; (USNMENT01758263).

***narayanshahi, Leptotrombidium (Leptotrombidium) Nadchatram, 1970b: 155***

**Paratypes (L)**

NEPAL • 2; Kirat Province, Jhapa District, Terai; 30 Nov. 1965; ex *Bandicota bengalensis* (Gray) (Rodentia: Muridae); (USNMENT01758264, USNMENT01758265). 1; same locality and host; 1 Dec. 1965; (USNMENT01762032).

***nasalis, Microtrombicula Loomis, 1963: 331***

**Holotype (L)**

USA • California State, Riverside County, Joshua Tree National Park; 29 Dec. 1961; ex *Peromyscus crinitus* (Merriam) (Rodentia: Cricetidae); R. B. Loomis coll.; RML 38399; (USNMENT01758266).

**Paratypes (L)**

USA • 2; same locality and host; 9 Feb. 1962; RML 39398; (USNMENT01758267, USNMENT01758268).



***nasicola*, Audya Vercammen-Grandjean, 1956b: 350****Paratypes (L)**

DEMOCRATIC REPUBLIC OF THE CONGO • 3; Équateur Province, Mbandaka; 22 Jan. 1954; ex *Rattus rattus* (L.) (Rodentia: Muridae); (USNMENT01758269, USNMENT01758270, USNMENT01758271).

***nasicola*, Doloisia Domrow and Nadchatram, 1962: 583****Holotype (L)**

LAOS • Xieng Khouang Province; 28 Aug. 1960; ex *Rattus* sp. (Rodentia: Muridae); (USNMENT01758272).

**Paratypes (L)**

LAOS • 3; same data as holotype; (USNMENT01758273, USNMENT01758274, USNMENT01758275).

***nasilionis*, Schoutedenichia (*Trisetichia*) Vercammen-Grandjean, 1958: 84****Paratypes (L)**

DEMOCRATIC REPUBLIC OF THE CONGO • 7; Haut-Katanga Province, Lubumbashi; Mar. 1926; ex *Nasilio brachyrhynchus* A. Smith (= *Elephantulus brachyrhynchus*) (Macroscelidea: Macroscelididae); (USNMENT01758276, USNMENT01758277, USNMENT01758278, USNMENT01758279, USNMENT01758280, USNMENT01758281, USNMENT01758282).

***nasuae*, Neoschoengastia Boshell and Kerr, 1942: 19****Syntypes (L)**

COLOMBIA • 14; Meta Department, Restrepo; 10 Jul. 1937; ex *Nasua dorsalis* Gray (*Nasua nasua* L.) (Carnivora: Procyonidae); Moyano coll.; USNM 53019; (USNMENT01758283, USNMENT01758284, USNMENT01758285, USNMENT01758286, USNMENT01758287, USNMENT01758288, USNMENT01758289, USNMENT01758290, USNMENT01758291, USNMENT01758292, USNMENT01758293, USNMENT01758294, USNMENT01758295, USNMENT01758296).

***navojae, Hexidionis* Lucas and Loomis, 1968: 235****Holotype (L)**

MEXICO • Sonora State, Navojoa; 3 Dec. 1964; ex *Neotoma albigula* Hartley (Rodentia: Cricetidae); R. B. Loomis col.; RBL 641203; (USNMENT01758297).

**Paratypes (L)**

MEXICO • 2; same data as holotype; (USNMENT01758298, USNMENT01758299).

***neotomae, Euschoengastoides* Loomis, 1971: 695****Holotype (L)**

USA • California State, Riverside County, Joshua Tree National Park; 12 Jul. 1961; ex *Peromyscus crinitus* (Merriam) (Rodentia: Cricetidae); W J. Wrenn coll.; RML 56225; (USNMENT01758300).

***neotropicalis, Eutrombicula* Brennan and Reed, 1974b: 704****Holotype (L)**

VENEZUELA • Trujillo State; 26 Jan. 1966; ex *Oryzomys albigularis* (Tomes) (= *Nephelomys albigularis*) (Rodentia: Cricetidae); RML 48921; (USNMENT01758301).

**Paratypes (L)**

VENEZUELA • 14; same data as holotype; (USNMENT01758302, USNMENT01758303, USNMENT01758304, USNMENT01758305, USNMENT01758306, USNMENT01758307, USNMENT01758308, USNMENT01758309, USNMENT01758310, USNMENT01758311, USNMENT01758312, USNMENT01758313, USNMENT01758314, USNMENT01758315). 10; same locality and host; 28 Jan. 1966; RML 52768; (USNMENT01758316, USNMENT01758317, USNMENT01758318, USNMENT01758319, USNMENT01758320, USNMENT01758321, USNMENT01758322, USNMENT01758323, USNMENT01758324, USNMENT01758325). 10; same locality and host; 19 Jan. 1966; RML 48899; (USNMENT01758326, USNMENT01758327, USNMENT01758328, USNMENT01758329, USNMENT01758330, USNMENT01758331,

USNMENT01758332, USNMENT01758333, USNMENT01758334,  
USNMENT01758335).

***nesiota, Microtrombicula* Brennan and Amerson, 1971: 1312**

**Holotype (L)**

NORTH CENTRAL PACIFIC • 13° 45' N, 169° 33'W; 11 Dec. 1964; ex *Sula dactylatra* Lesson (Suliformes: Sulidae); D. Husted coll.; RML 46929; (USNMENT01758336).

***nesudatus, Colicus* Goff and Brennan, 1978c: 565**

**Holotype (L)**

VENEZUELA • Falcón State, Cerro Socopó, 15 May 1968; ex *Akodon urichi* J.A. Allen and Chapman (= *Necromys urichi*) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 53461; (USNMENT01758337).

**Paratypes (L)**

VENEZUELA • 2; same data as holotype; (USNMENT01758338, USNMENT01758339). 1; same locality and host; 13 May 1968; RML 53269; (USNMENT0175838340). 1; same locality and host; 18 May 1968; RML 53462; (USNMENT01758341).

***neterella, Gahrliepia (Gahrliepia)* Traub and Morrow, 1955: 14**

**Holotype (L)**

MALAYSIA • Selangor State, Hulu Langat District; 26 Aug. 1952; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); J. R. Audy and B. J. Harrison coll.; UNSM 2157; (USNMENT01758342).

**Paratypes (L)**

MALAYSIA • 2; same data as holotype; (USNMENT01758343, USNMENT01758344). 4; same locality and host; 31 Aug. 1951; (USNMENT01758345, USNMENT01758346, USNMENT01758347, USNMENT01758348). 5; same locality; 2 Jul. 1951; ex *Rattus mulleri* Jentink (= *Sundamys muelleri*) (Rodentia: Muridae); R. Traub coll.; (USNMENT01758349, USNMENT01758350, USNMENT01758351, USNMENT01758352, USNMENT01758353) 1; same locality; 14 Oct. 1952; ex *Rattus bowersi* Anderson (= *Berylmys bowersi*) (Rodentia: Muridae); (USNMENT01758354).

***nigeriensis*, *Trombicula* Ewing, 1928: 78****Syntypes (L)**

NIGERIA • 49; Oyo State Ibadan; no date; ex *Funisciurus leucogenys oliviae* (Dollman) (Rodentia: Sciuridae); USNM 981; (USNMENT01758355, USNMENT01758356, USNMENT01758357, USNMENT01758358, USNMENT01758359, USNMENT01758360, USNMENT01758361, USNMENT01758362, USNMENT01758363, USNMENT01758364, USNMENT01758365, USNMENT01758366, USNMENT01758367, USNMENT01758368, USNMENT01758369, USNMENT01758370, USNMENT01758371, USNMENT01758372, USNMENT01758373, USNMENT01758374, USNMENT01758375, USNMENT01758376, USNMENT01758377, USNMENT01758378, USNMENT01758379, USNMENT01758380, USNMENT01758381, USNMENT01758382, USNMENT01758383, USNMENT01758384, USNMENT01758385, USNMENT01758386, USNMENT01758387, USNMENT01758388, USNMENT01758389, USNMENT01758390, USNMENT01758391, USNMENT01758392, USNMENT01758393, USNMENT01758394, USNMENT01758395, USNMENT01758396, USNMENT01758397, USNMENT01758398, USNMENT01758399, USNMENT01758400, USNMENT01758401, USNMENT01758402, USNMENT01758403).

***nihii*, *Euschoengastia* Brennan and Jones, 1954: 168****Holotype (L)**

USA • California State, Monterey County, Hastings Natural History Reservation; 25 Apr. 1951; ex *Citellus beecheyi* (Richardson) (= *Otospermophilus beecheyi*) (Rodentia: Sciuridae); RML 29388; (USNMENT01758404).

**Paratypes (L)**

USA • 4; same data; RML 29387; (USNMENT01758405, USNMENT01758406, USNMENT01758407, USNMENT01758408). 1; same locality and host; 15 Apr. 1949; RML 29535; (USNMENT01758409). 1; same locality and host; 19 Apr. 1953; RML 32512; (USNMENT01758410). 4; same locality and host; 25 Apr. 1951; RML 29387;

(USNMENT01758411, USNMENT01758412, USNMENT01758413, USNMENT01758414). 3; same data; RML 29388; (USNMENT01758415, USNMENT01758416, USNMENT01758417). 9; same locality and host; 26 Apr. 1951; RML 29389; (USNMENT01758418, USNMENT01758419, USNMENT01758420, USNMENT01758421, USNMENT01758422, USNMENT01758423, USNMENT01758424, USNMENT01758425, USNMENT01758426). 2; same locality and host; 27 Apr. 1953; RML 32518; (USNMENT01758427, USNMENT01758428). 4; same locality and host; 28 Apr. 1951; RML 29391; (USNMENT01758429, USNMENT01758430, USNMENT01758431, USNMENT01758432). 1; same locality and host; 25 Mar. 1951; RML 29376; (USNMENT01758433). 5; same locality and host; 21 May 1951; RML 29392; (USNMENT01758434, USNMENT01758435, USNMENT01758436, USNMENT01758437, USNMENT01758438). 1; same locality and host; 23 May 1951; RML 29396; (USNMENT01758439). 2; same locality and host; 25 May 1951; RML 29400; (USNMENT01758440, USNMENT01758441). 1; same locality and host; 20 Jul. 1953; RML 32501; (USNMENT01758442). 1; same data; RML 32492; (USNMENT01758443). 1; same locality and host; 21 Jul. 1953; RML 32494; (USNMENT01758444). 1; same locality and host; 24 Jul. 1953; RML 32500; (USNMENT01758445). 2; same data; RML 32499; (USNMENT01758446, USNMENT01758447). 1; same locality and host; 27 Jul. 1953; RML 32502; (USNMENT01758448). 1; same locality and host; 30 Jul. 1953; RML 32504; (USNMENT01758449). 1; same locality and host; 3 Aug. 1953; RML 32595; (USNMENT01758450). 1; same locality and host; 4 Aug. 1953; RML 32506; (USNMENT01758451). 5; same locality and host; 5 Aug. 1953; RML 32507; (USNMENT01758452, USNMENT01758453, USNMENT01758454, USNMENT01758455, USNMENT01758456). 2; same data; RML 32508; (USNMENT01758457, USNMENT01758458). 3; same locality and host; 8 Aug. 1953; RML 32509; (USNMENT01758459, USNMENT01758460, USNMENT01758461). 2; same locality and host; 9 Aug. 1953; RML 32510; (USNMENT01758462). 1; same locality and host; 15 Aug. 1949; RML 28133; (USNMENT01758463). 4; same locality and host; 19 Aug. 1953; RML 32512; (USNMENT01758464, USNMENT01758465, USNMENT01758466, USNMENT01758467). 4; same locality and host; 20 Aug. 1953;

RML 32513; (USNMENT01758468, USNMENT01758469, USNMENT01758470, USNMENT01758471). 2; same data; RML 32514; (USNMENT01758472, USNMENT01758473). 2; same locality and host; 21 Aug. 1953; RML 32515; (USNMENT01758474, USNMENT01758475). 3; same locality and host; 22 Aug. 1953; RML 32516; (USNMENT01758476, USNMENT01758477, USNMENT01758478). 3; same locality and host; 27 Aug. 1953; RML 32518; (USNMENT01758479, USNMENT01758480, USNMENT01758481). 1; same locality and host; 29 Aug. 1953; RML 32519; (USNMENT01758482). 1; same locality and host; 31 Aug. 1953; RML 32521; (USNMENT01758483). 6; same data; RML 32520; (USNMENT01758484, USNMENT01758485, USNMENT01758486, USNMENT01758487, USNMENT01758488, USNMENT01758489). 1; same locality and host; 1 Sep. 1953; RML 32522; (USNMENT01758490). 3; same locality and host; 3 Sep. 1953; RML 32523; (USNMENT01758491, USNMENT01758492, USNMENT01758493). 2; same locality and host; 8 Nov. 1942; RML 29539; (USNMENT01762033, USNMENT01762034). 1; same locality and host; 28 Nov. 1942; RML 29537; (USNMENT01762035). 1; same locality and host; 31 Dec. 1942; RML 29541; (USNMENT01762036). 1; same locality; 3 Jun. 1953; ex *Perognathus californicus* Merriam (= *Chaetodipus californicus*) (Rodentia: Heteromyidae); RML 32524; (USNMENT01762037).

***nihoaensis*, *Toritrombicula* Goff, 1984c: 258**

**Holotype (L)**

USA • Hawaii State, Nihoa Island; May 1981; ex *Telespyza ultima* Bryan (Passeriformes: Fringillidae), S. Conant coll.; BPBM 13032; (USNMENT01758494).

**Paratypes (L)**

USA • 15; same data as holotype; (USNMENT01758495, USNMENT01758496, USNMENT01758497, USNMENT01758498, USNMENT01758499, USNMENT01758500, USNMENT01758501, USNMENT01758502, USNMENT01758503, USNMENT01758504, USNMENT01758505, USNMENT01758506, USNMENT01758507, USNMENT01758508, USNMENT01758509).

***nivaria*, *Trombicula* Lawrence, 1949: 439****Paratype (L)**

SOUTH AFRICA • 1; KwaZulu-Natal Province, Royal Natal National Park; no date; ex *Oedura nivaria* Boulenger (= *Afroedura nivaria*) (Squamata: Gekkonidae); NM 4817; (USNMENT01758510).

***nocticola*, *Chiropptella* (*Chiropptella*) Nadchatram, 1966: 27****Paratypes (L)**

SOLOMON ISLANDS • 4; Kupe; 2 Dec. 1959; ex “unidentified bat” (Chiroptera); (USNMENT01758511, USNMENT01758512, USNMENT01758513, USNMENT01758514).

***nolae*, *Speleocola* Goff and Brennan, 1977b: 1089****Holotype (L)**

VENEZUELA • Monagas State; 11 Jul. 1967; ex *Peropteryx kappleri* Peters (Chiroptera: Emballonuridae); RML 52715; (USNMENT01758515).

**Paratypes (L)**

VENEZUELA • 4; same data as holotype; (USNMENT01758516, USNMENT01758517, USNMENT01758518, USNMENT01758519).

***nudosetosa*, *Chiropptella* (*Neosomia*) Brown, 1998a: 80****Paratype (L)**

PHILIPPINES • 1; Mindanao Island; 1963; ex “unidentified bat” (Chiroptera); (USNMENT01758520).

***nudosetosa*, *Hannemania* Wharton, 1938: 142****Syntypes (L)**

MEXICO • 3; Yucatán State; 1 Aug. 1936; ex *Artibeus jamaicensis* Leach (Chiroptera: Phyllostomidae); USNM 1264; (USNMENT01758521, USNMENT01758522, USNMENT01758523).

***nudosetosa*, *Radfordiana* Goff, 1978: 886****Paratypes (L)**

PAPUA NEW GUINEA • 6; Morobe Province, Situm; 18 Apr. 1970; ex *Varanus* sp. (Squamata: Varanidae); BPBM 11324; (USNMENT01758524, USNMENT01758525, USNMENT01758526, USNMENT01758527, USNMENT01758528, USNMENT01758529).

***numerosa*, *Euschoengastia* Wrenn and Loomis, 1974: 246****Holotype (L)**

USA • California State, Ventura County; 12 Nov. 1960; ex *Aphelocoma coerulescens* (Bosc) (Passeriformes: Corvidae); K. D. Petyon coll.; KDP 601112; (USNMENT01758530).

**Paratype (L)**

USA • 1; same data as holotype; (USNMENT01758531).

***nuñezi*, *Neoschoengastia* Hoffmann, 1944: 221****Paratypes (L)**

MEXICO • 2; Federal District; Jul. 1944; ex *Homo sapiens* L. (Primata: Hominidae); R. A. Nuñez coll.; (USNMENT01758532, USNMENT01758533).

***nurahmadi*, *Chatia* (*Shunsennia*) Traub and Nadchatram, 1966b: 380****Holotype (L)**

PAKISTAN • Kaghan Valley, Mansehra District; 2 Nov. 1963; ex *Apodemus* sp. (Rodentia: Muridae); (USNMENT01758534).

***obesa*, *Euschoengastia* Brennan and Beck, 1955: 16****Holotype (L)**

USA • Utah State, Wayne County, Torrey; 7 Aug. 1952; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); RML 31212; (USNMENT01758535).

**Paratypes (L)**



USA • 8; same data as holotype; (USNMENT01758536, USNMENT01758537, USNMENT01758538, USNMENT01758539, USNMENT01758540, USNMENT01758541, USNMENT01758542, USNMENT01758543). 9; same data; RML 31173; (USNMENT01758544, USNMENT01758545, USNMENT01758546, USNMENT01758547, USNMENT01758548, USNMENT01758549, USNMENT01758550, USNMENT01758551, USNMENT01758552). 9; Utah State, Utah County, Cedar Valley; 1 Nov. 1952; same host; RML 31175; (USNMENT01758553, USNMENT01758554, USNMENT01758555, USNMENT01758556, USNMENT01758557, USNMENT01758558, USNMENT01758559, USNMENT01758560, USNMENT01758561). 3; same data; RML 31192; (USNMENT01758562, USNMENT01758563, USNMENT01758564). 2; same data; RML 31182; (USNMENT01758565, USNMENT01758566).

***oblonga, Euschoengastia Fauran, 1959: 6***

**Paratype (L)**

FRENCH GUIANA • 1; Matoury commune, Camp Rochambeau; 9 Aug. 1957; ex *Cuniculus paca* (L.) (Rodentia: Cuniculidae); P. Fauran coll.; (USNMENT01758567).

***obscura, Euschoengastia Wrenn and Loomis, 1974: 244***

**Holotype (L)**

USA • California State, Riverside County, Joshua Tree National Park; 17 Mar. 1963; ex *Dipodomys merriami* Mearns (Rodentia: Heteromyidae); H. S. Logsdon coll.; HSL 630317; (USNMENT01758568).

**Paratype (L)**

USA • 1; same data as holotype; (USNMENT01758569).

***occidentalis, Comatacarus Ewing, 1942: 489***

**Lectotype (L)**

USA • California State, Lake County, Lake Pillsbury; 10 Sep. 1939; ex *Otospermophilus beecheyi* (Richardson) (Rodentia: Sciuridae); USNM 1415; (USNMENT01758570).

***occidentalis, Pseudoschoengastia Brennan, 1952a: 135*****Holotype (L)**

USA • California State, Plumas County, Quincy; 29 Jan. 1950; ex *Peromyscus boylii* (Baird) (Rodentia: Cricetidae); RML 28942; (USNMENT01758571).

**Paratypes (L)**

USA • 3; same data as holotype; (USNMENT01758572, USNMENT01758573, USNMENT01758574). 1; same locality and host; 1 Jun. 1950; RML 28083; (USNMENT01758575).

***oceanica, Toritrombicula Brennan and Amerson, 1971: 1315*****Holotype (L)**

PACIFIC OCEAN • 1° 27' N, 176° 15' W; 16 Oct. 1965; ex *Pluvialis dominica* Muller (Charadriiformes: Charadriidae); RML 46202; (USNMENT01758576).

**Paratype (L)**

PACIFIC OCEAN • 1; same data as holotype; (USNMENT01758577).

***ocellifera, Euschoengastia Traub and Audy, 1954b: 79*****Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 2 Aug. 1951; ex *Chiropodomys legatus* Thomas (= *Chiropodomys major*) (Rodentia: Muridae); USNM 2113; (USNMENT01758578).

**Paratype (L)**

MALAYSIA • 1; same data as holotype; (USNMENT01758579).

***ochotona, Hannemania Radford, 1942: 72*****Lectotype (L)**

USA • Montana State, Ravalli County, Ross' hole; 12 Feb. 1933; ex *Ochotona* sp. (Lagomorpha: Ochotonidae); R. R. Parker coll.; USNM 1575; (USNMENT01758580).

**Paralectotype (L)**

USA • 1; same data as lectotype; (USNMENT01758581).

***oconnori, Myotrombicula* Brown, 1997b: 157****Paratypes (L)**

PHILIPPINES • 1; Negros Oriental Province; 15 Jul. 1984; ex *Rhinolophus arcuatus* Peters (Chiroptera: Rhinolophidae); H. Klompen coll.; HK 84-806; (USNMENT01758582).

***octavia, Ascochoengastia (Laurentella)* Domrow, 1962d: 588****Paratypes (L)**

VIETNAM • 2; Ninh Thuận Province, Phan Rang–Tháp Chàm; 22 Jul. 1960; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); (USNMENT01758583, USNMENT01758584).

***oenomyia, Micromtrombicula (Microtrombicula)* Vercammen-Grandjean, 1965a: 110****Paratypes (L)**

DEMOCRATIC REPUBLIC OF THE CONGO • 5; North Kivu Province, Kabunga; 15 Sep. 1953; ex *Oenomys hypoxanthus* (Pucheran) (Rodentia: Muridae); (USNMENT01758585, USNMENT01758586, USNMENT01758587, USNMENT01758588, USNMENT01758589). 2; same locality; 19 Oct. 1953; ex *Rattus rattus* (L.) (Rodentia: Muridae); (USNMENT01758590, USNMENT01758591).

***ohioensis, Euschoengastia* Farrell, 1956: 199****Syntype (L)**

USA • 3; Ohio State, Clermont County, Union Township City, Glen Este; 25 Jan. 1949; ex *Synaptomys cooperi* Baird (Rodentia: Cricetidae); USNM 1997; (USNMENT01758592, USNMENT01758593, USNMENT01758594).

***olympia, Trombicula* Brennan and Jones, 1961b: 198****Holotype (L)**

PERU • Puno Department, Sandia Province, Limbani District, Peru; 11 Aug. 1951; ex *Phyllotis phaeus* Osgood (= *Phyllotis osilae* J. A. Allen) (Rodentia: Cricetidae); RML 31557; (USNMENT01758595).

**Paratypes (L)**

PERU • 4; same data as holotype; (USNMENT01758596, USNMENT01758597, USNMENT01758598, USNMENT01758599).

***oopsi, Pseudoschoengastia Brennan, 1968b: 680***

**Holotype (L)**

COLOMBIA • Valle del Cauca Department; Cali City, Pichinde; 18 Mar. 1967; ex *Thomasomys fuscatus* J.A. Allen (= *Handleyomys fuscatus*) (Rodentia: Cricetidae); RML 47714; (USNMENT01758600).

***ordinata, Gahrlepiea (Gahrlepiea) Traub and Morrow, 1957: 173***

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 13 Aug. 1953; ex *Rattus alticola* (Thomas) (= *Maxomys alticola*) (Rodentia: Muridae); R. Traub coll.; USNM 2441; (USNMENT01758601).

**Paratypes (L)**

MALAYSIA • 2; same data as holotype; (USNMENT01758602, USNMENT01758603).

***oregonensis, Trombicula Ewing, 1929b: 11***

**Lectotype (L)**

USA • Oregon State, Corvallis County; 17 May 1912; ex “unidentified mole” (Eulipotyphla: Talpidae); USNM 990; (USNMENT01758604).

**Paralectotypes (L)**

USA • 6; same data as lectotype; (USNMENT01758605, USNMENT01758606, USNMENT01758607, USNMENT01758608, USNMENT01758609, USNMENT01758610).

***oreophilum, Leptotrombidium (Lorillatum) Nadchatram and Traub, 1964b: 272***

**Holotype (L)**

VIETNAM • Khanh Hoa Province, Đại Lãnh; 4 Dec. 1960; ex *Rattus* sp. (Rodentia: Muridae); (USNMENT01758611).

**Paratype (L)**

VIETNAM • 1; same data as holotype; (USNMENT01758612).

***Ornamentata, Gunterana* Nadchatram and Traub, 1969: 263**

**Paratypes (L)**

PAPUA NEW GUINEA • 1; Morobe Province, Wau City, Edie Creek; 4 Nov. 1966; ex *Rattus* sp. (Rodentia: Muridae); BPBM 8206; (USNMENT01758613). 1; same locality; 6 Nov. 1966; ex *Pogonomelomys* sp. (Rodentia: Muridae); (USNMENT01758614).

***ornata, Trombicula* Loomis and Lipovsky, 1954: 47**

**Paratypes (L)**

USA • 3; Kansas State, Barber County; 11 Apr. 1949; ex *Neotoma micropus* Baird (Rodentia: Muridae); KU 3402; (USNMENT01758615, USNMENT01758616, USNMENT01758617).

***orphana, Parasecia* Brennan, 1971b: 212**

**Holotype (L)**

BRAZIL • Para State, Belém, Guamá Ecological Research Area; 11 Sep. 1968; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); T. H. G. Aitken coll.; RML 50351; (USNMENT01758618).

**Paratypes (L)**

BRAZIL • 4; same data as holotype; (USNMENT01758619, USNMENT01758620, USNMENT01758621, USNMENT01758622).

***oscillatus, Myxacarus* Brennan and Yunker, 1966a: 239**

**Holotype (L)**

PANAMA •; Panama province, Panama City, Summit Botanical Gardens; 20 Dec. 1961; ex *Proechimys semispinosus* Tomes (Rodentia: Echimyidae); RML 44241; (USNMENT01758623).

**Paratypes (L)**

PANAMA • 1; same locality and host; 6 Jan. 1961; RML 40179; (USNMENT01758624). 1; Colón province, Piña; 20 Dec. 1960; same host; RML 40141; (USNMENT01758625).

9; same locality, 6 Dec. 1960; ex *Hoplomys gymnurus* Thomas (Rodentia: Echimyidae); M. Keenan coll.; RML 40095; (USNMENT01758626, USNMENT01758627, USNMENT01758628, USNMENT01758629, USNMENT01758630, USNMENT01758631, USNMENT01758632, USNMENT01758633, USNMENT01758634). 1; same locality; 7 Dec. 1960; ex *Oryzomys talamancae* J.A. Allen (= *Transandinomys talamancae*) (Rodentia: Cricetidae); RML 40118; (USNMENT01758635). 4; Panama Province, Paraíso; 15 Feb. 1962; ex *Dasyops novemcinctus* L. (Cingulata: Dasypodidae); RML 44450; (USNMENT01758636, USNMENT01758637, USNMENT01758638, USNMENT01758639). 1; Cerro Azul, Panama province, Panama; 16 Mar. 1961; ex *Metachirus nudicaudatus* (É. Geoffroy) (Didelphimorphia: Didelphidae); RML 40543; (USNMENT01758640).

***otomyia*, *Neoschoengastia* Radford, 1942: 76**

**Paratype (L)**

SOUTH AFRICA • 1; Gauteng Province, Pretoria, Onderstepoort; 23 May 1939; ex *Otomys tropicalis* Thomas (Rodentia: Muridae); USNM 1568; (USNMENT01758641).

***otophila*, *Euschoengastia* Loomis and Bunnell, 1962: 180**

**Holotype (L)**

USA • North Carolina State, Orange County; 18 Nov. 1956; ex *Peromyscus californicus* (Gambel) (Rodentia: Cricetidae); (USNMENT01758642).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01758643, USNMENT01758644).

***ovicornis*, *Ectonyx* Brennan, 1960a: 91**

**Holotype (L)**

PERU • Cuzco Department, Cuzco City, Quince Mil Community; 8 Aug. 1953; ex *Proechimys hendeei* Thomas (= *Proechimys simonsi*) (Rodentia: Echimyidae); RML 33549; (USNMENT01758645).

**Paratypes (L)**

PERU • 3; same data as holotype; (USNMENT01758646, USNMENT01758647, USNMENT01758648).

***owenevansi*, *Traubacarus* Audy and Nadchatram, 1957b: 201**

**Paratypes (L)**

MALAYSIA • 1; Pahang State, Raub District, Fraser's Hill; 14 Jan. 1956; ex *Rattus rajah* Thomas (= *Maxomys rajah*) (Rodentia: Muridae); CORU 42650; (USNMENT01758649).  
1; same date; CORU 41675; (USNMENT01758650).

***owiensis*, *Neotrombicula* Womersley and Kohls, 1947: 4**

**Paratypes (L)**

INDONESIA • 3; Papua Province, Owi Island; 15 Aug. 1944; "in soil"; (USNMENT01758651, USNMENT01758652, USNMENT01758653).

***pachydactyli*, *Eutrombicula* Lawrence, 1949: 443**

**Paratype (L)**

NAMIBIA • 1; Hardap Region; Rehoboth; no date; ex *Pachydactylus laevigatus* Kluge (= *Chondrodactylus laevigatus* Fischer) (Squamata: Gekkonidae); (USNMENT01758654).

***pacifica*, *Vargatula* Goff and Loomis, 1982: 603**

**Holotype (L)**

PAPUA NEW GUINEA • Green Islands, Nissan Island; no date; ex *Sus scrofa* (L.) (Cetartiodactyla: Suidae), L. J. Dumbleton coll.; (USNMENT01758655).

***palawanensis*, *Cheladonta* (*Susa*) Brown and Goff, 1988b: 117**

**Paratype (L)**

PHILIPPINES • 1; Palawan Province; 8 Jan. 1960; without host information; L. Quarte coll.; (USNMENT01758656).

***palestinensis*, *Trombicula* Radford, 1957: 141**

**Paratypes (L)**

ISRAEL • 3, kibbutz Mishmar Ha'Emek; 28 Nov. 1952; ex *Acomys cahirinus* (É. Geoffroy) (Rodentia: Muridae); (USNMENT01758657, USNMENT01758658, USNMENT01758659).

***palmella*, *Fonsecia* Brennan and Loomis, 1959: 62**

**Paratype (L)**

USA • 1; Louisiana State, Parish of St. Tammany Park; 30 Apr. 1954; ex *Eumeces fasciatus* L. (= *Plestiodon fasciatus*) (Squamata: Scincidae); (USNMENT01758660).

***palmigera*, *Trombicula* Fauran, 1960: 12**

**Paratype (L)**

FRENCH GUIANA • 1; Cayenne Department, Montabo; Jun. 1960; ex *Dasyprocta aguti* L. (Rodentia: Dasyproctidae); (USNMENT01758661).

***pamelae*, *Euschoengastia* Brennan, 1968b: 681**

**Holotype (L)**

COLOMBIA • Cauca Department; 12 May 1967; ex *Thomasomys cinereiventer* J.A. Allen (Rodentia: Cricetidae); RML 47750; (USNMENT01758662).

**Paratypes (L)**

COLOMBIA • 5; same data as holotype; (USNMENT01758663, USNMENT01758664, USNMENT01758665, USNMENT01758666, USNMENT01758667). 1; same locality and host; 5 May 1967; RML 47746; (USNMENT01758668).

***panai luberoensis*, *Schoutedenichia* (*Nasichia*) Vercammen-Grandjean, 1958: 73**

**Paratypes (L)**

DEMOCRATIC REPUBLIC OF THE CONGO • 2; North Kivu Province, Lubero; 2 Jul. 1953; ex *Mastomys coucha* (Smith) (Rodentia: Muridae); (USNMENT01758669, USNMENT01758670).

***panamense*, *Sasacarus* Goff, 1987c: 105**

**Holotype (L)**



PANAMA • Chiriquí province, Santa Clara; 15 Apr. 1975; ex *Cryptotis nigrescens* (J.A. Allen) (Eulipotyphla: Soricidae); R. Hartmann coll.; (USNMENT01758671).

**Paratypes (L)**

PANAMA • 15; same data as holotype; (USNMENT01758672, USNMENT01758673, USNMENT01758674, USNMENT01758675, USNMENT01758676, USNMENT01758677, USNMENT01758678, USNMENT01758679, USNMENT01758680, USNMENT01758681, USNMENT01758682, USNMENT01758683, USNMENT01758684, USNMENT01758685, USNMENT01758686).

*panamensis hamaxiaia, Trombicula (Leptorrobmidium) Brennan and Dalmat, 1960: 188*

**Holotype (L)**

GUATEMALA • Chimaltenango Department; 27 Feb. 1951; ex *Sylvilagus floridanus* (J.A. Allen) (Lagomorpha: Leporidae); RML 29908; (USNMENT01758687).

**Paratypes (L)**

GUATEMALA • 8; same data as holotype; (USNMENT01758688, USNMENT01758689, USNMENT01758690, USNMENT01758691, USNMENT01758692, USNMENT01758693, USNMENT01758694, USNMENT01758695).

*panamensis, Trombicula Ewing, 1925a: 259*

**Lectotype (L)**

PANAMA • Panama province, Balboa; no date; ex *Sigmodon hispidus* Say and Ord (Rodentia: Cricetidae); USNM 890; (USNMENT01758696).

**Paralectotypes (L)**

PANAMA • 9; same data as lectotype; (USNMENT01758697, USNMENT01758698, USNMENT01758699, USNMENT01758700, USNMENT01758701, USNMENT01758702, USNMENT01758703, USNMENT01758704, USNMENT01758705).

***paniculatum*, *Leptotrombidium (Trombiculindus)* Traub, Nadchatram and Lakshana, 1968: 370**

**Holotype (L)**

THAILAND • Kanchanaburi Province; 19 Nov. 1952; ex *Menetes berdmorei* (Blyth) (Rodentia: Sciuridae); R. E. Elbel coll.; (USNMENT01758706).

**Paratype (L)**

THAILAND • 1; Loei Province, Tha Li District; 9 Dec. 1953; ex *Rattus rajah* Thomas (= *Maxomys rajah*) (Rodentia: Muridae); (USNMENT01758707).

***panitae*, *Leptotrombidium (Lorillatum)* Nadchatram and Traub, 1964b: 272**

**Holotype (L)**

THAILAND • Chiang Mai Province, Doi Suthep; 17 May 1962; ex *Rattus rajah* Thomas (= *Maxomys rajah*) (Rodentia: Muridae); SMRL 985; (USNMENT01758708).

***paragoga*, *Trombicula* Brenna and Jones, 1960: 524**

**Holotype (L)**

TRINIDAD AND TOBAGO • Sangre Grande Region, Cumaca; 5 Jun. 1954; ex *Nectomys squamipes* Brants (Rodentia: Cricetidae); RML 33626; (USNMENT01758709).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 2; Saint Patrick County; 9 Aug. 1953; ex *Echimys armatus* (I. Geoffroy) (= *Makalata didelphoides* [Desmarest]) (Rodentia: Echimyidae); RML 33600; (USNMENT01758710, USNMENT01758711).

***paraguayensis*, *Andalgalomacarus* Goff and Whitaker, 1984c: 327**

**Holotype (L)**

PARAGUAY • Boquerón Department, Teniente Agripino Enciso National Park; 28 Jun. 1982; ex *Andalgalomys pearsoni* (Myers) (Rodentia: Cricetidae); D. A. Abrell coll.; DBA 271; (USNMENT01758712).

**Paratypes (L)**

PARAGUAY • 6; same data as holotype; (USNMENT01758713, USNMENT01758714, USNMENT01758715, USNMENT01758716, USNMENT01758717,

USNMENT01758718). 4; same locality and host; 7 Jul. 1982; DBA 281; (USNMENT01758719, USNMENT01758720, USNMENT01758721, USNMENT01758722). 1; same locality and host; 12 Jul. 1982; DBA 297; (USNMENT01758723).

***parkeri*, *Trombicula* Radford, 1942: 62**

**Lectotype (L)**

USA • Colorado State, Conejos County, Antonito; 9 Sep. 1931; ex *Ochotona princeps* (Richardson) (Lagomorpha: Ochotonidae); USNM 1570; (USNMENT01758724).

**Paralectotype (L)**

USA • 1; same data as lectotype; (USNMENT01758725).

***parmulaseta*, *Gahrleipia* (*Ripiaspichia*) Brown, 1997a: 29**

**Holotype (L)**

PHILIPPINES • Leyte Province, Leyte Island; 18 Mar. 1987; ex *Apomys littoralis* (Sanborn) (Rodentia: Muridae); H. Klompen coll.; HK 87-0318; (USNMENT01758726).

**Paratypes (L)**

PHILIPPINES • 1; same data as holotype; (USNMENT01758727). 3; same locality; 26 May 1984; ex *Rattus everetti* (Günther) (Rodentia: Muridae); B. M. OConnor coll.; BMOC 84-1500; (USNMENT01758728, USNMENT01758729, USNMENT01758730).

***parviscutum*, *Leptotrombidium* (*Leptotrombidium*) Mitchell and Nadchatram, 1966: 65**

**Paratypes (L)**

INDIA • 1; Madhya Pradesh State, Kanha National Park; 21 Dec. 1964; ex *Mus musculus* (L.) (Rodentia: Muridae); (USNMENT01758731). 1; same locality; 20 Dec. 1964; ex *Rattus blanfordi* (Thomas) (= *Madromys blanfordi*) (Rodentia: Muridae); (USNMENT01758732).

***parvula*, *Trombicula* Fauran, 1960: 15**

**Paratype (L)**

FRENCH GUIANA • 1; Stoupan; 19 Oct. 1959; ex *Ramphastos toco* Vigors (Piciformes: Ramphastidae); (USNMENT01758733).

***pastorae, Trombicula* Boshell and Kerr, 1942: 12**

**Syntypes (L)**

COLOMBIA • 2; Santander Department, Landázuri; no date; ex *Gallus gallus domesticus* (L.) (Galliformes: Phasianidae); USNM 53016; (USNMENT01758734, USNMENT01758735). 2; Meta Department, Restrepo; 8 Aug. 1937; ex *Numida Meleagris* (L.) (Galliformes: Numididae); USNM 3002; (USNMENT01758736, USNMENT01758737).

***pauensis, Neoschoengastia* Wharton and Hardcastle, 1946: 311**

**Holotype (L)**

MICRONESIA • Ulithi Atoll, Bulbul Island; 21 Aug. 1945; ex *Pluvialis dominica* Muller (Charadriiformes: Charadriidae); USNM 1788; (USNMENT01758738).

***pazca, Euschoengastia* Brennan and Jones, 1964b: 700**

**Holotype (L)**

ARGENTINA • Buenos Aires Province, Azul; 22 Feb. 1962; ex *Rattus* sp. (Rodentia: Muridae); RML 38090; (USNMENT01758739).

**Paratypes (L)**

ARGENTINA • 4; same data as holotype; (USNMENT01758740, USNMENT01758741, USNMENT01758742, USNMENT01758743). 9; same locality and host; 27 Mar. 1962; RML 38151; (USNMENT01758744, USNMENT01758745, USNMENT01758746, USNMENT01758747, USNMENT01758748, USNMENT01758749, USNMENT01758750, USNMENT01758751, USNMENT01758752). 11; same locality; 8 Mar. 1962; ex *Mus* sp. (Rodentia: Muridae); RML 38094; (USNMENT01758753, USNMENT01758754, USNMENT01758755, USNMENT01758756, USNMENT01758757, USNMENT01758758, USNMENT01758759, USNMENT01758760, USNMENT01758761, USNMENT01758762, USNMENT01758763). 8; same locality and host; 12 Apr. 1962; RML 38145;

(USNMENT01758764, USNMENT01758765, USNMENT01758766,  
 USNMENT01758767, USNMENT01758768, USNMENT01758769,  
 USNMENT01758770, USNMENT01758771).

***pearsoni*, *Microtrombicula* Goff and Whitaker, 1984c: 332**

**Holotype (L)**

PARAGUAY • Boquerón Department, Teniente Agripino Enciso National Park; 7 Jun. 1982; ex *Andalgalomys pearsoni* (Myers) (Rodentia: Cricetidae); D B. Abrell coll.; DBA 281; (USNMENT01758772).

**Paratypes (L)**

PARAGUAY • 1; same data as holotype; (USNMENT01758773). 1; same locality and host; 29 Jun. 1982; DBA 277; (USNMENT01758774).

***pecari*, *Trombicula* Brennan and Jones, 1960: 527**

**Holotype (L)**

PANAMA • Chiriquí Province; no date; ex *Pecari tajacu* (L.) (Cetartiodactyla: Tayassuidae); RML 35168; (USNMENT01758775).

**Paratypes (L)**

PANAMA • 12; same data as holotype; (USNMENT01758776, USNMENT01758777,  
 USNMENT01758778, USNMENT01758779, USNMENT01758780,  
 USNMENT01758781, USNMENT01758782, USNMENT01758783,  
 USNMENT01758784, USNMENT01758785, USNMENT01758786,  
 USNMENT01758787).

***pectinata*, *Guntheria* (*Domrowana*) Goff, 1981a: 36**

**Paratype (L)**

PAPUA NEW GUINEA • 1; Western Highlands Province; 5 Jul. 1963; ex *Rattus niobe* Thomas (Rodentia: Muridae); BPBM 11804; (USNMENT01758788).

***pedregalensis*, *Ascoschoengastia* Hoffmann, 1951b: 97**

**Holotype (L)**

MEXICO • Federal District, Mexico City; 27 Jul. 1950; ex *Baiomys taylori* (Thomas) (Rodentia: Cricetidae); (USNMENT01758789).

***penetrans*, *Endotrombicula* Ewing, 1931: 17**

**Syntypes (L)**

KENYA • 11; Taita-Taveta County, Taita Hills, Sagalla Hill; 24 Apr. 1929; ex *Arthroleptis minutus* Boulenger (= *Phrynobatrachus minutus*) (Anura: Phrynobatrachidae); USNM 1026; (USNMENT01758790, USNMENT017587891, USNMENT01758792, USNMENT01758793, USNMENT01758794, USNMENT01758795, USNMENT01758796, USNMENT01758797, USNMENT01758798, USNMENT01758799, USNMENT01758800).

***penetrans*, *Gahrlliepia* (*Gahrlliepia*) Traub and Morrow, 1955: 45**

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 27 Aug. 1953; ex *Rattus whiteheadi whiteheadi* Thomas (= *Maxomys whiteheadi*) (Rodentia: Muridae); R. Traub coll.; USNM 2170; (USNMENT01758801).

**Paratypes (L)**

MALAYSIA • 38; same data as holotype; (USNMENT01758802, USNMENT01758803, USNMENT01758804, USNMENT01758805, USNMENT01758806, USNMENT01758807, USNMENT01758808, USNMENT01758809, USNMENT01758810, USNMENT01758811, USNMENT01758812, USNMENT01758813, USNMENT01758814, USNMENT01758815, USNMENT01758816, USNMENT01758817, USNMENT01758818, USNMENT01758819, USNMENT01758820, USNMENT01758821, USNMENT01758822, USNMENT01758823, USNMENT01758824, USNMENT01758825, USNMENT01758826, USNMENT01758827, USNMENT01758828, USNMENT01758829, USNMENT01758830, USNMENT01758831, USNMENT01758832, USNMENT01758833, USNMENT01758834, USNMENT01758835, USNMENT01758836, USNMENT01758837, USNMENT01758838, USNMENT01758839).

***penetrans*, *Hannemania* Ewing, 1931: 18****Syntype (L)**

USA • 2; Virginia State, Fairfax County, Great Falls Park; 27 Aug. 1930; ex *Lithobates* sp. (Anura: Ranidae); USNM 1028; (USNMENT01758840, USNMENT01758841).

***peniculatum*, *Leptotrombidium* (*Leptotrombidium*) Traub and Lakshana, 1966: 280****Holotype (L)**

THAILAND • Khon Kaen Province, Chum Phae District; 26 Nov. 1962; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); SMRL 2014; (USNMENT01758842).

**Paratypes (L)**

THAILAND • 1; same data as holotype; (USNMENT01758843). 1; same locality and host; 30 Nov. 1962; SMRL 2041; (USNMENT01758844). 1; same data; SMRL 2074; (USNMENT01758845). 1; same locality and host; 25 Nov. 1962; SMRL 1994; (USNMENT01758846). 1; same locality and host; 27 Nov. 1962; SMRL 2033; (USNMENT01758847). 1; same locality and host; 28 Nov. 1962; SMRL 2043; (USNMENT01758848). 1; same locality; 27 Nov. 1962; ex *Rattus berdmorei* Blyth (= *Berylmys berdmorei*) (Rodentia: Muridae); SMRL 2022; (USNMENT01758849). 1; same locality; 28 Nov. 1962; ex *Rattus rattus* (Rodentia: Muridae); SMRL 2023; (USNMENT01758850).

***peniscutum*, *Leptotrombidium* (*Leptotrombidium*) Vercammen-Grandjean, Nadchatram and Traub, 1966: 451****Holotype (L)**

PAKISTAN • Gilgit-Baltistan Province, Ghizer District, Phandar Valley; 9 Sep. 1963; ex *Apodemus* sp. (Rodentia: Muridae); (USNMENT01758851).

***periosum*, *Leptotrombidium* (*Leptotrombidium*) Traub and Nadchatram, 1967c: 487****Holotype (L)**

MALAYSIA • Pahang State, Raub District, Fraser's Hill; 13 Apr. 1956; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); (USNMENT01758852).

**Paratype (L)**

MALAYSIA • 1; same locality and host; 11 Apr. 1956; (USNMENT01758853).

***perissochaeta*, *Microtormbicula* Traub and Nadchatram, 1966a: 318****Holotype (L)**

PAKISTAN • Gilgit-Baltistan Province, Ghizer District, Goopechh valley; 5 Sep. 1963; ex *Rattus* sp. (Rodentia: Muridae); (USNMENT01758854).

**Paratypes (L)**

PAKISTAN • 1; same locality; 27 Aug. 1964; ex *Cricetulus* sp. (Rodentia: Cricetidae); (USNMENT01758855). 5; Chitral State; 17 Aug. 1964; ex *Rattus rattoides* Hodgson (= *Rattus pyctoris*) (Rodentia: Muridae); (USNMENT01758856, USNMENT01758857, USNMENT01758858, USNMENT01758859, USNMENT01758860).

***peromysci*, *Schoengastia* Ewing, 1929a: 296****Syntype (L)**

USA • 1; Massachusetts State; Worcester County, Sturbridge; 17 May 1928; ex *Peromyscus leucopus* (Rafinesque) (Rodentia: Cricetidae); USNM 993; (USNMENT01758861).

***perplexa*, *Hannemania* Brennan, 1947: 248****Holotype (L)**

USA • Montana State, Yellowstone County, Custer; 6 Aug. 1946; ex *Eptesicus fuscus pallidus* (Young) (Chiroptera: Vespertilionidae); D. J. Pletsch coll.; RML 23010; (USNMENT01758862).

***peruensis*, *Hoffmannina* Goff, 1987b: 809****Holotype (L)**

PERU • Cusco Department, Urubamba Province, Machu Picchu; Apr. 1915; ex *Lestoros inca* (Thomas) (Paucituberculata: Caenolestidae); E. Heller coll.; USNM 194935; (USNMENT01758863).

**Paratypes (L)**



PERU • 5; same data as holotype; (USNMENT01758864, USNMENT01758865, USNMENT01758866, USNMENT01758867, USNMENT01758868).

***peruensis*, Kaaia Brennan, 1958: 74**

**Holotype (L)**

PERU • Puno Department, Sandia Province, Limbani District; 31 Aug. 1951; ex *Punomys lemminus* Osgood (Rodentia: Cricetidae); RML 31558; (USNMENT01758869).

**Paratypes (L)**

PERU • 6; same data as holotype; (USNMENT01758870, USNMENT01758871, USNMENT01758872, USNMENT01758873, USNMENT01758874, USNMENT01758875). 3; same locality and host; 24 Jun. 1951; RML 31564; (USNMENT01758876, USNMENT01758877, USNMENT01758878). 2; same locality; 25 Jun. 1951; ex *Neotomys ebriosus* Thomas (Rodentia: Cricetidae); RML 31556; (USNMENT01758879, USNMENT01758880). 1; same locality and host; 31 Aug. 1951; RML 31559; (USNMENT01758881). 9; Puno Department; 15 Apr. 1951; ex *Phyllotis osilae* J.A. Allen (Rodentia: Cricetidae); RML 31546; (USNMENT01758882, USNMENT01758883, USNMENT01758884, USNMENT01758885, USNMENT01758886, USNMENT01758887, USNMENT01758888, USNMENT01758889, USNMENT01758890).

***peruensis*, Polylopadium Goff, Ritzi and Hice, 2002: 276**

**Holotype (L)**

PERU • Loreto Department; 27 Jul. 1998; ex *Oryzomys yunganus* Thomas (= *Hylaeamys yunganus*) (Rodentia: Cricetidae); (USNMENT01758891).

**Paratypes (L)**

PERU • 1; same data as holotype; (USNMENT01758892). 1; same locality; 26 Jun. 1998; ex *Proechimys quadruplicatus* Hershkovitz (Rodentia: Echimyidae); (USNMENT01758893).

***peruviana*, Trombicula Ewing, 1926: 112**

**Holotype (P)**

PERU • Adult; Chanchamayo Province, Perené District; Jun. 1920; “in soil”; USNM 954; (USNMENT01758894).

***peruviensis*, *Loomisia* Goff, Whitaker and Barkley, 1984: 80**

**Holotype (L)**

PERU • Lambayeque Department, Cerro La Vieja; Jul. 1981; ex *Tomopeas ravus* Miller (Chiroptera: Molossidae); L. J. Barkley coll.; LJB 1667; (USNMENT01758895).

**Paratypes (L)**

PERU • 7; same data as holotype; (USNMENT01758896, USNMENT01758897, USNMENT01758898, USNMENT01758899, USNMENT01758900, USNMENT01758901, USNMENT01758902).

***petulans*, *Guntherana* (*Derrickiella*) Domrow, 1960b: 202**

**Paratypes (L)**

AUSTRALIA • 2; Queensland State, ETTY Bay; 30 Jul. 1958; ex *Rattus assimilis* (Gould) (= *Rattus fuscipes* [Waterhouse]) (Rodentia: Muridae); (USNMENT01758903, USNMENT01758904).

***phangi*, *Leptotrombidium* (*Leptotrombidium*) Upham and Nadchatram, 1968: 195**

**Holotype (L)**

MALAYSIA • Selangor State, Gombak District, Bukit Lagong, Batu caves; 15 Dec. 1965; “in ground hole”; (USNMENT01758905).

***philipi*, *Schoengastia* Womersley and Kohls, 1947: 6**

**Paratypes (L)**

PAPUA NEW GUINEA • 3; Milne Bay Province, Goodenough Island; 17 Jan. 1944; ex *Leiopisma albertisii* Babour (= *Carlia bicarinata* [Macleay]) (Squamata: Scincidae); (USNMENT01758906, USNMENT01758907, USNMENT01758908).

***philippensis*, *Neoschoengastia* Phillip and Woodward, 1946: 158**

**Paratype (L)**

PHILIPPINES • 29; Mindanau Island, San Juan; 2 to 3 Apr. 1945; ex *Rattus* sp. (Rodentia: Muridae); USATC 14C; (USNMENT01758909, USNMENT01758910, USNMENT01758911, USNMENT01758912, USNMENT01758913, USNMENT01758914, USNMENT01758915, USNMENT01758916, USNMENT01758917, USNMENT01758918, USNMENT01758919, USNMENT01758920, USNMENT01758921, USNMENT01758922, USNMENT01758923, USNMENT01758924, USNMENT01758925, USNMENT01758926, USNMENT01758927, USNMENT01758928, USNMENT01758929, USNMENT01758930, USNMENT01758931, USNMENT01758932, USNMENT01758933, USNMENT01758934, USNMENT01758935, USNMENT01758936, USNMENT01758937).

***phylloti*, *Euschoengastia* Wharton, 1948: 90**

**Paratype (L)**

PERU • 2; Puno Department, Caccachara Valley; 22 Oct. 1945; ex *Phyllotis darwini* (Waterhouse) (Rodentia: Cricetidae); RML 25958; (USNMENT01758938, USNMENT01758939).

***pichindensis*, *Euschoengastia* Brennan, 1968b: 682**

**Holotype (L)**

COLOMBIA • Valle del Cauca Department, Cali City, La Flora; 31 Mar. 1967; ex *Oryzomys caliginosus* Tomes (= *Melanomys caliginosus*) (Rodentia: Cricetidae); RML 47745; (USNMENT01758940).

**Paratypes (L)**

COLOMBIA • 1; same data as holotype; (USNMENT01758941).

***picta*, *Gahrlipeia* (*Gahrlipeia*) Traub and Morrow, 1955: 32**

**Holotype (L)**

MYANMAR • Selangor State, Hulu Langat District; 4 Mar. 1952; ex *Rattus bowersi* Anderson (= *Berylmys bowersi*) (Rodentia: Muridae); USNM 2165; (USNMENT01758942).

**Paratype (L)**

MYANMAR • 1; same locality; 12 Aug. 1952; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); (USNMENT01758943).

***piercei*, *Trombicula* Ewing, 1931: 13****Lectotype (L)**

PHILIPPINES • Negros Occidental Province, Sagay; 23 May 1928; ex “unidentified bat” (Chiroptera); USNM 1021; (USNMENT01758944).

**Paralectotypes (L)**

PHILIPPINES • 4; same data as lectotype; (USNMENT01758945, USNMENT01758946, USNMENT01758947, USNMENT01758948).

***pilalta*, *Trombicula* (*Leptotrombidium*) Traub and Audy, 1954a: 50****Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 5 Jun. 1952; ex *Rattus baluensis* (Thomas) (Rodentia: Muridae); J. R. Audy coll.; USNM 2016; (USNMENT01758949).

**Paratypes (L)**

MALAYSIA • 21; same data as holotype; (USNMENT01758950, USNMENT01758951, USNMENT01758952, USNMENT01758953, USNMENT01758954, USNMENT01758955, USNMENT01758956, USNMENT01758957, USNMENT01758958, USNMENT01758959, USNMENT01758960, USNMENT01758961, USNMENT01758962, USNMENT01758963, USNMENT01758964, USNMENT01758965, USNMENT01758966, USNMENT01758967, USNMENT01758968, USNMENT01758969, USNMENT01758970).

***pilosa*, *Euschoengastia* (*Helenicula*) Abonnenc and Taufflieb, 1957: 556****Paratypes (L)**

CHAD • 3; Mayo-Kebbi Ouest Region; no date; ex *Numida meleagris* (L.) (Galliformes: Numididae); RML 19155; (USNMENT01758971, USNMENT01758972, USNMENT01758973).

***pilosum*, *Leptotrombidium* (*Leptotrombidium*) Traub and Lakshana, 1966: 289****Holotype (L)**

THAILAND • Chaiyaphum Province Phu Khiao District, Ban Non Khun; 11 Dec. 1952; ex *Bandicota* sp. (Rodentia: Muridae); (USNMENT01758974).

**Paratypes (L)**

THAILAND • 8; same data as holotype; (USNMENT01758975, USNMENT01758976, USNMENT01758977, USNMENT01758978, USNMENT01758979, USNMENT01758980, USNMENT01758981, USNMENT01758982). 9; same locality and date; ex *Herpestes auropunctatus* (Hodgson) (Carnivora: Herpestidae); (USNMENT01758983, USNMENT01758984, USNMENT01758985, USNMENT01758986, USNMENT01758987, USNMENT01758988, USNMENT01758989, USNMENT01758990, USNMENT01758991). 2; same locality; 22 Dec. 1951; ex *Rattus argentiventer* (Robinson and Kloss) (Rodentia: Muridae); (USNMENT01758992, USNMENT01758993).

***pinnatus*, *Odontacarus* (*Odontacarus*) Goff and Loomis, 1977: 372****Holotype (L)**

USA • larva Texas State, Brewster County, Big Bend National Park; 26 Aug. 1971; ex *Cnemidophorus tigris* Baird and Girard (= *Aspidoscelis tigris*) (Squamata: Teiidae); J. T. Baccus coll.; JTB 116702; (USNMENT01758994).

**Paratype (L)**

USA • 1; same locality; 19 Aug. 1968; ex *Cophosaurus texanus* Troschel (Squamata: Phrynosomatidae); W. C. Welbourn coll.; WCW 680719; (USNMENT01758995).

***pipellae*, *Trombicula* (*Leptotrombidium*) Traub and Audy, 1954a: 49****Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 17 Jul. 1951; ex *Prionodon linsang gracilis* (Horsfield) (Carnivora: Viverridae); R. Traub coll.; (USNMENT01758996).

**Paratypes (L)**

MALAYSIA • 3; same data as holotype; (USNMENT01758997, USNMENT01758998, USNMENT01758999). 12; same locality; 8 Jul. 1951; ex *Helictis everetti* Thomas (=

*Melogale everetti* (Carnivora: Mustelidae); D. Johnson coll.; (USNMENT01759000, USNMENT01759001, USNMENT01759002, USNMENT01759003, USNMENT01759004, USNMENT01759005, USNMENT01759006, USNMENT01759007, USNMENT01759008, USNMENT01759009, USNMENT01759010, USNMENT01759011). 1; Sabah State, Kota Kinabalu; 8 Aug. 1951; ex *Rattus mulleri* Jentink (= *Sundamys muelleri*) (Rodentia: Muridae); (USNMENT01759012).

***pipistrelli, Euschoengastia Brennan, 1947: 249***

**Holotype (L)**

USA • Missouri State, Stone County; 11 Sep. 1946; ex *Pipistrellus subflavus* F. Cuvier (= *Perimyotis subflavus*) (Chiroptera: Vespertilionidae); RML 23241; (USNMENT01759013).

**Paratypes (L)**

USA • 4; same data as holotype; (USNMENT01759014, USNMENT01759015, USNMENT01759016, USNMENT01759017). 2; same locality and host; 23 Sep. 1946; RML 23240; (USNMENT01759018, USNMENT01759019).

***pipistrelli, Microtrombicula Ah, 1964, 186***

**Holotype (L)**

SOUTH KOREA • Haeundae District, Busan City, Gimhae International Airport; 26 Dec. 1962; ex *Pipistrellus abramus* (Temminck) (Chiroptera: Vespertilionidae); H. S. Ah coll.; (USNMENT01759020).

**Paratype (L)**

SOUTH KOREA • 1; Seongdong District, Seoul; 25 Feb. 1963; ex *Pipistrellus savii coreensis* (Imaizumi) (= *Hypsugo alaschanicus* (Bobrinskoj) (Chiroptera: Vespertilionidae); (USNMENT01759021).

***pirloti, Euschoengastia Jadin and Vercammen-Grandjean, 1954: 287***

**Paratypes (L)**

DEMOCRATIC REPUBLIC OF THE CONGO • 4; South Kivu Province, Bukavu City, Lwiro; no date; ex *Lophuromys aquilus* (True) (= *Lophuromys flavopunctatus* Thomas) (Rodentia: Muridae); (USNMENT01759022, USNMENT01759023, USNMENT01759024, USNMENT01759025).

***pisinna*, *Intercutestrix* Brennan and Reed, 1974a: 187**

**Holotype (L)**

VENEZUELA • Amazonas State, San Juan de Manapiare City, Manapiare River; 5 Jul. 1967; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); RML 49359; (USNMENT01759026).

**Paratype (L)**

VENEZUELA • 1; same data as holotype; (USNMENT01759027).

***plaumanni*, *Trombicula* Brennan and Jones, 1964a: 309**

**Holotype (L)**

BRAZIL • Santa Catarina State, Seara, Nova Teutônia; 21 Aug. 1945; ex *Ctenomys minutus* Nehring (Rodentia: Ctenomyidae); RML 34911; (USNMENT01759028).

**Paratypes (L)**

BRAZIL • 28; same data as holotype; (USNMENT01759029, USNMENT01759030, USNMENT01759031, USNMENT01759032, USNMENT01759033, USNMENT01759034, USNMENT01759035, USNMENT01759036, USNMENT01759037, USNMENT01759038, USNMENT01759039, USNMENT01759040, USNMENT01759041, USNMENT01759042, USNMENT01759043, USNMENT01759044, USNMENT01759045, USNMENT01759046, USNMENT01759047, USNMENT01759048, USNMENT01759049, USNMENT01759050, USNMENT01759051, USNMENT01759052, USNMENT01759053, USNMENT01759054, USNMENT01759055, USNMENT01759056).

***plumosa*, *Schoengastia* Goff, 1980c: 323**

**Paratypes (L)**

PAPUA NEW GUINEA • 3; Sandaun Province, Telefomin District; 29 Jan. 1970; ex *Rattus niobe* Thomas (Rodentia: Muridae); A. B. Mirza coll.; RML 98356; (USNMENT01759057, USNMENT01759058, USNMENT01759059).

***plumosa, Trombicula* Radford, 1953c: 231**

**Paratype (L)**

INDIA • 1; Manipur State, Imphal West District; 14 Feb. 1946; ex *Callosciurus pygerythrus* (I. Geoffroy) (Rodentia: Sciuridae); (USNMENT01759060).

***plumosus, Acomatacarus (Xenacarus)* Greenberg, 1951: 525**

**Paratype (L)**

USA • 2; Kansas State, Barber County; 13 Apr. 1949; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); (USNMENT01759061, USNMENT01759062).

***plurisetae, Gahrliepia (Gahrliepia)* Traub and Morrow, 1955: 28**

**Holotype (L)**

INDIA • Assam State, Ledo City, Stillwell Road; 28 Aug. 1945; ex *Suncus caeruleus* (Kerr) (= *Suncus murinus* L.) (Eulipotyphla: Soricidae); USATC 3562; (USNMENT01759063).

**Paratypes (L)**

INDIA • 1; same locality and host; 29 Jun. 1945; USATC 1481; (USNMENT01759064).  
1; same locality and host; 17 Jun. 1945; USATC 1443; (USNMENT01759065).

***pluvius, Acariscus* Wharton, 1945b: 401**

**Syntype (L)**

PAPUA NEW GUINEA • 1; Bougainville, Jaba River; 9 Jan. 1945; ex *Anous tenuirostris* (Temminck) (Charadriiformes: Laridae); USNM 1558; (USNMENT01759066).

***pobsa, Schoengastia* Brennan and Amerson, 1971: 1311**

**Holotype (L)**



KIRIBATI • Phoenix Islands, McKean Island; 1 May 1966; “nesting area”; RML 46987; (USNMENT01759067).

**Paratypes (L)**

KIRIBATI • 1; same data as holotype; (USNMENT01759068). 1; same data; RML 46997; (USNMENT01759069). 6; same locality; 11 Jun. 1966; ex *Psittrostra cantans* Wilson (= *Telespiza cantans*) (Passeriformes: Fringillidae); RML 46979; (USNMENT01759070, USNMENT01759071, USNMENT01759072, USNMENT01759073, USNMENT01759074, USNMENT01759075). 4; Phoenix Islands, Phoenix Island; 15 Apr. 1966; ex *Phaethon rubricauda* Boddaert (Phaethontiformes: Phaethontidae); RML 46985; (USNMENT01759076, USNMENT01759077, USNMENT01759078, USNMENT01759079). 1; same locality; 15 Apr. 1966; ex *Puffinus nativitatis* Streets (Procellariiformes: Procellariidae); RML 46983; (USNMENT01759080). 6; same locality; 26 May 1965; ex *Oryctolagus cuniculus* (L.) (Lagomorpha: Leporidae); RML 45775; (USNMENT01759081, USNMENT01759082, USNMENT01759083, USNMENT01759084, USNMENT01759085, USNMENT01759086).

***pogoi*, *Perissopalla* Goff and Brennan, 1982: 171**

**Holotype (L)**

VENEZUELA • Guárico State, Calabozo; 16 Aug. 1968; ex *Monodelphis brevicaudata* (Erxleben) (Didelphimorphia: Didelphidae); RML 53311; (USNMENT01759087).

**Paratypes (L)**

VENEZUELA • 9; same data as holotype; (USNMENT01759088, USNMENT01759089, USNMENT01759090, USNMENT01759091, USNMENT01759092, USNMENT01759093, USNMENT01759094, USNMENT01759095, USNMENT01759096).

***polychaetus*, *Acomatacarus* Greenberg, 1952: 488**

**Paratype (L)**

USA • 1; Arkansas State, Washington County; 30 Mar. 1948; ex *Peromyscus leucopus* (Rafinesque) (Rodentia: Cricetidae); (USNMENT01759097).

***pomerantzi*, *Euschoengastia* Brennan and Jones, 1954: 171****Holotype (L)**

USA • California State, Plumas County; 29 Mar. 1950; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); RML 28044; (USNMENT01759098).

**Paratypes (L)**

USA • 5; same data as holotype; (USNMENT01759099, USNMENT01759100, USNMENT01759101, USNMENT01759102, USNMENT01759103).

***posekanyi*, *Neoschoengastia* Wharton and Hardcastle, 1946: 302****Holotype (L)**

JAPAN • Okinawa Island, Ie Shima Airfield; 26 Jul. 1945; ex *Streptopelia orientalis* (Latham) (Columbiformes: Columbidae); USNM 1799; (USNMENT01759104).

***postica*, *Phalcophila* Brennan and Reed, 1973b: 709****Holotype (L)**

VENEZUELA • Bolivar State; 11 Apr. 1966; ex *Pteronotus (Chilonycteris) personatus psilotis* (Dobson) (Chiroptera: Mormoopidae); Smithsonian Army coll.; RML 48161; (USNMENT01759105).

***potosina*, *Trombicula* Hoffmann, 1950: 161****Paratype (L)**

MEXICO • 4; San Luis do Potosí State, Bocas; no date; ex *Neotoma micropus* Baird (Rodentia: Cricetidae); A. Dampf coll.; (USNMENT01759106, USNMENT01759107, USNMENT01759108, USNMENT01759109).

***prachongae*, *Cheladonta (Susa)* Lakshana, 1969: 139****Holotype (L)**

THAILAND • Chiang Mai Province, Mae On District, Huai Kaeo; 12 Feb. 1964; ex *Rattus rattus* (L.) (Rodentia: Muridae); J. E. Scanlan and K. Thonglongya coll.; SMRL 3703; (USNMENT01759110).

***precaria, Euschoengastia* Brennan and Dalmat, 1960: 190****Holotype (L)**

GUATEMALA • Chimaltenango Department; 5 Apr. 1952; ex *Desmodus rotundus* (É. Geoffroy) (Chiroptera: Phyllostomidae); RML 30447; (USNMENT01759111).

**Paratypes (L)**

GUATEMALA • 3; same data; RML 30446; (USNMENT01759112, USNMENT01759113, USNMENT01759114). 1; same locality; 21 Jul. 1949; ex “unidentified bat” (Chiroptera); RML 30638; (USNMENT01759115).

***primus, Nycterinastes* Brennan and Reed, 1973b: 709****Holotype (L)**

VENEZUELA • Bolivar State, Icabaru; 5 May 1966; ex *Desmodus rotundus* (É. Geoffroy) (Chiroptera: Phyllostomidae); C. E. Yunker coll.; RML 49848; (USNMENT01759116).

**Paratypes (L)**

VENEZUELA • 1; same data as holotype; (USNMENT01759117). 1; same locality; 7 May 1966; ex *Lionycteris spurrelli* Thomas (Chiroptera: Phyllostomidae); RML 49839; (USNMENT01759118). 1; same data; RML 49841; (USNMENT01759119). 1; Miranda State; 14 Oct. 1966; ex *Anoura geoffroyi* Gray (Chiroptera: Phyllostomidae); RML 48306; (USNMENT01759120). 1; same locality and host; 8 Feb. 1967; RML 56070; (USNMENT01759121). 2; Bolivar State; 8 May 1966; ex *Anoura* sp. (Chiroptera: Phyllostomidae); RML 48463; (USNMENT01759122, USNMENT01759123). 1; same locality; 20 Jun. 1966; ex *A. geoffroyi*; RML 48499; (USNMENT01759124). 1; same locality and host; 23 Jun. 1966; RML 52850; (USNMENT01759125). 2; same locality; 13 Jun. 1966; ex *Glossophaga soricina* (Pallas) (Chiroptera: Phyllostomidae); RML 47903; (USNMENT01759126, USNMENT01759127). 2; same data; RML 50357; (USNMENT01759128, USNMENT01759129). 3; Amazonas State; 6 Oct. 1967; *D. rotundus*; RML 55743; (USNMENT01759130, USNMENT01759131, USNMENT01759132). 1; same locality; 21 Sep. 1967; ex *A. geoffroyi*; RML 55666; (USNMENT01759133). 1; same locality; 17 Sep. 1967; ex *Carollia perspicillata* (L.) (Chiroptera: Phyllostomidae); RML 53010; (USNMENT01759134). 1; same locality; 9

Feb. 1967; ex *Pteronotus (Chilonycteris) personatus psilotis* (Dobson) (Chiroptera: Mormoopidae); RML 55903; (USNMENT01759135).

***pseudoautumnalis*, *Trombicula (Neotrombicula) Gould, 1956: 41***

**Holotype (L)**

USA • California State, Wadena County; 31 Dec. 1948; ex *Thomomys bottae* (Eydoux and Gervais) (Rodentia: Geomyidae); W. E. Howard coll.; (USNMENT01759136).

**Paratype (L)**

USA • 1; same data as holotype; (USNMENT01759137).

***psittaci*, *Trombicula Floch and Abonnenc, 1949: 1***

**Holotype (L)**

FRENCH GUIANA • without specific locality; 20 May 1948; ex “unidentified perroquet” (Psittaciformes); (USNMENT01759138).

***psorakari*, *Schoengastia Nadchatram and Gentry, 1964: 1***

**Holotype (L)**

MALAYSIA • Terengganu State, Dungun District, Kuala Dungun; 14 Mar. 1963; “on a sandbar on the bank”; (USNMENT01759139).

**Paratypes (L)**

MALAYSIA • 2; same data as holotype; (USNMENT01759140, USNMENT01759141).

***puerilis*, *Euschoengastia Gould, 1956: 54***

**Holotype (L)**

USA • California State, Alameda County, Berkeley; 10 Oct. 1951; ex *Scapanus latimanus* (Bachman) (Eulipotyphla: Talpidae); T. M. Street coll.; (USNMENT01759142).

**Paratypes (L)**

USA • 4; same data as holotype; (USNMENT01759143, USNMENT01759144, USNMENT01759145, USNMENT01759146).

***pugnusus*, *Odontacarus (Odontacarus) Reed and Brennan, 1975: 15***

**Holotype (L)**

VENEZUELA • Mérida State; 13 Mar. 1966; ex *Thomasomys laniger* (Thomas) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 51863; (USNMENT01759147).

**Paratypes (L)**

VENEZUELA • 1; same locality and host; 11 Mar. 1966; RML 52769; (USNMENT01759148). 1; same locality and host; 16 Mar. 1966; RML 51854; (USNMENT01759149). 2; same locality and date; ex *Oryzomys minutus* Tomes (= *Microroryzomys minutus*) (Rodentia: Cricetidae); RML 51866; (USNMENT01759150, USNMENT01759151). 1; same data; RML 51867; (USNMENT01759152). 1; same locality; 17 Mar. 1966; same host; RML 49054; (USNMENT01759153). 1; same data; RML 52814; (USNMENT01759154). 1; same locality, 16 Mar. 1966; ex *Oryzomys* sp. (Rodentia: Cricetidae); RML 49053; (USNMENT01759155). 1; same locality and host; 15 Mar. 1966. RML 49054; (USNMENT01759156).

***punctata*, *Trombicula* Boshell and Kerr, 1942: 15****Syntypes (L)**

COLOMBIA • 2; Santander Department, Landázuri; 9 Oct. 1937; ex *Agouti paca* L. (= *Cuniculus paca*) (Rodentia: Cuniculidae); USNM 53015; (USNMENT01759157, USNMENT01759158).

***quadrisetosus*, *Tateracarus* Goff, 1993: 2****Holotype (L)**

NAMIBIA • Omaheke Region, Aminuis Constituency, Aminuis; 30 Oct. 1980; ex *Tatera leucogaster* (Peters) (= *Gerbilliscus leucogaster*) (Rodentia: Muridae); (USNMENT01759159).

**Paratypes (L)**

NAMIBIA • 9; same data as holotype; (USNMENT01759160, USNMENT01759161, USNMENT01759162, USNMENT01759163, USNMENT01759164, USNMENT01759165, USNMENT01759166, USNMENT01759167, USNMENT01759168).

***quintangula*, *Trombicula* Brennan and Jones, 1961b: 200****Holotype (L)**

PERU • Tacna Province; 24 Jan. 1952; ex *Phyllotis* sp. (Rodentia: Cricetidae); O. P. Pearson coll.; RML 34758; (USNMENT01759169).

**Paratypes (L)**

PERU • 3; same data as holotype; (USNMENT01759170, USNMENT01759171, USNMENT01759172). 1; same locality and host; 16 Dec. 1951; RML 34757; (USNMENT01759173).

***radfordi*, *Euschoengastia* Brennan and Jones, 1954: 173****Holotype (L)**

USA • California State, Monterey County, Hastings Natural History Reservation; 27 Oct. 1950; ex *Peromyscus californicus* (Gambel) (Rodentia: Cricetidae); RML 28296; (USNMENT01759174).

**Paratypes (L)**

USA • 4; same data as holotype; (USNMENT01759175, USNMENT01759176, USNMENT01759177, USNMENT01759178). 7; same locality and host; 29 Oct. 1950; RML 28298; (USNMENT01759179, USNMENT01759180, USNMENT01759181, USNMENT01759182, USNMENT01759183, USNMENT01759184, USNMENT01759185). 3; same locality and host; 8 Nov. 1950; RML 28312; (USNMENT01759186, USNMENT01759187, USNMENT01759188). 6; same locality and host; 24 Nov. 1950; RML 28345; (USNMENT01759189, USNMENT01759190, USNMENT01759191, USNMENT01759192, USNMENT01759193, USNMENT01759194). 3; same locality and host; 26 Nov. 1950; RML 28349; (USNMENT01759195, USNMENT01759196, USNMENT01759197). 2; same data; RML 28350; (USNMENT01759198, USNMENT01759199). 3; same locality and host; 10 Dec. 1950; RML 28371; (USNMENT01759200, USNMENT01759201, USNMENT01759202). 2; same locality and host; 11 Dec. 1950; RML 28374; (USNMENT01759203, USNMENT01759204). 7; same data; RML 28375; (USNMENT01759205, USNMENT01759206, USNMENT01759207, USNMENT01759208, USNMENT01759209, USNMENT01759210, USNMENT01759211). 1; same data; RML

28376; (USNMENT01759212). 2; same locality and host; 12 Dec. 1950; RML 28319; (USNMENT01759213, USNMENT01759214). 4; same data; RML 28381; (USNMENT01759215, USNMENT01759216, USNMENT01759217, USNMENT01759218).

***ralfi*, *Atelepalme* Brennan and Goff, 1979a: 241**

**Holotype (L)**

VENEZUELA • Falcon State; 17 Jul. 1968; ex *Sylvilagus floridanus* (J.A. Allen) (Lagomorpha: Leporidae); Smithsonian Army coll.; RML 53304; (USNMENT01759219).

**Paratypes (L)**

VENEZUELA • 2; same data as holotype; (USNMENT01759220, USNMENT01759221). 1; same locality and host; 15 Jul. 1968; RML 52788; (USNMENT01759222).

***rapmundi*, *Leptotrombidium* (*Leptotrombidium*) Nadchatram and Upham, 1966a: 107**

**Holotype (L)**

MALAYSIA • Selangor State, Hulu Langat District; 16 Nov. 1965; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); (USNMENT01759223).

**Paratype (L)**

MALAYSIA • 1; same data as holotype; (USNMENT01759224).

***rationalis*, *Perissopalla* Goff and Brennan, 1982: 171**

**Holotype (L)**

VENEZUELA • Bolivar State; 16 Jun. 1966; ex *Glossophaga soricina* (Pallas) (Chiroptera: Phyllostomidae); RML 48466; (USNMENT01759225).

**Paratypes (L)**

VENEZUELA • 5; same data as holotype; (USNMENT01759226, USNMENT01759227, USNMENT01759228, USNMENT01759229, USNMENT01759230).

***rattus*, *Neoschoengastia* Womersley and Heaslip, 1943: 118**

**Paratypes (L)**

AUSTRALIA • 2; Queensland State, Brisbane; 7 Jun. 1938; ex *Rattus assimilis* (Gould) (= *Rattus fuscipes* [Waterhouse]) (Rodentia: Muridae); RML 24766; (USNMENT01759231, USNMENT01759232).

***rebeccannae*, *Neoschoengastia* Brennan, 1965a: 79**

**Holotype (L)**

USA • Texas State, Kleberg County, Kingsville; 3 Nov. 1961; ex *Eremophila alpestris* (L.) (Passeriformes: Alaudidae); B. McDaniel coll.; RML 38077; (USNMENT01759233).

***rectifunda*, *Gahrliopia* (*Walchia*) Traub and Evans, 1957: 321**

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 30 Aug. 1953; ex *Rattus whiteheadi* Thomas (= *Maxomys whiteheadi*) (Rodentia: Muridae); USATC 20556; (USNMENT01759234).

**Paratype (L)**

MALAYSIA • 1; same locality and host; 15 Jul. 1953; USATC 20523; (USNMENT01759235).

***reedi*, *Hoffmannina* Brennan, 1972a: 16**

**Holotype (L)**

VENEZUELA • Trujillo State; 22 Jan. 1966; ex *Thomasomys laniger* (Thomas) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 48908; (USNMENT01759236).

**Paratypes (L)**

VENEZUELA • 10; same data as holotype; (USNMENT01759237, USNMENT01759238, USNMENT01759239, USNMENT01759240, USNMENT01759241, USNMENT01759242, USNMENT01759243, USNMENT01759244, USNMENT01759245, USNMENT01759246).

***reesi*, *Trombicula* (*Trombicula*) Allred, 1957: 97**

**Paratype (L)**

USA • 1; Utah State, Salt Lake County, Lake Blanche; 1952; ex *Peromyscus maniculatus* (Wagner) (Rodentia: Cricetidae); (USNMENT01759247).



***revelae*, *Trombicula* Audy, 1952: 140****Paratypes (L)**

MALAYSIA • 2; Perlis State; 4 Feb. 1952; ex *Hipposideros* sp. (Chiroptera: Hipposideridae); (USNMENT01759248, USNMENT01759249).

***reversa*, *Euschoengastia* Brennan and Jones, 1961b: 188****Holotype (L)**

PERU • Puno Department; 9 Mar. 1952; ex *Hepesromys ducilla* (Thomas) (= *Calomys lepidus*) (Rodentia: Cricetidae); RML 34759; (USNMENT01759250).

**Paratype (L)**

PERU • 1; same data as holotype; (USNMENT01759251).

***rex*, *Guntherana* (*Derrickiella*) Domrow, 1960b: 212****Paratypes (L)**

AUSTRALIA • 2; Queensland State, ETTY Bay; 30 Jul. 1958; ex *Rattus assimilis* (Gould) (= *Rattus fuscipes* [Waterhouse]) (Rodentia: Muridae); (USNMENT01759252, USNMENT01759253).

***rhipidomysi*, *Microtrombicula* Goff, Whitaker and Dietz, 1983: 183****Holotype (L)**

BRAZIL • Minas Gerais State, National Park of Serra da Canastra; 26 Jan. 1980; ex *Rhipidomys mastacalis* (Lund) (Rodentia: Cricetidae); BPBM 12710; (USNMENT01759254).

**Paratypes (L)**

BRAZIL • 4; same data as holotype; (USNMENT01759255, USNMENT01759256, USNMENT01759257, USNMENT01759258).

***rhopropi*, *Eutrombicula* Lawrence, 1949: 445****Paratype (L)**

NAMIBIA • 1; Namib desert; no date; ex *Rhopropus afer* Peters (Squamata: Gekkonidae); (USNMENT01759259).

***riversi*, *Neoschoengastia* Wharton and Hardcastle, 1946: 299****Syntypes (L)**

PAPUA NEW GUINEA • 39; Bougainville Island, Cape Torokina; 27 Jul. 1944; ex *Eurystomus orientalis* (L.) (Coraciiformes: Coraciidae); J. M. Fritts coll.; USNM 1799; (USNMENT01759260, USNMENT01759261, USNMENT01759262, USNMENT01759263, USNMENT01759264, USNMENT01759265, USNMENT01759266, USNMENT01759267, USNMENT01759268, USNMENT01759269, USNMENT01759270, USNMENT01759271, USNMENT01759272, USNMENT01759273, USNMENT01759274, USNMENT01759275, USNMENT01759276, USNMENT01759277, USNMENT01759278, USNMENT01759279, USNMENT01759280, USNMENT01759281, USNMENT01759282, USNMENT01759283, USNMENT01759284, USNMENT01759285, USNMENT01759286, USNMENT01759287, USNMENT01759288, USNMENT01759289, USNMENT01759290, USNMENT01759291, USNMENT01759292, USNMENT01759293, USNMENT01759294, USNMENT01759295, USNMENT01759296, USNMENT01759297, USNMENT01759298).

***robbinsi*, *Odontacarus* Loomis and Spath, 1969: 187****Holotype (L)**

MEXICO • Baja California Sur State, San Antonio; 28 Jun. 1967; ex *Sceloporus orcutti* Stejneger (Squamata: Phrynosomatidae); L. W. Robbins coll.; LWR 620628; (USNMENT01759299).

***rohweri*, *Trombicula* Ewing, 1942: 488****Syntype (L)**

USA • 1; Mississippi State, Harrison County, Gulfport City, Handsboro; 14 Feb. 1940; ex *Troglodytes aedon aedon* Vieillot (Passeriformes: Troglodytidae); G. G. Rohwer coll.; USNM 1413; (USNMENT01759300).

***roluis*, *Euschoengastia* Traub and Audy, 1954b: 79**

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 31 Aug. 1951; ex *Chiropodomys legatus* Thomas (= *Chiropodomys major*) (Rodentia: Muridae); USNM 2112; (USNMENT01759301).

**Paratypes (L)**

MALAYSIA • 7; same data as holotype; (USNMENT01759302, USNMENT01759303, USNMENT01759304, USNMENT01759305, USNMENT01759306, USNMENT01759307, USNMENT01759308).

***romola*, *Eushcoengastia* Brennan and Jones, 1954: 179****Holotype (L)**

USA • California State, Monterey County, Hastings Natural History Reservation; 24 Jul. 1950; ex *Perognathus californicus* Merriam (= *Chaetodipus californicus*) (Rodentia: Heteromyidae); RML 27908; (USNMENT01759309).

**Paratypes (L)**

USA • 13; same data as holotype; (USNMENT01759310, USNMENT01759311, USNMENT01759312, USNMENT01759313, USNMENT01759314, USNMENT01759315, USNMENT01759316, USNMENT01759317, USNMENT01759318, USNMENT01759319, USNMENT01759320, USNMENT01759321, USNMENT01759322). 3; same locality and host; 3 Sep. 1953; RML 32543; (USNMENT01759323, USNMENT01759324, USNMENT01759325). 14; same locality and host; 4 Sep. 1953; RML 32544; (USNMENT01759326, USNMENT01759327, USNMENT01759328, USNMENT01759329, USNMENT01759330, USNMENT01759331, USNMENT01759332, USNMENT01759333, USNMENT01759334, USNMENT01759335, USNMENT01759336, USNMENT01759337, USNMENT01759338, USNMENT01759339). 1; same locality and host; 10 Aug. 1953; RML 32531; (USNMENT01759340). 3; same locality and host; 3 Nov. 1950; RML 28301; (USNMENT01759341, USNMENT01759342, USNMENT01759343). 2; same locality and host; 6 Nov. 1950; RML 28309; (USNMENT01759344, USNMENT01759345). 1; same locality and host; 12 Dec. 1950; RML 28380; (USNMENT01759346). 2; same

locality and host; 17 Dec. 1950; RML 28386; (USNMENT01759347, USNMENT01759348). 3; same locality; 5 Sep. 1950; ex *Dipodomys venustus* (Merriam) (Rodentia: Heteromyidae); RML 28153; (USNMENT01759349, USNMENT01759350, USNMENT01759351). 1; same locality; 4 Nov. 1942; ex *Citellus beecheyi* (Richardson) (= *Otospermophilus beecheyi*) (Rodentia: Sciuridae); RML 27931; (USNMENT01759352).

***roseannleilaniae*, *Leptotrombidium (Trombiculindus)* Brown, 1992: 287**

**Paratype (L)**

PHILIPPINES • 1; Mindanao Island, Bukidnon province, Mount Kitanglad; ex *Rattus everetti* (Günther) (Rodentia: Muridae); (USNMENT01759353).

***roselli*, *Schoengastia* Goff, 1980c: 321**

**Paratypes (L)**

PAPUA NEW GUINEA • 3; Morobe Province, Mount Kaindi; 20 Aug. 1969; ex *Rattus ruber* Thomas (= *Rattus feliceus*) (Rodentia: Muridae); A. B. Mirza coll.; BPBM 11505; (USNMENT01759354, USNMENT01759355, USNMENT01759356).

***rotstieri*, *Quadrasetta* Goff and Brennan, 1977a: 503**

**Holotype (L)**

VENEZUELA • Falcon State; 13 May 1968; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); Smithsonian army coll.; RML 53271; (USNMENT01759357).

**Paratypes (L)**

VENEZUELA • 4; same data as holotype; (USNMENT01759358, USNMENT01759359, USNMENT01759360, USNMENT01759361).

***rotunda*, *Euschoengastia* Brennan and Beck, 1955: 17**

**Holotype (L)**

USA • Utah State, San Juan County; 1 Jul. 1952; ex *Ochotona princeps* (Richardson) (Lagomorpha: Ochotonidae); RML 31174; (USNMENT01759362).

**Paratypes (L)**

USA • 7; same data as holotype; (USNMENT01759363, USNMENT01759364, USNMENT01759365, USNMENT01759366, USNMENT01759367, USNMENT01759368, USNMENT01759369).

***rotundiscutata, Trombicula (Trombicula) Fauran, 1959: 12***

**Paratype (L)**

FRENCH GUIANA • 1; Matoury commune, Camp Rochambeau; 9 Aug. 1957; ex *Cuniculus paca* (L.) (Rodentia: Cuniculidae); P. Fauran coll.; (USNMENT01759370).

***rousetti, Ascoschoengastia Goff, 1981b: 69***

**Paratypes (L)**

PHILIPPINES • 2; South Cotabato Province, Tupi, Mount Matutum; 18 Apr. 1966; ex *Rousettus amplexicaudatus* (É. Geoffroy Saint-Hilaire) (Chiroptera: Pteropodidae); BPBM 11808; (USNMENT01759371, USNMENT01759372).

***rowanae, Leptotrombidium (Leptotrombidium) Nadchatram, 1970b: 155***

**Paratypes (L)**

NEPAL • 2; Ilam District; 16 Dec. 1965; ex *Rattus brunneusculus* (Hodgson) (= *Rattus tanezumi* Temminck) (Rodentia: Muridae); (USNMENT01759373, USNMENT01759374); 1; same locality and host; 17 Dec. 1965; (USNMENT01759375).

***rubra, Euschoengastia Farrell, 1956: 163***

**Syntype (L)**

USA • 1; North Carolina State, Orange County, Duke Fores; 7 Jan. 1950; “under decaying stumps”; C. E. Farrell coll.; USNM 1991; (USNMENT01759376).

***rugosa, Cotrombicula Goff, 1979a: 89***

**Paratypes (L)**

AUSTRALIA • 2; Western Australia State, Port Warrender; 31 Oct. 1976; ex *Zygomys argurus* (Thomas) (Rodentia: Muridae); WAM 791579; (USNMENT01759377, USNMENT01759378).

***rupestre*, *Leptotrombidium* (*Leptotrombidium*) Traub and Nadchatram, 1967a: 4****Holotype (L)**

PAKISTAN • Mansehra District, Kaghan Valley, 29 Aug. 1963; ex *Alticola roylei* Gray (Rodentia: Cricetidae); (USNMENT01759379).

**Paratypes (L)**

PAKISTAN • 1; same locality and host; 26 Aug. 1963; (USNMENT01759380). 1; same locality; 23 Jul. 1963; ex *Ochotona* sp. (Lagomorpha: Ochotonidae); (USNMENT01759381). 1; same locality and host; 7 Aug. 1963; (USNMENT01759382).

***rustica*, *Gahrliopia* Gater, 1932: 167****Paratype (L)**

MALAYSIA • 1; Selangor State, Petaling District, Sungai Buloh; 23 Jul. 1930; ex *Rattus surifer* Miller (= *Maxomys surifer*) (Rodentia: Muridae); USNM 1059; (USNMENT01759383).

***rutila*, *Gahrliopia* Gater, 1932: 165****Paratype (L)**

MALAYSIA • 1; Selangor State Petaling District, Sungai Buloh; 8 Aug. 1930; ex *Rattus mulleri* Jentink (= *Sundamys muelleri*) (Rodentia: Muridae); USNM 1057; (USNMENT01759384).

***ryckmani*, *Euschoengastoides* Brennan, 1966: 772****Holotype (L)**

MEXICO • Sonora State, Tiburón Island; 21 Jun. 1963; ex *Perognathus* sp. (Rodentia: Heteromyidae); R. E. Ryckman coll.; RML 38682; (USNMENT01759385).

**Paratypes (L)**

MEXICO • 1; same data as holotype; (USNMENT01759386). 1; Baja California State; 18 Apr. 1964; ex *Perognathus formosus* Merriam (= *Chaetodipus formosus*) (Rodentia: Heteromyidae); W. J. Wrenn coll.; RML 36226; (USNMENT01759387).

***saccopteryx*, *Trombicula* Brennan and Jones, 1960: 530**

**Holotype (L)**

TRINIDAD AND TOBAGO • San Fernando; Guaracara River; 18 Mar. 1958; ex *Saccopteryx bilineata* (Temminck) (Chiroptera: Emballonuridae); RML 34687; (USNMENT01759388).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 5; same data as holotype; (USNMENT01759389, USNMENT01759390, USNMENT01759391, USNMENT01759392, USNMENT01759393). 1; same locality and host; 15 Apr. 1957; RML 34425; (USNMENT01759394). 9; Caroni County; 22 Feb. 1958; same host; RML 34672; (USNMENT01759395, USNMENT01759396, USNMENT01759397, USNMENT01759398, USNMENT01759399, USNMENT01759400, USNMENT01759401, USNMENT01759402, USNMENT01759403). 9; Churchill Roosevelt Highway; 12 Jul. 1957; same host; RML 34431; (USNMENT01759404, USNMENT01759405, USNMENT01759406, USNMENT01759407, USNMENT01759408, USNMENT01759409, USNMENT01759410, USNMENT01759411, USNMENT01759412). 9; Manzanilla Bay, Manzanilla Beach; 20 Mar. 1957; same host; RML 34417; (USNMENT01759413, USNMENT01759414, USNMENT01759415, USNMENT01759416, USNMENT01759417, USNMENT01759418, USNMENT01759419, USNMENT01759420, USNMENT01759421). 7; Saint Patrick County; 10 Nov. 1954; RML 33664; (USNMENT01759422, USNMENT01759423, USNMENT01759424, USNMENT01759425, USNMENT01759426, USNMENT01759427, USNMENT01759428). 7; same locality and host; 23 Jun. 1956; RML 34036; (USNMENT01759429, USNMENT01759430, USNMENT01759431, USNMENT01759432, USNMENT01759433, USNMENT01759434, USNMENT01759435). 3; Tortuga; 18 Jun. 1958; same host; RML 34784; (USNMENT01759436, USNMENT01759437, USNMENT01759438). 9; Cedros; 13 Jan. 1959; same host; RML 35194; (USNMENT01759439, USNMENT01759440, USNMENT01759441, USNMENT01759442, USNMENT01759443, USNMENT01759444, USNMENT01759445, USNMENT01759446, USNMENT01759447). 6; Siparia Region, Siparia; 5 Mar. 1959; same host; RML 35094;

(USNMENT01759448, USNMENT01759449, USNMENT01759450, USNMENT01759451, USNMENT01759452, USNMENT01759453). 9; Port of Spain City, Haller Field; 15 Apr. 1957; same host; RML 34425; (USNMENT01759454, USNMENT01759455, USNMENT01759456, USNMENT01759457, USNMENT01759458, USNMENT01759459, USNMENT01759460, USNMENT01759461, USNMENT01759462). 9; Saint George County; 22 Feb. 1958; same host; RML 33555; (USNMENT01759463, USNMENT01759464, USNMENT01759465, USNMENT01759466, USNMENT01759467, USNMENT01759468, USNMENT01759469, USNMENT01759470, USNMENT01759471). 9; La Brea; 14 Apr. 1958; same host; RML 34777; (USNMENT01759472, USNMENT01762038, USNMENT01762039, USNMENT01762040, USNMENT01762041, USNMENT01762042, USNMENT01762043, USNMENT01762044, USNMENT01762045).

***sagitta*, *Gahrliepia* (*Gahrliepia*) Goff, 1983j: 281**

**Holotype (L)**

INDONESIA • Java Island; 1849; ex *Sciuropterus sagitta* (L.) (= *Hylopetes sagitta*) (Rodentia: Sciuridae); (USNMENT01759473).

**Paratypes (L)**

INDONESIA • 2; same data as holotype; (USNMENT01759474, USNMENT01759475).

***samboni*, *Neoschoengastia* Radford, 1942: 76**

**Lectotype (L)**

USA • Montana State, Ravalli County, Ross' hole; 12 Feb. 1933; ex *Ochotona* sp. (Lagomorpha: Ochotonidae); USNM 1566; (USNMENT01759476).

**Paralectotype (L)**

USA • 1; same data as lectotype; (USNMENT01759477).

***sandfordi*, *Leptotrombidium* Goff, 1981b: 72**

**Paratypes (L)**



PHILIPPINES • 3; Mindanau Island, Catabata Province; 23 Jun. 1966; ex *Rallus torquatus* L. (= *Hypotaenidia torquata*) (Gruiformes: Rallidae); BPBM 11807; (USNMENT01759478, USNMENT01759479, USNMENT01759480).

***sandoshami*, *Chiroptella* (*Chiroptella*) Nadchatram, 1966: 21**

**Paratypes (L)**

MALAYSIA • 1; Selangor State, Gombak District, Rawang City, Templer Park; 12 May 1962; ex *Hipposideros* sp. (Chiroptera: Hipposideridae); BPBM 6897; (USNMENT01759481). 1; same locality and host; 2 May 1962; (USNMENT01759482).

***santiagoensis*, *Paraguacarus* Goff and Webb, 1989b: 93**

**Holotype (L)**

CHILE • Santiago Province; 23 Dec. 1975; ex *Octodon degus* (Molina) (Rodentia: Octodontidae); R. E. Martin coll.; REM 1316; (USNMENT01759483).

***saperoi*, *Neotrombicula* Radford, 1954: 296**

**Holotype (L)**

YEMEN • Ta'izz; 1951; ex *Rattus rattus* (L.) (Rodentia: Muridae); K. L. Knight coll.; (USNMENT01759484).

***sargenti*, *Trombicula* Brennan, 1952b: 61**

**Holotype (L)**

USA • Utah State, Joab County, Jericoh; 14 Oct. 1951; ex *Neotoma* sp. (Rodentia: Cricetidae); RML 29605; (USNMENT01759485).

**Paratypes (L)**

USA • 3; same data as holotype; (USNMENT01759486, USNMENT01759487, USNMENT01759488).

***sarisatum*, *Leptotrombidium* (*Trombiculindus*) Traub and Nadchatram, 1967b: 423**

**Holotype (L)**

MALAYSIA • Pahang State, Cameron Highlands District, Mount Batu Brinchang; 10 Jan. 1958; ex “unidentified shrew” (Eulipotyphla: Soricidae); R. Traub coll.; RT B47287; (USNMENT01759489).

***sasai*, *Gahrliopia* (*Walchia*) Suzuki, 1972: 30**

**Holotype (L)**

JAPAN • Ōita Prefecture, Hita District, Hita City, Subashiri; 6 Jan. 1970; ex *Talpa mucrura* Hodgson (= *Euroscaptor micrura*) (Eulipotyphla: Talpidae); H. Susuki and S. Sasagawa coll.; (USNMENT01759490).

**Paratypes (L)**

JAPAN • 5; same data as holotype; (USNMENT01759491, USNMENT01759492, USNMENT01759493, USNMENT01759494, USNMENT01759495).

***saurella*, *Schoengastia* Brennan and Amerson, 1971: 1311**

**Holotype (L)**

USA • larva; Baker Island; 9 Jul. 1963; ex *Cryptoblepharus boutonii* (Des Jardin) (Squamata: Scincidae). RML 45540; (USNMENT01759496).

**Paratypes (L)**

USA • 7; same data as holotype; (USNMENT01759497, USNMENT01759498, USNMENT01759499, USNMENT01759500, USNMENT01759501, USNMENT01759502, USNMENT01759503). 2; same locality and host; 15 Oct. 1963; RML 46192; (USNMENT01759504, USNMENT01759505). 1; Howland Island; 11 Feb. 1964; same host; RML 45852; (USNMENT01759506). 2; same locality and host; 10 Oct. 1963; RML 46185; (USNMENT01759507, USNMENT01759508). 1; same data; RML 46186; (USNMENT01759509). 1; same data; RML 46187; (USNMENT01759510). 1; same data; RML 46193; (USNMENT01759511). 2; same data; RML 46194; (USNMENT01759512, USNMENT01759513). KIRIBATI • 3; Phoenix Islands, Hull Island; 30 Oct. 1963; same host; RML 46195; (USNMENT01759514, USNMENT01759515, USNMENT01759516). 3; same data; RML 46196; (USNMENT01759517, USNMENT01759518, USNMENT01759519). 1; Phoenix Islands, Enderbury Island; 20 Nov. 1963; RML 46198; (USNMENT01759520). 3; same data; RML

46199; (USNMENT01759521, USNMENT01759522, USNMENT01759523). 3; same data; RML 46189; (USNMENT01759524, USNMENT01759525, USNMENT01759526). 1; same data; RML 46190; (USNMENT01759527). 2; same data; RML 46188; (USNMENT01759528, USNMENT01759529).

***scaevola*, *Ascochoengastia (Oculicola)* Domrow, 1960a: 182**

**Paratype (L)**

AUSTRALIA • 1; Queensland State, Innisfail; 27 Jun. 1956; ex *Hydromys chrysogaster* (É. Geoffroy Saint-Hilaire) (Rodentia: Muridae); (USNMENT01759531).

***scanloni*, *Helenicula* Domrow and Nadchatram, 1964: 481**

**Holotype (L)**

THAILAND • Nan Province, Ban Pha Hang; 12 Dec. 1961; ex *Menetes berdmorei* (Blyth) (Rodentia: Sciuridae); (USNMENT01759532).

**Paratypes (L)**

THAILAND • 1; same locality; 5 Dec. 1961; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); (USNMENT01759533) 1; same locality; 10 Dec. 1961; *Rattus rattus* (L.) (Rodentia: Muridae); (USNMENT01759534).

***scanloni*, *Leptotrombidium (Leptotrombidium)* Traub and Lakshana, 1966: 275**

**Holotype (L)**

THAILAND • Chiang Mai Province, Chiang Dao District; 17 Nov. 1962; ex *Rattus niviventer* Hodgson (= *Niviventer niviventer*) (Rodentia: Muridae); SMRL 1979; (USNMENT01759535).

**Paratypes (L)**

THAILAND • 1; same data as holotype; (USNMENT01759536). 1; same locality; 12 Nov. 1962; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); SMRL 1840; (USNMENT01759537). 3; same locality and host; 16 Nov. 1962; SMRL 1962; (USNMENT01759538, USNMENT01759539, USNMENT01759540). 1; same locality and host; 28 Nov. 1962; SMRL 2039; (USNMENT01759541). 1; same locality; 14 Nov. 1962; ex *Arctogalidia trivirgata* (Gray) (Carnivora: Viverridae); SMRL 1978;

(USNMENT01759542). 2; same locality; 17 Nov. 1962; ex *Crocidura horsfieldii* (Tomes) (Eulipotyphla: Soricidae); SMRL 1975; (USNMENT01759543, USNMENT01759544). 1; Chiang Mai Province, Hot District; 3 Nov. 1962; ex *T. glis*; SMRL 1692; (USNMENT01759545). 2; same locality; 6 Nov. 1962; ex *Macropygia unchall* Swainson (Columbiformes: Columbidae); SMRL 1774; (USNMENT01759546, USNMENT01759547). 1; Khon Kaen Province, Chum Phae District; 30 Nov. 1962; ex *Tupaia glis* (Diard) (Scandentia: Tupaiidae); SMRL 2079; (USNMENT01759548). 1; same locality; 28 Nov. 1962; ex *Menetes berdmorei* (Blyth) (Rodentia: Sciuridae); SMRL 2039; (USNMENT01759549).

***scelopori*, *Neoschoengastia* Ewing, 1931: 15**

**Syntypes (L)**

USA • 2; Texas State, Uvalde County; 13 Jul. 1928; ex *Sceloporus spinosus* Wiegmann (Squamata: Phrynosomatidae); USNM 1024; (USNMENT01759550, USNMENT01759551).

***schoenesetosus*, *Odontacarus* (*Odontacarus*) Reed and Brennan, 1975: 17**

**Holotype (L)**

VENEZUELA • Trujillo State; 29 Jan. 1966; ex *Thomasomys vestitus* Thomas (Rodentia: Cricetidae); Smithsonian Army coll.; RML 49029; (USNMENT01759552).

**Paratypes (L)**

VENEZUELA • 1; same data as holotype; (USNMENT01759553). 6; same locality; 26 Jan. 1966; ex *Thomasomys lugens* (Thomas) (= *Aepeomys lugens*) (Rodentia: Cricetidae); RML 48920; (USNMENT01759554, USNMENT01759555, USNMENT01759556, USNMENT01759557, USNMENT01759558, USNMENT01759559). 1 larva same locality and host, 25 Jan. 1966; RML 48918; (USNMENT01759560). 11; same locality; 21 Oct. 1965; ex *Lonchorhina aurita* Tomes (Chiroptera: Phyllostomidae); RML 52808; (USNMENT01759561, USNMENT01759562, USNMENT01759563, USNMENT01759564, USNMENT01759565, USNMENT01759566, USNMENT01759567, USNMENT01759568, USNMENT01759569, USNMENT01759570). 1; same locality; 22 Oct. 1965; ex *Artibeus jamaicensis* Leach

(Chiroptera: Phyllostomidae); RML 52821; (USNMENT01759571). 8; Mérida State; 16 Feb. 1966; ex *Thomasomys laniger* (Thomas) (Rodentia: Cricetidae); RML 52813; (USNMENT01759572, USNMENT01759573, USNMENT01759574, USNMENT01759575, USNMENT01759576, USNMENT01759577, USNMENT01759578, USNMENT01759579). 1; same locality and host; 14 Feb. 1966; RML 49040; (USNMENT01759580).

***scincicola*, *Schoengastia* Lawrence, 1949: 427**

**Paratype (L)**

ZIMBABWE • 1; Manicaland province, Mutare City, Bvumba Mountains Feb. 1948; ex *Mabuya varia* Loveridge (= *Trachylepis brauni* [Tornier]) (Squamata: Scincidae); NM 4870; (USNMENT01759581).

***scitula*, *Pseudoschoengastia* Brennan and Jones, 1959: 427**

**Holotype (L)**

MEXICO • Chiapas State; 6 Sep. 1953; ex *Liomys pictus* (Thomas) (= *Heteromys pictus*) (Rodentia: Heteromyidae); RML 34933; (USNMENT01759582).

***sciuricola*, *Schoengastia* Ewing, 1925a: 261**

**Syntypes (L)**

USA • 10; Montana State, Ravalli County, Florence; ex *Sciurus hudsonicus richardsoni* Bachman (= *Tamiasciurus hudsonicus richardsoni*) (Rodentia: Sciuridae); USNM 892; (USNMENT01759583, USNMENT01759584, USNMENT01759585, USNMENT01759586, USNMENT01759587, USNMENT01759588, USNMENT01759589, USNMENT01759590, USNMENT01759591, USNMENT01759592).

***scorpionis*, *Neotrombicula* Lakshana, 1966: 258**

**Holotype (L)**

THAILAND • Ubon Ratchathani Province, Sirindhorn District, Chong Mek; 2 Jun. 1963; ex *Cercophonius squama* (Gervais) (Scorpiones: Scorpionidae); SMRL 2406; (USNMENT01759593).

***scottae*, *Trombicula* Brennan, 1952b: 62**

**Holotype (L)**

USA • California State, Monterey County, Hastings Natural History Reservation; 29 Sep. 1950; ex *Peromyscus truei* (Shufeldt) (Rodentia: Cricetidae); RML 28152; (USNMENT01759594).

**Paratypes (L)**

USA • 3; same data as holotype; (USNMENT01759595, USNMENT01759596, USNMENT01759597). 1; same data; RML 28152; (USNMENT01759598). 2; same locality and host; 16 May 1951; RML 29464; (USNMENT01759599, USNMENT01759600). 6; same locality and host; 11 Dec. 1950; RML 28378; (USNMENT01759601, USNMENT01759602, USNMENT01759603, USNMENT01759604, USNMENT01759605, USNMENT01759606). 1; same locality and host; 24 Aug. 1953; RML 32562; (USNMENT01759607). 5; same locality and host; 9 Apr. 1951; RML 29461; (USNMENT01759608, USNMENT01759609, USNMENT01759610, USNMENT01759611, USNMENT01759612). 11; same locality and host; 13 Apr. 1951; RML 29462; (USNMENT01759613, USNMENT01759614, USNMENT01759615, USNMENT01759616, USNMENT01759617, USNMENT01759618, USNMENT01759619, USNMENT01759620, USNMENT01759621, USNMENT01759622, USNMENT01759623). 4; same locality and host; 10 Nov. 1950; RML 28317; (USNMENT01759624, USNMENT01759625, USNMENT01759626, USNMENT01759627). 1; same locality and host; 8 Dec. 1950; RML 28368; (USNMENT01759628). 1; same locality and host; 19 Jul. 1950; RML 27910; (USNMENT01759629). 6; same locality; 17 Sep. 1950; ex *Peromyscus californicus* (Gambel) (Rodentia: Cricetidae); RML 28144; (USNMENT01759630, USNMENT01759631, USNMENT01759632, USNMENT01759633, USNMENT01759634, USNMENT01759635). 7; same locality and host; 15 Aug. 1950; RML 28143; (USNMENT01759636, USNMENT01759637, USNMENT01759638,

USNMENT01759639, USNMENT01759640, USNMENT01759641,  
 USNMENT01759642). 3; same locality and host; 5 Oct. 1950; RML 28146;  
 (USNMENT01759643, USNMENT01759644, USNMENT01759645). 1; same locality  
 and host; 9 Apr. 1951; RML 29461; (USNMENT01759646). 6; same locality and host; 16  
 May 1951; RML 29433; (USNMENT01759647, USNMENT01759648,  
 USNMENT01759649, USNMENT01759650, USNMENT01759651,  
 USNMENT01759652). 2; same locality; 6 Apr. 1951; ex *Peromyscus maniculatus*  
 (Wagner) (Rodentia: Cricetidae); RML 29442; (USNMENT01759653,  
 USNMENT01759654). 2; same locality and host; 11 Apr. 1946; RML 28392;  
 (USNMENT01759655, USNMENT01759656). 5; same locality; 26 Apr. 1951; ex  
*Neotoma fuscipes* Baird (Rodentia: Cricetidae); RML 29645; (USNMENT01759657,  
 USNMENT01759658, USNMENT01759659, USNMENT01759660,  
 USNMENT01759661). 1; same locality and host; 28 May 1951; RML 27943;  
 (USNMENT01759662). 1; same locality and host; 17 Dec. 1938; RML 29467;  
 (USNMENT01759663).

***scrobiculata*, *Guntheria* (Guntheria) Goff, 1979e: 246**

**Paratypes (L)**

PAPUA NEW GUINEA • 3; Sandaun Province, Oksapmin; 29 Mar. 1971; ex *Peroryctes*  
*raffrayana* (Milne-Edwards) (Peramelemorphia: Peroryctidae); BPBM 11432;  
 (USNMENT01759664, USNMENT01759665, USNMENT01759666).

***secunda*, *Speleocola* Brennan and Jones, 1960: 509**

**Holotype (L)**

TRINIDAD AND TOBAGO • Saint Patrick County; 23 Jun. 1956; ex *Micronycteris*  
*hirsuta* (Peters) (Chiroptera: Phyllostomidae); RML 34034; (USNMENT01759667).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 19; same data as holotype; (USNMENT01759668,  
 USNMENT01759669, USNMENT01759670, USNMENT01759671,  
 USNMENT01759672, USNMENT01759673, USNMENT01759674,  
 USNMENT01759675, USNMENT01759676, USNMENT01759677,

USNMENT01759678, USNMENT01759679, USNMENT01759680,  
 USNMENT01759681, USNMENT01759682, USNMENT01759683,  
 USNMENT01759684, USNMENT01759685, USNMENT01759686). 3; same data; RML  
 34035; (USNMENT01759687, USNMENT01759688, USNMENT01759689).

***secundus*, *Nyscterinastes* Brennan and Reed, 1973b: 709**

**Holotype (L)**

VENEZUELA • Miranda State, Venezuela; 14 Oct. 1966; ex *Anoura geoffroyi* Gray  
 (Chiroptera: Phyllostomidae); RML 48306; (USNMENT01759690).

**Paratypes (L)**

VENEZUELA • 5; same data as holotype; (USNMENT01759691, USNMENT01759692,  
 USNMENT01759693, USNMENT01759694, USNMENT01759695). 5; Bolivar State,  
 Icabaru; 7 May 1968; same host; RML 49838; (USNMENT01759696,  
 USNMENT01759697, USNMENT01759698, USNMENT01759699,  
 USNMENT01759700). 2; same data; RML 49837; (USNMENT01759701,  
 USNMENT01759702).

***senase*, *Acomatacarus* (*Acomatacarus*) Greenberg, 1952: 484**

**Paratypes (L)**

USA • 1; Kansas State, Barber County; 11 Apr. 1949; ex *Neotoma micropus* Baird  
 (Rodentia: Cricetidae); (USNMENT01759703). 1; same locality; 10 Apr. 1949; ex *Myotis*  
*velifer* (J.A. Allen) (Chiroptera: Vespertilionidae); (USNMENT01759704).

***senticosus*, *Aitkenius* Brennan and Reed, 1973a: 532**

**Holotype (L)**

VENEZUELA • Táchira State, San Cristóbal; 17 Mar. 1968; ex *Oryzomys minutus* Tomes  
 (= *Microrizomys minutus*) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 55936;  
 (USNMENT01759705).

**Paratypes (L)**



VENEZUELA • 3; same data as holotype; (USNMENT01759706, USNMENT01759707, USNMENT01759708). 1; same locality and host; 5 Mar. 1968; RML 55927; (USNMENT01759709).

***sepikensis*, *Ascoschoengastia* Goff, 1979f: 533**

**Paratypes (L)**

PAPUA NEW GUINEA • 2; Sandaun Province, Telefomin District; 24 Aug. 1963; ex *Dactylopsila trivirgata* Gray (Diprotodontia: Petauridae); BPBM 11407; (USNMENT01759710, USNMENT01759711).

***serrata*, *Gahrlipeia* (*Ripiaspichia*) Brown and Goff, 1988b: 117**

**Paratype (L)**

PHILIPPINES • 1; Luzon Island, Baguio; 1964; ex *Rattus rattus* (L.) (Rodentia: Muridae); (USNMENT01759712).

***serrata*, *Guntheria* Goff, 1980a: 87**

**Paratypes (L)**

PAPUA NEW GUINEA • 2; Morobe Province; 12 Dec. 1969; ex *Rattus niobe* Thomas (Rodentia: Muridae); BPBM 11559; (USNMENT01759713, USNMENT01759714).

***serratus*, *Xenodontacarus* Loomis and Goff, 1973: 113**

**Holotype (L)**

MEXICO • Sinaloa State, Concodia, San Nicolás de Pánuco; 10 Dec. 1964; ex *Artibeus lituratus* (Olfers) (Chiroptera: Phyllostomidae); R. B. Loomis and K. D. Peyton coll.; RBL 641210; (USNMENT01759715).

***setosa*, *Ascoschoengastia* Goff, 1979a: 86**

**Paratype (L)**

AUSTRALIA • 1; Western Australia State, Brooking Springs; 30 Sep. 1976; ex *Zygomys argurus* (Thomas) (Rodentia: Muridae); WAM 791577; (USNMENT01759716).

**setosa, *Chatia* Brennan, 1946b: 132****Holotype (L)**

USA • Montana State, Ravalli County, Blodgett Canyon; 5 Jun. 1945; ex *Sciurus hudsonicus richardsoni* Bachman (= *Tamiasciurus hudsonicus richardsoni*) (Rodentia: Sciuridae); RML 21728; (USNMENT01759717).

**Paratypes (L)**

USA • 3; same data as holotype; (USNMENT01759718, USNMENT01759719, USNMENT01759720). 4; same locality and host; 11 Jul. 1945; RML 21870; (USNMENT01759721, USNMENT01759722, USNMENT01759723, USNMENT01759724). 4; Montana State, Ravalli County, Skalkaho Creek; 11 Jul. 1944; same host; RML 21200; (USNMENT01759725, USNMENT01759726, USNMENT01759727, USNMENT01759728). 1; same locality and host; 16 Nov. 1945; RML 21201; (USNMENT01759729). 1; same locality; 10 May 1945; ex *Citellus lateralis tescorum* Say (= *Callospermophilus lateralis*) (Rodentia: Sciuridae); RML 21806; (USNMENT01759730). 1; Montana State, Ravalli County, Lolo Canyon; 17 Jun. 1945; same host; RML 21735; (USNMENT01759731). 5; Montana State, Ravalli County, Ross' hole; 12 Oct. 1945; ex *Neotoma cinerea* (Ord) (Rodentia: Cricetidae); RML 22034; (USNMENT01759732, USNMENT01759733, USNMENT01759734, USNMENT01759735, USNMENT01759736). 2; same locality and host; 16 Oct. 1945; RML 22039; (USNMENT01759737, USNMENT01759738). 2; same locality; 17 Oct. 1945; ex *Peromyscus maniculatus artemisiae* (Rhoads) (= *Peromyscus maniculatus* [Wagner]) (Rodentia: Cricetidae); RML 22041; (USNMENT01759739, USNMENT01759740). 2; Montana State, Ravalli County, Gird Creek; 27 Oct. 1945; same host; RML 22056; (USNMENT01759741, USNMENT01759742). 1; same locality and host; 17 Oct. 1945; RML 22046; (USNMENT01759743). 1; Montana State, Ravalli County, Hughes Creek; 16 Jun. 1945; ex *Ochotona princeps* (Richardson) (Lagomorpha: Ochotonidae); RML 21740; (USNMENT01759744). 4; Idaho State, Elmore County; 23 Jun. 1945; ex *Peromyscus maniculatus sonoriensis* (Le Conte) (Rodentia: Cricetidae); RML 21985; (USNMENT01759745, USNMENT01759746, USNMENT01759747, USNMENT01759748, USNMENT01759749). 3; same locality; 26 Jun. 1945; ex *C.*

*lateralis*; RML 21862; (USNMENT01759750, USNMENT01759751, USNMENT01759752).

***setosa*, *Trombicula* Ewing, 1937: 171**

**Syntypes (L)**

USA • 4; Georgia State, Okefenokee Swamp; 2 Dec. 1934; ex *Peromyscus gossypinus* (Le Conte) (Rodentia: Cricetidae); E. V. Komarek coll.; USNM 1256; (USNMENT01759753, USNMENT01759754, USNMENT01759755, USNMENT01759756).

***shannoni*, *Trombicula* Ewing, 1929b: 10**

**Syntypes (L)**

PERU • 16; Lima Province; 28 May 1925; ex *Felis catus* (L.) (Carnivora: Felidae); USNM 986; (USNMENT01759757, USNMENT01759758, USNMENT01759759, USNMENT01759760, USNMENT01759761, USNMENT01759762, USNMENT01759763, USNMENT01759764, USNMENT01759765, USNMENT01759766, USNMENT01759767, USNMENT01759768, USNMENT01759769, USNMENT01759770, USNMENT01759771, USNMENT01759772).

***shatrovi*, *Blankaartia* Bassini-Silva and Barros-Battesti, 2017: 2**

**Paratypes (L)**

BRAZIL • 4; São Paulo State, São Paulo; 4 Jun. 1932; ex “unidentified bird” (Passeriformes); IBSP 367; (USNMENT01759773, USNMENT01759774, USNMENT01759775, USNMENT01759776).

***shawi*, *Odontacarus* Brennan, 1959: 5**

**Holotype (L)**

USA • larva; California State, San Diego County, Anza-Borrego Desert State Park; 13 Jun. 1957; ex *Coleonyx variegatus* (Baird) (Squamata: Eublepharidae); RML 34387; (USNMENT01759777).

**Paratypes (L)**

USA • 7; same data as holotype; (USNMENT01759778, USNMENT01759779, USNMENT01759780, USNMENT01759781, USNMENT01759782, USNMENT017597083, USNMENT01759784). 1; same data; RML 34631; (USNMENT01759785). 1; same data; RML 34632; (USNMENT01759786). 1; same data; RML 34636; (USNMENT01759787). 1; California State, Riverside County; 4 May 1957; same host; RML 34635; (USNMENT01759788).

***siamensis*, *Trombicula (Sasatrombicula) Nadchatram and Mitchell, 1965: 74***

**Paratype (L)**

THAILAND • 1; Chiang Mai Province, Doi Suthep; 10 Apr. 1962; ex *Rhinolophus luctus* Temminck (Chiroptera: Rhinolophidae); (USNMENT01759789).

***signator*, *Neoschoengastia* Ewing, 1931: 14**

**Syntypes (L)**

USA • 4; Oklahoma State, Latimer County, Wilburton; 17 May 1929; ex *Neotoma* sp. (Rodentia; Cricetidae); C. Sanborn and G. Stiles coll.; USNM 1023; (USNMENT01759790, USNMENT01759791, USNMENT01759792, USNMENT01759793).

***similis*, *Wagenaaria* Brennan, 1967: 148**

**Holotype (L)**

CURAÇAO • Willemstad City, Hato Caves; 26 Nov. 1948; ex *Mormoops megalophylla* (Peters) (Chiroptera: Mormoopidae); RML 45403; (USNMENT01759794).

**Paratypes (L)**

CURAÇAO • 2; same locality and host; 20 Oct. 1948; RML 45404; (USNMENT01759795, USNMENT01759796) 11; same locality and host; 1 Dec. 1948; RML 45423; (USNMENT01759797, USNMENT01759798, USNMENT01759799, USNMENT01759800, USNMENT01759801, USNMENT01759802, USNMENT01759803, USNMENT01759804, USNMENT01759805, USNMENT01759806, USNMENT01759807).

***simplex*, *Hemitrombicula* Ewing, 1938: 294****Syntypes (L)**

USA • 2; North Carolina State, Craven County, Camp Bryan; Jul. 1931; ex *Pantherophis obsoletus* (Say) (Squamata: Colubridae); USNM 1278; (USNMENT01759808, USNMENT01759809).

***simulans*, *Euschoengastia* Wrenn and Loomis, 1974: 241****Holotype (L)**

USA • California State, Riverside County, Joshua Tree National Park; 26 Nov. 1967; ex *Peromyscus eremicus* (Baird) (Rodentia: Cricetidae); R. C. Stephens and R. M. Davis coll.; RMD 671127; (USNMENT01759810).

**Paratype (L)**

USA • 1; same data as holotype; (USNMENT01759811).

***simulata*, *Gahrliepia* (*Walchia*) Traub and Evans, 1957: 317****Holotype (L)**

MALAYSIA • Pahang State, Raub District, Fraser's Hill; 13 Jan. 1956; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); USATC 40004; (USNMENT01759812).

**Paratypes (L)**

MALAYSIA • 9; same data as holotype; (USNMENT01759813, USNMENT01759814, USNMENT01759815, USNMENT01759816, USNMENT01759817, USNMENT01759818, USNMENT01759819, USNMENT01759820, USNMENT01759821). 2; same locality and host; 14 Jan. 1956; USATC 40020; (USNMENT01759822, USNMENT01759823). 1; same data; USATC 40028; (USNMENT01759824).

***sloomi*, *Euschoengastia* Brennan, 1965b: 108****Holotype (L)**

USA • Nevada State, Nye County, Mercury; 28 Oct. 1961; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); D. M. Allred coll.; RML 39765; (USNMENT01759825).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01759826, USNMENT01759827).

***smarma*, *Atelepalmes* Brennan and Reed, 1973b: 706****Holotype (L)**

VENEZUELA • Guárico State, San Juan de Los Morros; 3 Jan. 1968; ex *Zygodontomys brevicauda* J.A. Allen and Chapman (Rodentia: Cricetidae); Smithsonian Army coll.; RML 52943; (USNMENT01759828).

**Paratypes (L)**

VENEZUELA • 3; same data as holotype; (USNMENT01759829, USNMENT01759830, USNMENT01759831).

***sola*, *Trombicula* (*Trombicula*) Gould, 1956: 46****Holotype (L)**

USA • California State, Imperial County, Palo Verde; 21 Jan. 1951; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); D. P. Furman and D. J. Gould coll.; (USNMENT01759832).

***solickiana*, *Hoffmanniella* Crossley and Clement, 2015: 248****Paratypes (L)**

USA • 1; Georgia State, Laurens County; 16 Jul. 2008; ex *Corynorhinus rafinesquii* (Lesson) (Chiroptera: Vespertilionidae); M. J. Clement coll.; USNM 207410; (USNMENT01759833). 1; Georgia State, Appling County; 6 Jul. 2008; same host; USNM 207410; (USNMENT01759834).

***solitus*, *Neoschoengastia* Nadchatram, 1967a: 149****Holotype (L)**

THAILAND • Nan Province, Ban Pha Hang; 4 Nov. 1961; ex *Pomatorhinus hypoleucos* (Blyth) (= *Erythrogenys hypoleucos*) (Passeriformes: Timaliidae); J. E. Scanlon and Thonglongya coll.; SMRL V120; (USNMENT01759835).

***somaliensis*, *Vargatula* Goff, 1983h: 618****Holotype (L)**

SOMALIA • no specific locality and date; ex *Heterocephalus glaber* (Rodentia: Bathyergidae); FMNH 74337; (USNMENT01759836).

**Paratypes (L)**

SOMALIA • 10; same data as holotype; (USNMENT01759837, USNMENT01759838, USNMENT01759839, USNMENT01759840, USNMENT01759841, USNMENT01759842, USNMENT01759843, USNMENT01759844, USNMENT01759845, USNMENT01759846).

***soricicola*, *Gahrliepia* (*Walchia*) Traub and Evans, 1957: 305****Holotype (L)**

INDIA • Assam State, Ledo, Stillwell Road; 19 May 1945; ex *Crocidura* sp. (Eulipotyphla: Soricidae); R. Traub coll.; USATC 1057; (USNMENT01759847).

**Paratypes (L)**

INDIA • 2; same locality and host; 20 May 1945; USATC 1067; (USNMENT01759848, USNMENT01759849). 1; same locality and host; 22 May 1945; USATC 1072; (USNMENT01759850).

***soricinus*, *Euschoengastia* Gould, 1956: 65****Holotype (L)**

USA • California State, Plumas County, Quincy; 20 Oct. 1949; ex *Sortrowbridgii* Baird (Eulipotyphla: Soricidae); RML 28063; (USNMENT01759851).

**Paratypes (L)**

USA • 3; same locality and host; 17 Aug. 1949; RML 28094; (USNMENT01759852, USNMENT01759853, USNMENT01759854). 2; same locality and host; 29 May 1950; RML 28041; (USNMENT01759855, USNMENT01759856). 1; same locality and host; 9 Mar. 1949; RML 26551; (USNMENT01759857).

***soucouyanti*, *Trombicula* Brennan and Yunker, 1966a: 256****Holotype (L)**

PANAMA • larva, Chiriquí province, Cerro Punta, 24 Apr. 1961; ex *Sturnira ludovici* Anthony (Chiroptera: Phyllostomidae); C. E. Yunker coll.; RML 40711; (USNMENT01759858).

**Paratypes (L)**

PANAMA • 5; same data as holotype; (USNMENT01759859, USNMENT01759860, USNMENT01759861, USNMENT01759862, USNMENT01759863).

***southardi*, *Trombicula* (*Neotrombicula*) Kardos, 1961: 507**

**Holotype (L)**

NORTH KOREA • South P'yöngan Province, Ch'ör-hyön; 31 Mar. 1954; ex *Crocidura lasiura* Dobson (Eulipotyphla: Soricidae); USNM 2240; (USNMENT01759864).

**Paratypes (L)**

NORTH KOREA • 1; same data as holotype; (USNMENT01759865). 1; same locality; 21 Mar. 1953; ex *Rattus norvegicus* (Berkenhout) (Rodentia: Muridae); (USNMENT01759866). 1; same locality; 7 Apr. 1953; ex *Clethrionomys rufocanus* (Sundevall) (= *Myodes rufocanus*) (Rodentia: Cricetidae); (USNMENT01759867). 1; Kangwön province, Kümhwa County; 10 Jan. 1953; ex *Apodemus agrarius* (Pallas) (Rodentia: Muridae); (USNMENT01759868).

***spathi*, *Trombicula* Loomis and Tanigoshi, 1968: 155**

**Paratype (L)**

MEXICO • 1; Sonora State; 18 Jul. 1965; ex *Tadarida femorasacca* Merriam (= *Nyctinomops femorosacca*) (Chiroptera: Molossidae); L. C. Spath, R. B. Loomis and J. L. Fowler coll.; LCS650718; (USNMENT01759869).

***spelaea*, *Microtrombicula* Goff, 1990a: 175**

**Holotype (L)**

INDONESIA • Jailolo District Halmahera Island, Kampung Pasir Putih; 7 May 1981; ex *Eonycteris spelaea* (Dobson) (Chiroptera: Pteropodidae); (USNMENT01759870).

***spicea*, *Trombicula* Gater, 1932: 151**



**Paratype (L)**

MALAYSIA • 1; Selangor State, Petaling District, Sungai Buloh; 8 Aug. 1930; ex *Rattus mulleri* Jentink (= *Sundamys muelleri*) (Rodentia: Muridae); USNM 1051; (USNMENT01759871).

***spilletti, Leptotrombidium (Leptotrombidium) Mitchell and Nadchatram, 1966: 66*****Paratypes (L)**

INDIA • 2; Madhya Pradesh State, Kanha National Park; 25 Dec. 1964; ex *Rattus blanfordi* (Thomas) (= *Madromys blanfordi*) (Rodentia: Muridae); BPBM 6627; (USNMENT01759872, USNMENT01759873).

***spinicoxa, Eusaperium Goff, 1992a: 38*****Holotype (L)**

PERU • Cusco Department, Urubamba Province, Machu Picchu; Apr. 1915; ex *Lestoros inca* (Thomas) (Paucituberculata: Caenolestidae); E. Heller coll.; USNM 194935; (USNMENT01759874).

**Paratypes (L)**

PERU • 7; same data as holotype; (USNMENT01759875, USNMENT01759876, USNMENT01759877, USNMENT01759878, USNMENT01759879, USNMENT01759880, USNMENT01759881).

***spirostra, Tecomatlana (Hooperella) Vercammen-Grandjean, 1967: 854*****Holotype (L)**

BRAZIL • Minas Gerais state, Lagoa Santa; 10 Apr. 1962; ex *Micronycteris megalotis* (Gray) (Chiroptera: Phyllostomidae); (USNMENT01759882).

**Paratypes (L)**

BRAZIL • 2; same data as holotype; (USNMENT01759883, USNMENT01759884).

***spipi, Eutrombicula Brennan and Reed, 1974b: 705*****Holotype (L)**

VENEZUELA • Amazonas State, La Esmeralda; 6 Mar. 1967; ex *Echimys armatus* (I. Geoffroy) (= *Makalata didelphoides* [Desmarest]) (Rodentia: Echimyidae); Smithsonian Army coll.; RML 52734; (USNMENT01759885).

**Paratypes (L)**

VENEZUELA • 9; same data as holotype; (USNMENT01759886, USNMENT01759887, USNMENT01759888, USNMENT01759889, USNMENT01759890, USNMENT01759891, USNMENT01759892, USNMENT01759893, USNMENT01759894). 9; same locality and host; 1 Mar. 1967; RML 52556; (USNMENT01759895, USNMENT01759896, USNMENT01759897, USNMENT01759898, USNMENT01759899, USNMENT01759900, USNMENT01759901, USNMENT01759902, USNMENT01759903). 9; same locality and host; 2 Mar. 1967; RML 52559; (USNMENT01759904, USNMENT01759905, USNMENT01759906, USNMENT01759907, USNMENT01759908, USNMENT01759909, USNMENT01759910, USNMENT01759911, USNMENT01759912). 10; same data; RML 52557; (USNMENT01759913, USNMENT01759914, USNMENT01759915, USNMENT01759916, USNMENT01759917, USNMENT01759918, USNMENT01759919, USNMENT01759920, USNMENT01759921, USNMENT01759922). 8; same locality and host; 3 Mar. 1967; RML 52560; (USNMENT01759923, USNMENT01759924, USNMENT01759925, USNMENT01759926, USNMENT01759927, USNMENT01759928, USNMENT01759929, USNMENT01759930). 14; same locality and host; 5 Mar. 1967; RML 50036; (USNMENT01759931, USNMENT01759932, USNMENT01759933, USNMENT01759934, USNMENT01759935, USNMENT01759936, USNMENT01759937, USNMENT01759938, USNMENT01759939, USNMENT01759940, USNMENT01759941, USNMENT01759942, USNMENT01759943, USNMENT01759944). 2; same data; RML 50033; (USNMENT01759945, USNMENT01759946). 1; same locality and host; 17 Mar. 1967; RML 52735; (USNMENT01759947). 4; same data; RML 52564; (USNMENT01759948, USNMENT01759949, USNMENT01759950, USNMENT01759951). 11; same data; RML 52565; (USNMENT01759952, USNMENT01759953, USNMENT01759954, USNMENT01759955,

USNMENT01759956, USNMENT01759957, USNMENT01759958,  
 USNMENT01759959, USNMENT01759960, USNMENT01759961,  
 USNMENT01759962). 6; Bolivar State, Bolivar; 7 Apr. 1967; ex *Lutreolina crassicaudata*  
 (Desmarest) (Didelphimorphia: Didelphidae); RML 52611; (USNMENT01759963,  
 USNMENT01759964, USNMENT01759965, USNMENT01759966,  
 USNMENT01759967, USNMENT01759968).

***spissa, Euschoengastia Brennan and Jones, 1961a: 110***

**Holotype (L)**

PANAMA • Chiriquí province; 4 May 1960; ex *Peromyscus nudipes* Goodwin (= *Peromyscus mexicanus* [Saussure]) (Rodentia: Cricetidae); RML 35963; (USNMENT01759969).

***splendens, Trombicula Ewing, 1913: 113***

**Syntype (P)**

USA • Adult; Wisconsin State, Columbia County, Portage; 2 Sep. 1909; “in soil”; H. E. Ewing coll.; (USNMENT01759970).

***sproccsi, Trombicula Brennan, 1965b: 109***

**Holotype (L)**

USA • Arizona State, Pima County, Sabino Canyon Recreation Area; 31 Jul. 1961; ex *Pipistrellus hesperus* H. Allen (= *Parastrellus hesperus*) (Chiroptera: Vespertilionidae); RML 37835; (USNMENT01759971).

**Paratypes (L)**

USA • 4; same data as holotype; (USNMENT01759972, USNMENT01759973, USNMENT01759974, USNMENT01759975). 3; Arizona State, Mohave County, Kingman; 8 Jul. 1961; same host; RML 37834; (USNMENT01759976, USNMENT01759977, USNMENT01759978). 2; Arizona State, Pima County; 30 Jun. 1961; same host; RML 37830; (USNMENT01759979, USNMENT01759980). 1; same locality and host; 21 Aug. 1961; RML 37833; (USNMENT01759981). 5; same locality

and host; 13 Sep. 1961; RML 37820; (USNMENT01759982, USNMENT01759983, USNMENT01759984, USNMENT01759985, USNMENT01759986).

***squamosa*, Guntheria Goff, 1981h: 298**

**Paratypes (L)**

PAPUA NEW GUINEA • 5; Morobe Province, Bulolo; 19 Aug. 1967; ex *Rattus ruber* Thomas (= *Rattus feliceus*) (Rodentia: Muridae); BPBM 11933; (USNMENT01759987, USNMENT01759988, USNMENT01759989, USNMENT01759990, USNMENT01759991).

***squamosus*, Trombiculindus Radford, 1948a: 127**

**Paratypes (L)**

INDIA • 3; Uttarakhand State, Kumaon Hills; Oct. 1946; ex *Rattus* sp. (Rodentia: Cricetidae); (USNMENT01759992, USNMENT01759993, USNMENT01759994).

***squarrosa*, Teratothrix Brennan and Goff, 1978a: 543**

**Holotype (L)**

VENEZUELA • Apure State, Nulita; 29 Jan. 1968; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); RML 55955; (USNMENT01759995).

***stafordi*, Euschoengastia Brennan and White, 1960: 347**

**Holotype (L)**

USA • Alabama State, Bibb County; 8 Jan. 1953; ex *Pipistrellus subflavus* F. Cuvier (= *Perimyotis subflavus*) (Chiroptera: Vespertilionidae); RML 35030; (USNMENT01759996).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01759997, USNMENT01759998). 1; same data; RML 35967; (USNMENT01759999). 4; same data; RML 34968; (USNMENT01760000). 2; same locality and host; 30 Jan. 1953; RML 35019; (USNMENT01760001, USNMENT01760002). 1; same locality and host; 1 Nov. 1952; RML 35032; (USNMENT01760003). 5; Alabama State, Madison County; 2 Feb. 1953; ex

*Eptesicus fuscus* (Beauvois) (Chiroptera: Vespertilionidae); RML 35017; (USNMENT01760004, USNMENT01760005, USNMENT01760006, USNMENT01760007, USNMENT01760008).

***starki, Gahrliopia (Gahrliopia) Lakshana and Dohany, 1972: 13***

**Holotype (L)**

THAILAND • Trang Province, Mueang Trang District, Khao Chong Wildlife Park; 29 Jan. 1964; ex *Rattus surifer* Miller (= *Maxomys surifer*) (Rodentia: Muridae); W. Songprakob coll.; SMRL 7187; (USNMENT01760009).

**Paratypes (L)**

THAILAND • 3; same data as holotype; (USNMENT01760010, USNMENT01760011, USNMENT01760012).

***steffani, Teratothrix Goff, 1981d: 248***

**Holotype (L)**

COLOMBIA • Antioquia Department; 14 Sep. 1970; ex *Proechimys semispinosus* Tomes (Rodentia: Echimyidae); N. E. Peterson coll.; (USNMENT01760013).

**Paratypes (L)**

COLOMBIA • 22; same data as holotype; (USNMENT01760014, USNMENT01760015, USNMENT01760016, USNMENT01760017, USNMENT01760018, USNMENT01760019, USNMENT01760020, USNMENT01760021, USNMENT01760022, USNMENT01760023, USNMENT01760024, USNMENT01760025, USNMENT01760026, USNMENT01760027, USNMENT01760028, USNMENT01760029, USNMENT01760030, USNMENT01760031, USNMENT01760032, USNMENT01760033, USNMENT01760034, USNMENT01760035). 2; same locality; 8 Apr. 1972; ex *Neacomys tenuipes* Thomas (Rodentia: Cricetidae); (USNMENT01760036, USNMENT01760037).

***stephensi, Euscheongastia Loomis and Somerby, 1966: 219***

**Holotype (L)**

MEXICO • Sonora State, San Carlos Bay; 6 Jul. 1960; ex *Onychomys torridus* (Coues) (Rodentia: Cricetidae); R. B. Loomis coll.; RBL 600706; (USNMENT01760038).

**Paratype (L)**

MEXICO • 1; same data as holotype; (USNMENT01760039).

***sternalis*, *Trombicula* Brennan and Jones, 1961b: 202**

**Holotype (L)**

PERU • Puno Department, Pampa Queullecota; 5 Feb. 1952; ex *Ctenomys peruanus* Sanborn and Pearson (Rodentia: Ctenomyidae); O. P. Pearson coll.; RML 34763; (USNMENT01760040).

**Paratypes (L)**

PERU • 2; same data as holotype; (USNMENT01760041, USNMENT01760042).

***stewarti*, *Leeuwenhoekia* (*Comatacarus*) Gould, 1956: 15**

**Holotype (L)**

USA • California State, San Luis Obispo County; 11 Aug. 1950; ex *Perognathus californicus* Merriam (= *Chaetodipus californicus*) (Rodentia: Heteromyidae); D. J. Gould coll.; (USNMENT01760043).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01760044, USNMENT01760045).

***strandtmanni*, *Guntherana* Nadchatram and Traub, 1969: 265**

**Paratypes (L)**

PAPUA NEW GUINEA • 1; Morobe Province, Wau, Edie Creek; 5 Nov. 1966; ex *Rattus* sp. (Rodentia: Muridae); BPBM 8208; (USNMENT01760046); 1; same locality and host; 6 Nov. 1966; (USNMENT01760047).

***strandtmani*, *Womersia* Wharton, 1947: 382**

**Holotype (L)**

USA • Texas State, Galveston County; 19 Jun. 1946; ex *Pelecanus occidentalis* L. (Pelecaniformes: Pelecanidae); R. W. Strandtman coll.; USNM 1785; (USNMENT01760048).

***striatum*, *Leptotrombidium* (*Leptotrombidium*) Nadchatram and Traub, 1964a: 65**

**Holotype (L)**

LAOS • Xieng Khouang Province; 21 Aug. 1960; ex *Tamiops rodolphii* (Milne-Edwards) (Rodentia: Sciuridae); IMR 103546; (USNMENT01760049).

**Paratypes (L)**

LAOS • 1; same data as holotype; IMR 103537; (USNMENT01760050). 1; same data; IMR 103537; (USNMENT01760051). 1; same data. IMR 103533; (USNMENT01760052).

***strongi*, *Neoschoengastia* Wharton and Hadrcastle, 1946: 320**

**Holotype (L)**

REPUBLIC OF PALAU • Peleliu Island; 8 Sep. 1945; ex *Arenaria interpres* (L.) (Charadriiformes: Scolopacidae); J. N. Strong coll.; USNM 1791; (USNMENT01760055).

***subacutascuta*, *Tecomatlana* (*Beamerella*) Vercammen-Grandjean, 1967b: 853**

**Holotype (L)**

TRINIDAD AND TOBAGO • Cumuto District; no date; ex *Micronycteris hirsuta* (Peters) (Chiroptera: Phyllostomidae); (USNMENT01760056).

***subintermedia*, *Trombicula* (*Leptotrombidium*) Jameson and Toshioka, 1954: 17**

**Holotype (L)**

SOUTH KOREA • Gyeonggi Province, Yeoncheon County; 27 Nov. 1957; ex *Apodemus agrarius* (Pallas) (Rodentia: Muridae); (USNMENT01760057).

***subquadrata*, *Eutrombicula* Lawrence, 1951: 114**

**Paratype (L)**

SOUTH AFRICA • 1; KwaZulu-Natal Province, Pietermaritzburg; Dec. 1950; ex *Lepus saxatilis* F. Cuvier (Lagomorpha: Leporidae); NM 4919; (USNMENT01760058).

***subrara, Siseca* Audy, 1956: 42****Paratypes (L)**

MALAYSIA • 1; Selangor State, Gombak District, Bukit Lagong; 21 Sep. 1953; ex *Sphaeropaeus globusmagicus* Jeekel (Sphaerotheriida: Zephroniidae); CORU 40978; (USNMENT01760059). 1; same data; CORU 40979; (USNMENT01760060).

***subsignata, Trombicula (Neotrombicula)* Brennan and Wharton, 1950: 159****Syntypes (L)**

USA • 5; New York State, Broome County; 10 Aug. 1947; ex *Microtus pennsylvanicus* (Ord) (Rodentia: Cricetidae); USNM 1837; (USNMENT01760061, USNMENT01760062, USNMENT01760063, USNMENT01760064, USNMENT01760065).

***sulawesiensis, Schoengastia* Goff, Durden and Whitaker, 1986: 91****Holotype (L)**

INDONESIA • Sulawesi Island, Bogani Nani Wartabone National Park; Feb. 1985; ex *Bunomys fratrorum* (Thomas) (Rodentia: Muridae); (USNMENT01760066).

**Paratypes (L)**

INDONESIA • 1; same data as holotype; (USNMENT01760067). 9; same locality and date; ex *Maxomys hellwaldii* (Jentink) (Rodentia: Muridae); (USNMENT01760068, USNMENT01760069, USNMENT01760070, USNMENT01760071, USNMENT01760072, USNMENT01760073, USNMENT01760074, USNMENT017600875, USNMENT01760076). 3; same locality and date; ex *Maxomys musschenbroekii* (Jentink) (Rodentia: Muridae); (USNMENT01760077, USNMENT01760078, USNMENT01760079).

***sunniana, Odontacarus (Odontacarus)* Reed and Brennan, 1975: 19****Holotype (L)**

VENEZUELA • Lara State, El Tocuyo; 15 Jul. 1968; ex *Proechimys semispinosus* Tomes (Rodentia: Echimyidae); Smithsonian Army coll.; RML 53580; (USNMENT01760080).

**Paratypes (L)**



VENEZUELA • 6; same data as holotype; (USNMENT01760081, USNMENT01760082, USNMENT01760083, USNMENT01760084, USNMENT01760085, USNMENT01760086). 1; same data; RML 53579; (USNMENT01760087). 3; same data; RML 53581; (USNMENT01760088, USNMENT01760089, USNMENT01760090). 2; same data; RML 53582; (USNMENT01760091, USNMENT01760092). 2; same data; RML 53583; (USNMENT01760093, USNMENT01760094). 1; same data; RML 53584; (USNMENT01760095). 3; same data; RML 53585; (USNMENT01760096, USNMENT01760097, USNMENT01760098). 2; same locality and host; 13 May 1968; RML 53270; (USNMENT01760099, USNMENT01760100).

***superciliaris*, *Neotrombicula* Loomis and Megens, 1975: 162**

**Paratypes (L)**

USA • 1; California State, Kern County; 21 Dec. 1963; ex *Uta stansburiana* Baird and Girard (Squamata: Phrynosomatidae); P. D. Spoecker coll.; PDS 6; (USNMENT01760101). 1; same locality and host; 4 Jan. 1964; PDS 11; (USNMENT01760102). 1; same locality and host; 8 Feb. 1964; PDS 14; (USNMENT01760103).

***suriana*, *Novotrombicula* Hoffmann, 1954: 23**

**Holotype (L)**

MEXICO • Chiapas State, Sumidero Canyon; 25 Aug. 1953; ex *Peromyscus mexicanus* (Saussure) (Rodentia: Cricetidae); (USNMENT01760104).

***sylogisma*, *Guntheria* Goff, 1982d: 409**

**Paratypes (L)**

PAPUA NEW GUINEA • 3; Western Province; 2 Feb. 1960; ex *Melomys* sp. (Rodentia: Muridae); BPBM 12375; (USNMENT01760105, USNMENT01760106, USNMENT01760107).

***sylvilagi*, *Trombicula* (*Neotrombicula*) Brennan and Wharton, 1950: 186**

**Holotype (L)**

USA • Kansas State, Leavenworth County; 7 Oct. 1946; ex *Sylvilagus* sp. (Lagomorpha: Leporidae); RML 23242; (USNMENT01760108).

**Paratypes (L)**

USA • 1; same data as holotype; (UNMENT01760109).

***tachirae*, *Eutrombicula* Brennan and Reed, 1974b: 705**

**Holotype (L)**

VENEZUELA • Táchira State, San Cristóbal; 2 Mar. 1968; ex *Oryzomys albigularis* (Tomes) (= *Nephelomys albigularis*) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 53683; (USNMENT01760110).

**Paratypes (L)**

VENEZUELA • 8; same data as holotype; (USNMENT01760111, USNMENT01760112, USNMENT01760113, USNMENT01760114, USNMENT01760115, USNMENT01760116, USNMENT01760117, USNMENT01760118). 10; same locality and host; 3 Mar. 1968; RML 55925; (USNMENT01760119, USNMENT01760120, USNMENT01760121, USNMENT01760122, USNMENT01760123, USNMENT01760124, USNMENT01760125, USNMENT01760126, USNMENT01760127, USNMENT01760128). 3; same locality and host; 16 Mar. 1968; RML 55998; (USNMENT01760129, USNMENT01760130, USNMENT01760131). 8; same locality and host; 17 Mar. 1968; RML 55938; (USNMENT01760132, USNMENT01760133, USNMENT01760134, USNMENT01760135, USNMENT01760136, USNMENT01760137, USNMENT01760138, USNMENT01760139). 6; same locality and host; 18 Mar. 1968; RML 56002; (USNMENT01760140, USNMENT01760141, USNMENT01760142, USNMENT01760143, USNMENT01760144, USNMENT01760145). 7; same data; RML 53229; (USNMENT01760146, USNMENT01760147, USNMENT01760148, USNMENT01760149, USNMENT01760150, USNMENT01760151, USNMENT01760152). 7; same locality and host; 20 Mar. 1968; RML 53234; (USNMENT01760153, USNMENT01760154, USNMENT01760155, USNMENT01760156, USNMENT01760157, USNMENT01760158, USNMENT01760159). 7; same locality and host; 21 Mar. 1968; RML 53235;

(USNMENT01760160, USNMENT01760161, USNMENT01760162,  
 USNMENT01760163, USNMENT01760164, USNMENT01760165,  
 USNMENT01760166). 2; same locality and host; 22 Mar. 1968; RML 53238;  
 (USNMENT01760167, USNMENT01760168). 2; same locality and host; 24 Mar. 1968;  
 RML 56008; (USNMENT01760169, USNMENT01760170). 3; Trujillo State; same host  
 and date; RML 48915; (USNMENT01760171, USNMENT01760172,  
 USNMENT01760173).

***tachirensis*, *Quadrasetta* Brennan and Goff, 1977b: 501**

**Holotype (L)**

VENEZUELA • Táchira State, San Cristóbal; 21 Mar. 1968; ex *Akodon* sp. (Rodentia:  
 Cricetidae); Smithsonian Army coll.; RML 53653; (USNMENT01760174).

**Paratypes (L)**

VENEZUELA • 3; same data as holotype; (USNMENT01760175, USNMENT01760176,  
 USNMENT01760177).

***tadaridae*, *Speleocola* Lipovsky, 1952: 134**

**Paratypes (L)**

USA • 1; Oklahoma State, Woods County; 15 Sep. 1948; ex *Tadarida brasiliensis*  
*mexicana* (Saussure) (Chiroptera: Molossidae); (USNMENT01760178); 1; same locality  
 and host; 24 Aug. 1949; (USNMENT01760179).

***tafia*, *Ascoschoengastia* (*Laurentella*) Nadchatram and Domrow, 1964: 34**

**Holotype (L)**

MALAYSIA • Kedah State, Mount Jerai; 25 Feb. 1961; ex *Rattus rajah* Thomas (= *Maxomys rajah*) (Rodentia: Muridae); IMR 75241; (USNMENT01760180).

**Paratypes (L)**

MALAYSIA • 1; same data as holotype; IMR 75239; (USNMENT01760181). 1; same  
 data; IMR 75236; (USNMENT01760182).

***tamandua*, *Rhinibius* Brennan and Yunker, 1969: 304**

**Holotype (L)**

BRAZIL • Pará State, Belém, Utinga State Park; 20 Mar 1968; ex *Tamandua tetradactyla* (L.) (Pilosa: Myrmecophagidae); C. E. Yunker coll.; RML 49365; (USNMENT01760183).

**Paratypes (L)**

BRAZIL • 4; same data as holotype; (USNMENT01760184, USNMENT01760185, USNMENT01760186, USNMENT01760187).

***tamarina*, *Speleocola* Goff, Whitaker and Dietz, 1987: 198****Holotype (L)**

BRAZIL • Rio de Janeiro State, Poço das Antas Biological Reserve; 1985; ex *Leontopithecus rosalia* (L.) (Primates: Callitrichidae); (USNMENT01760188).

**Paratypes (L)**

BRAZIL • 3; same data as holotype; (USNMENT01760189, USNMENT01760190, USNMENT01760191).

***tamyiai*, *Trombicula* (*Neotrombicula*) Philip and Fuller, 1950: 51****Holotype (L)**

JAPAN • Yamagata Prefecture; 17 Sep. 1920; ex *Homo sapiens* (L.) (Primata: Hominidae); USNM 1781; (USNMENT01760192).

**Paratypes (L)**

JAPAN • 12; same data as holotype; (USNMENT01760193, USNMENT01760194, USNMENT01760195, USNMENT01760196, USNMENT01760197, USNMENT01760198, USNMENT01760199, USNMENT01760200, USNMENT01760201, USNMENT01760202, USNMENT01760203, USNMENT01760204).

***tanigoshii*, *Euschoengastoides* Loomis, 1971: 701****Holotype (L)**

MEXICO • Sonora State; 8 Jul. 1965; ex *Perognathus intermedius* Merriam (= *Chaetodipus intermedius*) (Rodentia: Heteromyidae); L. C. Spath coll.; RML 56219; (USNMENT01760205).

***tanycera, Perisopalla Brennan, 1969a: 430*****Holotype (L)**

VENEZUELA • Bolivar State, Icabaru; 8 May 1968; ex *Peropteryx* sp. (Chiroptera: Emballonuridae); RML 49833; (USNMENT01760206).

**Paratypes (L)**

VENEZUELA • 7; same data as holotype; (USNMENT01760207, USNMENT01760208, USNMENT01760209, USNMENT01760210, USNMENT01760211, USNMENT01760212, USNMENT01760213). 1; same data; RML 49843; (USNMENT01760214). 5; same data; RML 49844; (USNMENT01760215, USNMENT01760216, USNMENT01760217, USNMENT01760218, USNMENT01760219). 7; same data; RML 49858; (USNMENT01760220, USNMENT01760221, USNMENT01760222, USNMENT01760223, USNMENT01760224, USNMENT01760225, USNMENT01760226). 3; same data; RML 49859; (USNMENT01760227, USNMENT01760228, USNMENT01760229). 7; same data; RML 49860; (USNMENT01760230, USNMENT01760231, USNMENT01760232, USNMENT01760233, USNMENT01760234, USNMENT01760235, USNMENT01760236). 5; same data; RML 49861; (USNMENT01760237, USNMENT01760238, USNMENT01760239, USNMENT01760240, USNMENT01760241). 11; same data; RML 49863; (USNMENT01760242, USNMENT01760243, USNMENT01760244, USNMENT01760245, USNMENT01760246, USNMENT01760247, USNMENT01760248, USNMENT01760249, USNMENT01762046, USNMENT01762047, USNMENT01762048). 1; same data. RML 49849; (USNMENT01762049).

***tanychaeta, Eutrombicula Brennan and Reed, 1974b: 706*****Holotype (L)**

VENEZUELA • Mérida State; 18 Mar. 1966; ex *Didelphis albiventris* Lund (Didelphimorphia: Didelphidae); RML 52777; (USNMENT01760250).

**Paratypes (L)**

VENEZUELA • 2; same data as holotype; (USNMENT01760251, USNMENT01760252).

***taphozousa*, *Octasternala* Brown, 1990: 23****Holotype (L)**

PHILIPPINES • Negros Oriental Province; 17 Feb. 1987; ex *Taphozous melanopogon* Temminck (Chiroptera: Emballonuridae); (USNMENT01760253).

***tarsala*, *Trombicula* (*Leptotrombidium*) Traub and Audy, 1954a: 51****Holotype (L)**

MALAYSIA • Sarawak State, Kuching City, Sama Jaya Nature Reserve; 30 Aug. 1951; ex *Rattus mulleri* Jentink (= *Sundamys muelleri*) (Rodentia: Muridae); CORU 21314; (USNMENT01760254).

**Paratype (L)**

MALAYSIA • 1; same data as holotype; (USNMENT01760255).

***tarsalis*, *Shunsennia* Jameson and Toshioka, 1953: 89****Holotype (L)**

SOUTH KOREA • Gangwon Province, Wonju; 13 Mar. 1952; ex *Clethrionomys rufocanus* (Sundevall) (= *Myodes rufocanus*) (Rodentia: Cricetidae); (USNMENT01760256).

***taylori*, *Schoengastia* Gunther, 1940: 257****Paratype (L)**

PAPUA NEW GUINEA • 1; Morobe Province, Bulolo; Nov. 1939; ex “unidentified macropod” (Diprotodontia: Macropodidae); (USNMENT01760257).

***tehminae*, *Trombigastia* Brown, 1997b: 162****Holotype (L)**

PHILIPPINES • Negros Oriental Province, Dumaguete; 11 Jun. 1987; ex *Eonycteris spelaea* (Dobson) (Chiroptera: Pteropodidae); H. Klompen coll.; HK 87-0611; (USNMENT01760258).

***templei*, *Rudnicula* Nadchatram and Wilson, 1965: 217**

**Paratype (L)**

PAPUA NEW GUINEA • 1; Sandaun Province, Telefomin District; 10 Aug. 1963; ex *Hipposideros* sp. (Chiroptera: Hipposideridae); P. Temple coll.; BPBM 4025; (USNMENT01760259).

***tenella, Gahrlepiea (Gahrlepiea) Traub and Morrow, 1955: 16*****Holotype (L)**

MALAYSIA • Stillwell Road; 30 Apr. 1945; ex *Rattus flavivectus yunnanensis* (Milne-Edwards) (= *Rattus tanezumi* [Temminck]) (Rodentia: Muridae); USNM 2158; (USNMENT01760260).

***tenuitarsus, Acomatacarus Lawrence, 1949: 458*****Paratype (L)**

ZIMBABWE • Matabeleland South Province, Beitbridge; no date; ex *Mabuya varia* Loveridge (= *Trachylepis brauni* [Tornier]) (Squamata: Scincidae); NM 4813; (USNMENT01760261).

***teratarsalis, Doloisia (Kymocta) Yunker and Brennan, 1962: 574*****Holotype (L)**

PANAMA • Colón province, Piña; 15 Dec. 1960; ex *Heteromys desmarestianus* Gray (Rodentia: Heteromyidae); M. Keenan coll.; RML 40130; (USNMENT01760262).

**Paratypes (L)**

PANAMA • 1; same data as holotype; (USNMENT01760263). 1; same locality and host; 7 Dec. 1960; RML 40112; (USNMENT01760264). 1; same locality; 6 Dec. 1960; ex *Hoplomys gymnurus* Thomas (Rodentia: Echimyidae); RML 40095; (USNMENT01760265). 3; same locality; 8 Aug. 1961; ex *Tylomys watsoni* Thomas (Rodentia: Cricetidae); RML 43373; (USNMENT01760266, USNMENT01760267, USNMENT01760268). 1; same locality and host; 7 Feb. 1962. RML 44401; (USNMENT01760269).

***terrestris, Euschoengastia Gould, 1956: 55***

**Holotype (L)**

USA • California State, Fresno County, Huntington Lake; 10 Jun. 1949; ex *Eutamias* sp. (Rodentia: Sciuridae); (USNMENT01760270).

**Paratypes (L)**

USA • 1; same data as holotype; (USNMENT01760271). 1; same locality and host; 7 Jun. 1949; (USNMENT01760272). 8; California State, Monterey County, Hastings Natural History Reservation; 3 May 1951; ex *Thomomys bottae* (Eydox and Gervais) (Rodentia: Geomyidae); RML 29410; (USNMENT01760273, USNMENT01760274, USNMENT01760275, USNMENT01760276, USNMENT01760277, USNMENT01760278, USNMENT01760279, USNMENT01760280). 2; same data; RML 29411; (USNMENT01760281, USNMENT01760282). 1; same locality and host; 10 May 1951; RML 29416; (USNMENT01760283).

***tertium, Polylopadium Brennan, 1968b: 679*****Holotype (L)**

COLOMBIA • Valle del Cauca Department, Cali, La Flora; 11 Mar. 1967; ex *Heteromys australis* Thomas (Rodentia: Heteromyidae); Trapido coll.; RML 47734; (USNMENT01760284).

**Paratypes (L)**

COLOMBIA • 1; same data as holotype; (USNMENT01760285).

***tessellata, Gahrlepiea (Gahrlepiea) Traub and Morrow, 1955: 34*****Holotype (L)**

MALAYSIA • Selangor State, Pahang Road; 7 Jul. 1948; ex *Lariscus insignis* (F. Cuvier) (Rodentia: Sciuridae); RT B 8160; (USNMENT01760286).

**Paratypes (L)**

MALAYSIA • 2; same data as holotype; (USNMENT01760287, USNMENT01760288). 1; Selangor State, Hulu Langat District; 4 Mar. 1952; ex *Rattus bowersi* Anderson (= *Berylmys bowersi*) (Rodentia: Muridae) RT B 17506; (USNMENT01760289). 1; same locality; no date; ex *Hylomys suillus* Müller (Eulipotyphla: Erinaceidae); RT B 16047; (USNMENT01760290).



***texana*, *Trombicula* Loomis and Crossley, 1963: 376****Holotype (L)**

USA • Texas State, Uvalde County, Frio Bat Cave; 22 Jan. 1956; ex *Mormoops megalophylla* (Peters) (Chiroptera: Mormoopidae); D. K. Jameson coll.; RML 32267; (USNMENT01760291).

**Paratypes (L)**

USA • 4; same data as holotype; (USNMENT01760292, USNMENT01760293, USNMENT01760294, USNMENT01760295).

***tgifi*, *Afropolonia* Goff, 1983a: 2****Holotype (L)**

SOUTH AFRICA • Northern Cape Province, Studer's Pass; 4 Oct. 1980; ex *Aethomys namaquensis* (A. Smith) (= *Micaelamys namaquensis* (Rodentia: Muridae); (USNMENT01760296).

**Paratype (L)**

SOUTH AFRICA • 1; same data as holotype; (USNMENT01760297).

***thalassa*, *Toritrombicula* Brennan and Amerson, 1971: 1316****Holotype (L)**

KIRIBATI •; Phoenix Islands, Phoenix Island; 11 Oct. 1966; ex *Nesofregetta albigularis* (Gmelin) (Procellariiformes: Oceanitidae); L. M. Huber coll.; RML 47206; (USNMENT01760298).

**Paratypes (L)**

KIRIBATI • 11; same data as holotype; (USNMENT01760299, USNMENT01760300, USNMENT01760301, USNMENT01760302, USNMENT01760303, USNMENT01760304, USNMENT01760305, USNMENT01760306, USNMENT01760307, USNMENT01760308, USNMENT01760309).

***thallomyia*, *Acomatacarus* Radford, 1946c: 581****Paratypes (L)**

SOUTH AFRICA • 3; Eastern Cape Province, Grahamstown City, Glen Craig; 22 May 1939; ex *Thallomys namaquensis grahami* (Roberts) (= *Micaelamys namaquensis* (A. Smith) (Rodentia: Muridae); G. Theiler coll.; USNM 1561; (USNMENT01760310, USNMENT01760311, USNMENT01760312).

***thalurania, Fonsecaia (Parasecia) Brennan, 1969b: 663***

**Holotype (L)**

BRAZIL • Para State, Belém, Mocambo reserve; 15 Apr. 1968; ex *Thalurania furcata* (Gmelin) (Apodiformes: Trochilidae); RML 49374; (USNMENT01760313).

***theileri, Acomatacarus Radford, 1946c: 580***

**Paratype (L)**

SOUTH AFRICA • 1; Eastern Cape Province; Port Elizabeth; 23 Apr. 1939; ex *Saccostomus campestris* Peters (Rodentia: Nesomyidae); G. Theiler coll.; (USNMENT01760314).

***thompsoni, Euschoengastia Domrow, 1962b: 44***

**Paratypes (L)**

MALAYSIA • 1; Selangor State, Hulu Langat District; 5 Jan. 1954; ex *Rattus bowersi* Anderson (= *Berylmys bowersi*) (Rodentia: Muridae); (USNMENT01760315). 1; same locality and host; 5 Aug. 1952; (USNMENT01760316).

***thompsoni, Trombicula Brennan, 1953: 292***

**Holotype (L)**

JAMAICA • Saint Andrew Parish; 28 Mar. 1949; ex *Arenaria interpres morinella* (L.) (Charadriiformes: Scolopacidae); RML 23920; (USNMENT01760317).

***thresca, Trombicula Brennan, 1967: 152***

**Holotype (L)**

FRANCE • Saint Barthélemy; Lorient (Caribbean Region); 3 Jun. 1949; ex *Tadarida brasiliensis* (I. Geoffroy) (Chiroptera: Molossidae); RML 45392; (USNMENT01760318).

**Paratype (L)**

FRANCE • 1; same data as holotype; (USNMENT01760319).

***thurmani*, *Leptotrombidium (Trombiculindus)* Traub, Nadchatram and Lakshana, 1968: 371**

**Holotype (L)**

THAILAND • Chaiyaphum Province; 31 Jan. 1952; ex *Rattus argentiventer* (Robinson and Kloss) (Rodentia: Muridae); R. E. Elbel coll.; RT B 9913; (USNMENT01760320).

**Paratypes (L)**

THAILAND • 3; same data as holotype; (USNMENT01760321, USNMENT01760322, USNMENT01760323).

***tibbettsi*, *Trombicula* Brennan and White, 1960: 348**

**Holotype (L)**

USA • Texas State, Uvalde County, Frio Bat Cave; 17 Nov. 1956; ex *Mormoops megalophylla* (Peters) (Chiroptera: Mormoopidae); RML 34266; (USNMENT01760324).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01760325, USNMENT01760326). 1; Alabama State, Lauderdale County, Key Cave National Wildlife Refuge; 27 Nov. 1952; ex *Myotis grisescens* (A. H. Howell) (Chiroptera: Vespertilionidae); J. S. White coll; RML 34960; (USNMENT01760327). TRINIDAD AND TOBAGO • 7; Sangre Grande Region, Mount Tamana, Taman Hill Cave; 12 Jun. 1956; ex *Chilonycteris rubiginosa* Wagner (= *Pteronotus (Phyllodia) parnellii rubiginosus*) (Chiroptera: Mormoopidae); RML 34019; (USNMENT01760328, USNMENT01760329, USNMENT01760330, USNMENT01760331, USNMENT01760332, USNMENT01760333, USNMENT01760334). 1; same data; RML 34021; (USNMENT01760335). 3; same locality; 20 Nov. 1957; ex *Mormoops tumidiceps* Miller (= *Mormoops megalophylla*) (Chiroptera: Mormoopidae); RML 34665; (USNMENT01760336, USNMENT01760337, USNMENT01760338).

***tincali*, *Pseudoschoengastia (Perissopalla)* Vercammen-Grandjean, 1964: 305**

**Holotype (L)**

GUATEMALA • Petén Department, Flores, Tikal; 20 Jul. 1961; ex *Balantiopteryx plicata* Peters (Chiroptera: Emballonuridae); M. Irwin coll.; (USNMENT01760339).

***tiptoni*, *Odontacarus* (*Odontacarus*) Reed and Brennan, 1975: 20****Holotype (L)**

VENEZUELA • Trujillo State; 29 Jan. 1966; ex *Thomasomys vestitus* Thomas (Rodentia: Cricetidae); Smithsonian Army coll.; RML 49029; (USNMENT01760340).

**Paratypes (L)**

VENEZUELA • 8; same data as holotype; (USNMENT01760341, USNMENT01760342, USNMENT01760343, USNMENT01760344, USNMENT01760345, USNMENT01760346, USNMENT01760347, USNMENT01760348). 1; same data; RML 49032; (USNMENT01760349). 1; same locality and host; 19 Jan. 1966; RML 48898; (USNMENT01760350). 1; same locality and host; 22 Jan. 1966; RML 48909; (USNMENT01760351). 1; same locality and host; 25 Jan. 1966; RML 48918; (USNMENT01760352). 9; same locality and host; 26 Jan. 1966; RML 48925; (USNMENT01760353, USNMENT01760354, USNMENT01760355, USNMENT01760356, USNMENT01760357, USNMENT01760358, USNMENT01760359, USNMENT01760360, USNMENT01760361).

***tiptoni*, *Schoutedenichia* (*Schoutedenichia*) Vercammen-Grandjean and Watkins, 1965b: 690****Holotype (L)**

MADAGASCAR • Fianarantsoa Province, Andrambovato; 10 Jan. 1952; ex *Rattus rattus* (L.) (Rodentia: Muridae); (USNMENT01760362).

**Paratypes (L)**

MADAGASCAR • 1; same data as holotype; (USNMENT01760363). 1; Ambatofinandrahana District; 28 Jan. 1952; same host; (USNMENT01760364)

***tiptoni*, *Trombicula* Brennan and Jones, 1961a: 122****Holotype (L)**

PANAMA • Chiriquí province; 12 Feb. 1960; ex *Peromyscus nudipes* Goodwin (= *Peromyscus mexicanus* [Saussure]) (Rodentia: Cricetidae); V. J. Tipton coll.; RML 35930; (USNMENT01760365).

***titovi, Euschoengastia Brennan, 1962: 618***

**Holotype (L)**

MEXICO • Guerrero State; 11 Jan. 1950; ex “unidentified motmot” (Coraciiformes: Momotidae); G. W. Wharton coll.; RML 35522; (USNMENT01760366).

**Paratypes (L)**

MEXICO • 10; same data as holotype; (USNMENT01760367, USNMENT01760368, USNMENT01760369, USNMENT01760370, USNMENT01760371, USNMENT01760372, USNMENT01760373, USNMENT01760374, USNMENT01760375, USNMENT01760376).

***toshiokai, Trombicula (Leptotrombidium) Sasa and Jameson, 1954: 302***

**Holotype (L)**

JAPAN • Tochigi Prefecture, Nikkō; 4 Sep. 1952; ex *Myotis macrodactylus* (Temminck) (Chiroptera: Vespertilionidae); (USNMENT01760377).

***tragulata, Euschoengastia Brennan and Jones, 1961a: 111***

**Holotype (L)**

PANAMA • Panama province, Barro Colorado Island; Nov. 1956; ex *Nasua narica* (L.) (Carnivora: Procyonidae); RML 34098; (USNMENT01760378).

**Paratypes (L)**

PANAMA • 2; same data as holotype; (USNMENT01760379, USNMENT01760380).

***transvaalensis, Ascoschoengastia Lawrence, 1949: 435***

**Paratype (L)**

SOUTH AFRICA • 1; Limpopo Province, Blouberg; no date; ex *Ichnotropis squamulosa* Peters (= *Meroles squamulosus*) (Squamata: Lacertidae); NM 4878; (USNMENT01760381).

***transylvanica*, Hoffmanniella Goff, 1988: 5****Holotype (L)**

COSTA RICA • Alajuela Province, Santa Rosa National Park; 9 Feb. 1981; ex *Desmodus rotundus* (É. Geoffroy) (Chiroptera: Phyllostomidae); J. Wilkinson coll.; (USNMENT01760382).

**Paratypes**

COSTA RICA • 4; same data as holotype; (USNMENT01760383, USNMENT01760384, USNMENT01760385, USNMENT01760386).

***trapezoides*, Euschoengastia Brennan and Jones, 1964b: 699****Holotype (L)**

ARGENTINA • Buenos Aires Province, Azul; 8 Mar. 1962; ex “unidentified fox” (Carnivora: Canidae); RML 38095; (USNMENT01760387).

**Paratypes (L)**

ARGENTINA • 7; same data as holotype; (USNMENT01760388, USNMENT01760389, USNMENT01760390, USNMENT01760391, USNMENT01760392, USNMENT01760393, USNMENT01760394).

***trapidoi*, Euschoengastia Brennan, 1968b: 682****Holotype (L)**

COLOMBIA • Valle del Cauca Department, Pichinde, Cali; 31 Mar. 1967; ex *Oryzomys caliginosus* Tomes (= *Melanomys caliginosus*) (Rodentia: Cricetidae); RML 47744; (USNMENT01760395).

**Paratypes (L)**

COLOMBIA • 1; same locality and host; 15 Mar. 1967; RML 47738; (USNMENT01760396). 7; same data; RML 47739; (USNMENT01760397, USNMENT01760398, USNMENT01760399, USNMENT01760400, USNMENT01760401, USNMENT01760402, USNMENT01760403). 3; same locality and host; 17 Mar. 1967; RML 47741; (USNMENT01760404, USNMENT01760405, USNMENT01760406). 4; same locality and host; 30 Mar. 1967; RML 47743;

(USNMENT01760407, USNMENT01760408, USNMENT01760409,  
USNMENT01760410).

***traubaudyi, Gahrliopia (Walchia) Nadchatram, 1970a: 8***

**Paratypes (L)**

PAPUA NEW GUINEA • 2; Sandaun Province, Oksapmin; 14 Oct. 1968; ex *Melomys* sp. (Rodentia: Muridae); BPBM 8250; (USNMENT01760411, USNMENT01760412).

***traubi, Susa Nadchatram and Lakshana, 1965: 329***

**Holotype (L)**

THAILAND • Chiang Mai Province, Chiang Dao District; 15 Nov. 1962, 7 Nov. 1962, ex *Crocidura horsfieldii* (Tomes) (Eulipotyphla: Soricidae); SMRL 1975; (USNMENT01760413).

***tricholecanium, Polylopadium Brennan and Reed, 1972a: 461***

**Holotype (L)**

VENEZUELA • Falcon State, Mirimire; 11 Nov. 1967; ex *Proechimys* sp. (Rodentia: Echimyidae); Smithsonian Army coll.; RML 53159; (USNMENT01760414).

***tricosus, Vanidicus Brennan and Jones, 1961a: 123***

**Holotype (L)**

PANAMA • Panama province, Panama City, Curundú; 8 Jul. 1954; ex *Liomys adspersus* (Peters) (= *Heteromys adspersus*) (Rodentia: Heteromyidae); RML 35292; (USNMENT01760415).

**Paratypes (L)**

PANAMA • 2; same data as holotype; (USNMENT01760416, USNMENT01760417).

***tricoxalae, Schoengastia Goff, 1980c: 323***

**Paratypes (L)**

PAPUA NEW GUINEA • 1; Sandaun Province, Telefomin District; 29 Jan. 1970; ex *Rattus niobe* Thomas (Rodentia: Muridae); A. B. Mirza coll.; BPBM 11506; (USNMENT01760418). 1; same locality and host; 28 Jan. 1970; (USNMENT01760419).

***trifurca*, *Trombicula* Ewing, 1933: 3**

**Lectotype (P)**

PANAMA • ♀; Panama Province, Chagres National Park, Chilibrillo Caves; 6 May 1931; “found crawling on walls”; L. H. Dunn coll.; USNM 1063; (USNMENT01760420).

**Paralectotypes (P)**

PANAMA • 3♀; same data as lectotype; (USNMENT01760421, USNMENT01760422, USNMENT01760423).

***trigenuala*, *Euschoengastia* Farrell, 1956: 131**

**Syntype (L)**

USA • 4; Oklahoma State, Cleveland County, Norman City, University of Oklahoma; 13 Sep 1933; ex *Scalopus* sp. (Eulipotyphla: Talpidae), USNM 1990; (USNMENT01760424, USNMENT01760425, USNMENT01760426, USNMENT01760427).

***trinidadensis*, *Whartonia* Brennan and Jones, 1960: 496**

**Holotype (L)**

TRINIDAD AND TOBAGO • Sangre Grande Region, Mount Tamana, Taman Hill Cave; 13 Jun. 1955; ex *Mormoops megalophylla* (Peters) (Chiroptera: Mormoopidae); RML 33675; (USNMENT01760428).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 6; same data as holotype; (USNMENT01760429, USNMENT01760430, USNMENT01760431, USNMENT01760432, USNMENT01760433, USNMENT01760434). 4; same data; RML 33680; (USNMENT01760435, USNMENT01760436, USNMENT01760437, USNMENT01760438). 4; same locality and host; 20 Nov. 1957; RML 34665; (USNMENT01760439, USNMENT01760440, USNMENT01760441, USNMENT01760442).



***trisetica*, *Trombicula* Loomis and Crossley, 1953: 32****Paratypes (L)**

USA • 5; Kansas State, Miami County; 26 May 1951; ex *Eumeces laticeps* Taylor (= *Plestiodon laticeps* [Schneider]) (Squamata: Scincidae); KU 30521; (USNMENT01760443, USNMENT01760444, USNMENT01760445, USNMENT01760446, USNMENT01760447).

***truncata*, *Teratothrix* Brennan and Goff, 1979b: 272****Holotype (L)**

VENEZUELA • Trujillo State; 21 Jan. 1966; ex *Thomasomys laniger* (Thomas) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 48906; (USNMENT01760448).

**Paratypes (L)**

VENEZUELA • 3; same data as holotype; (USNMENT01760449, USNMENT01760450, USNMENT01760451). 2; Mérida State; 15 Apr. 1966; same host; RML 48120; (USNMENT01760452, USNMENT01760453). 1; same locality; 20 Jan. 1966; ex *Marmosa fuscata* Thomas (= *Marmosops fuscatus*) (Didelphimorphia: Didelphidae); RML 48903; (USNMENT01760454).

***truncata*, *Trombicula* Brennan, 1970d: 810****Holotype (L)**

BRAZIL • Rondonia State, São Francisco do Guaporé Municipality, Pedras Negras; 14 Jul. 1964; ex *Saccopteryx bilineata* (Temminck) (Chiroptera: Emballonuridae); RML 50188; (USNMENT01760455).

**Paratypes (L)**

BRAZIL • 9; same data as holotype; (USNMENT01760456, USNMENT01760457, USNMENT01760458, USNMENT01760459, USNMENT01760460, USNMENT01760461, USNMENT01760462, USNMENT01760463, USNMENT01760464).

***tubercularis*, *Acomatacarus* Brennan, 1952c: 146****Holotype (L)**

VENEZUELA • Aragua State, Rafael Rangel campground; 1950; ex *Heteromys anomalus* (Thompson) (Rodentia: Heteromyidae); Schwarz coll.; RML 28432; (USNMENT01760465).

**Paratypes (L)**

VENEZUELA • 7; same data as holotype; (USNMENT01760466, USNMENT01760467, USNMENT01760468, USNMENT01760469, USNMENT01760470, USNMENT01760471, USNMENT01760472).

***tuberculata*, *Gahrlipeia* (*Gahrlipeia*) Traub and Morrow, 1955: 40**

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 21 Aug. 1953; ex *Rattus whiteheadi whiteheadi* Thomas (= *Maxomys whiteheadi*) (Rodentia: Muridae); RT B 19327; (USNMENT01760473).

**Paratypes (L)**

MALAYSIA • 1; same data as holotype; (USNMENT01760474). 1; same locality and host; 15 Jul. 1953; RT B 20523; (USNMENT01760475). 1; same locality and host; 17 Aug. 1953; RT B 19252; (USNMENT01760476). 2; same locality; 1 Sep. 1953; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); RT B 19476; (USNMENT01760477, USNMENT01760478). 20; same locality; 4 Aug. 1951; ex *Rattus mulleri* Jentink (= *Sundamys muelleri*) (Rodentia: Muridae); RT B 9108; (USNMENT01760479, USNMENT01760480, USNMENT01760481, USNMENT01760482, USNMENT01760483, USNMENT01760484, USNMENT01760485, USNMENT01760486, USNMENT01760487, USNMENT01760488, USNMENT01760489, USNMENT01760490, USNMENT01760491, USNMENT01760492, USNMENT01760493, USNMENT01760494, USNMENT01760495, USNMENT01760496, USNMENT01760497, USNMENT01760498). 2; same locality; 18 Jul. 1943; ex *Rattus rajah* Thomas (= *Maxomys rajah*) (Rodentia: Muridae); RT B 19058; (USNMENT01760499, USNMENT01760500). 1; same locality; 20 Aug. 1953; ex *Rattus rattus* (L.) (Rodentia: Muridae); RT B 19318; (USNMENT01760501). 2; same locality; 28

Jul. 1953; ex *Rattus* sp. (Rodentia: Muridae); RT B 19151; (USNMENT01760502, USNMENT01760503).

***tuberculohirsutus*, *Odontacarus* (*Odontacarus*) Reed and Brennan, 1975: 22**

**Holotype (L)**

VENEZUELA • Mérida State; 15 Mar. 1966; ex *Thomasomys laniger* (Thomas) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 49049; (USNMENT01760504).

**Paratypes (L)**

VENEZUELA • 8; same data as holotype; (USNMENT01760505, USNMENT01760506, USNMENT01760507, USNMENT01760508, USNMENT01760509, USNMENT01760510, USNMENT01760511, USNMENT01760512). 2; same data; RML 49044; (USNMENT01760513, USNMENT01760514). 3; same data; RML 49045; (USNMENT01760515, USNMENT01760516, USNMENT01760517). 1; same data; RML 49046; (USNMENT01760518). 1; same locality and host; 11 Mar. 1966; RML 52774; (USNMENT01760519). 1; same locality and host; 12 Mar. 1966; RML 51849; (USNMENT01760520). 6; same data; RML 51850; (USNMENT01760521, USNMENT01760522, USNMENT01760523, USNMENT01760524, USNMENT01760525, USNMENT01760526). 1; same data; RML 49042; (USNMENT01760527). 1; same data; RML 52771; (USNMENT01760528). 1; same locality and host; 13 Mar. 1966; RML 51861; (USNMENT01760529). 7; same data; RML 51851; (USNMENT01760530, USNMENT01760531, USNMENT01760532, USNMENT01760533, USNMENT01760534, USNMENT01760535, USNMENT01760536). 1; same locality and host; 14 Mar. 1966; RML 49043; (USNMENT01760537). 5; same locality and host; 21 Mar. 1966; RML 48116; (USNMENT01760538, USNMENT01760539, USNMENT01760540, USNMENT01760541, USNMENT01760542).

***tuhana*, *Trombicula* Traub and Audy, 1954a: 46**

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 7 Jun. 1951; ex *Nannosciurus whiteheadi* Thomas (= *Exilisciurus whiteheadi*) (Rodentia: Sciuridae); USNM 2012; (USNMENT01760543).

**Paratypes (L)**

MALAYSIA • 2; same data as holotype; (USNMENT01760544, USNMENT01760545).

***tumidus*, *Euschoengastoides* Loomis, 1971: 703**

**Holotype (L)**

MEXICO • Sonora State; 9 Apr. 1963; ex *Peromyscus eremicus* (Baird) (Rodentia: Cricetidae); W. J. Wrenn coll.; RML 56220; (USNMENT01760546).

***tuponka*, *Crotiscus* Brennan and Goff, 1978b: 571**

**Holotype (L)**

COLOMBIA • Chocó Department, Bando River; 17 Oct. 1958; ex *Proechimys* sp. (Rodentia: Echimyidae); RML 49970; (USNMENT01760547).

**Paratypes (L)**

COLOMBIA • 4; same data as holotype; (USNMENT01760548, USNMENT01760549, USNMENT01760550, USNMENT01760551).

***turmalis*, *Gahrlipeia* Gater, 1932: 168**

**Paratype (L)**

MALAYSIA • 1; Selangor State, Petaling District, Sungai Buloh; 23 Jul. 1930; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); USNM 1060; (USNMENT01760552).

***tweediei*, *Eutrombicula* (*Eltonella*) Audy, 1956: 36**

**Paratypes (L)**

MALAYSIA • 1; Selangor State, Gombak District, Bukit Lagong; 13 Aug. 1954; ex *Draco fimbriatus* Kuhl (Squamata: Agamidae); CORU 40789; (USNMENT01760553). 1; same data; CORU 40792; (USNMENT01760554).

***twentei*, *Trombicula (Leptotrombidium)* Loomis, 1954: 922****Paratype (L)**

USA • 1; Kansas State, Barber County; 25 Feb. 1953; ex *Antrozous pallidus* (Le Conte) (Chiroptera: Vespertilionidae); J. W. Twente coll.; KU 3101; (USNMENT01760555).

***tylana*, *Gahrliepia (Gahrliepia)* Traub and Morrow, 1955: 21****Holotype (L)**

THAILAND • Kanchanaburi Province, Kanchanaburi; 9 Jul. 1952; ex *Bandicota bengalensis* (Gray) (Rodentia: Muridae); USNM 2160; (USNMENT01760556).

**Paratypes (L)**

THAILAND • 1; same data RT B 32127; (USNMENT01760557). 1; same data; RT B 32128; (USNMENT01760558). 1; same data; RT B 32132; (USNMENT01760559). 1; same data; RT B 32134; (USNMENT01760560). 1; same data; RT B 32136; (USNMENT01760561). 1; same data; RT B 32137; (USNMENT01760562). 1; same data; RT B 32138; (USNMENT01760563). 1; same data; RT B 32140; (USNMENT01760564). 2; same data; RT B 32147; (USNMENT01760565, USNMENT01760566). 2; Ratchaburi Province, Ban Pong District; 14 Jun. 1952; same host; RT B 32125; (USNMENT01760567, USNMENT01760568). 1; same data; RT B 32123; (USNMENT01760569). 1; same data; RT B 32124; (USNMENT01760570). 1; Kanchanaburi Province, Kanchanaburi; 11 Jun. 1952; ex *Menetes berdmorei* (Blyth) (Rodentia: Sciuridae); RT B 15047; (USNMENT01760571).

***typicus*, *Hyracarus* Lawrence, 1949: 420****Paratype (L)**

SOUTH AFRICA • 1; KwaZulu-Natal Province, Howick City, Cedara; Aug. 1948; ex *Procavia capensis* Storr (Hyracoidea: Procaviidae); NM 4905; (USNMENT01760572).

***ungkomari*, *Helenicula* Nadchatram and Traub, 1971: 566****Paratypes (L)**

PHILIPPINES • 1; Palawan Province, Dalawan Bay, Minagas Point; 25 May 1962; ex *Tragulus nigricans* Thomas (Cetartiodactyla: Tragulidae); (USNMENT01760573). 1;

same locality and host; 22 Apr. 1962; (USNMENT01760574). 1; same locality; 26 Apr. 1962; ex *Macaca fascicularis philippinensis* (I. Geoffroy) (Primates: Cercopithecidae); (USNMENT01760575). 1; Palawan Province, Brooke's Point; 29 Mar. 1962; ex *Tupaia palawanensis* Thomas (Scandentia: Tupaiidae); (USNMENT01760576). 1; Palawan Province, Mount Mantalingajan; 10 Apr. 1962; ex *Paradoxurus philippinensis* Jourdan (= *Paradoxurus hermaphroditus* [Pallas]) (Carnivora: Viverridae); (USNMENT01760577).

***unicus, Odontacarus (Odontacarus) Goff and Brennan, 1978a: 50***

**Holotype (L)**

VENEZUELA • Aragua State, Rafael Rangel campground; 27 Jul. 1950; ex *Sigmodon hirsutus* (Burmeister) (Rodentia: Cricetidae); E. Schwartz and H. K. Schwartz coll.; (USNMENT01760578).

**Paratypes (L)**

VENEZUELA • 6; same data as holotype; (USNMENT01760579, USNMENT01760580, USNMENT01760581, USNMENT01760582, USNMENT01760583, USNMENT01760584).

***unisetosa, Odontacarus (Leogonius) Goff, 1979d: 140***

**Paratypes (L)**

PAPUA NEW GUINEA • 3; Sandaun Province, Oksapmin; 19 Mar. 1971; ex *Rattus verecundus* (Thomas) (Rodentia: Muridae); (USNMENT01760585, USNMENT01760586, USNMENT01760587).

***univari, Trombicula Brennan, 1965b: 110***

**Holotype (L)**

USA • Arizona State, Pima County, Sabino Canyon Recreation Area; 31 Jul. 1961; ex *Pipistrellus hesperus* H. Allen (= *Parastrellus hesperus*) (Chiroptera: Vespertilionidae); RML 37835; (USNMENT01760588).

**Paratypes (L)**

USA • 3; same data as holotype; (USNMENT01760589, USNMENT01760590, USNMENT01760591). 2; Arizona State, Pima County; 4 Aug. 1961; same host; RML

37827; (USNMENT01760592, USNMENT01760593). 3; same locality and host; 12 Apr. 1961; RML 37831; (USNMENT01760594, USNMENT01760595, USNMENT01760596). 2; same locality and host; 21 Aug. 1961; RML 37833; (USNMENT01760597, USNMENT01760598). 3; Arizona State, Mohave County, Kingman; 8 Jul. 1961; same host; RML 37834; (USNMENT01760599, USNMENT01760600, USNMENT01760601).

***uphami, Toritrombicula Nadchatram, 1967b: 411***

**Holotype (L)**

MALAYSIA • Pahang State, Cameron Highlands District, Mount Batu Brinchang; 30 Nov. 1964; ex *Pitta sordida* (Müller) (Passeriformes: Pittidae); (USNMENT01760602).

**Paratype (L)**

MALAYSIA • 1; same data as holotype; (USNMENT01760603).

***urogale, Leptotrombidium (Leptotrombidium) Brown, 1992: 287***

**Paratype (L)**

PHILIPPINES • 1; South Cotabato Province, Tupi, Mount Matutum; 1964; ex *Urogale everetti* (Thomas) (Scandentia: Tupaiidae); (USNMENT01760604).

***uromys, Ascoschoengastia Womersley and Kohls, 1947: 10***

**Paratypes (L)**

PAPUA NEW GUINEA • 3; Oro Province, Dobodura Airfield; 16 May 1944; ex *Uromys lamington* Troughton (= *Uromys caudimaculatus* [Kreffft]) (Rodentia: Muridae); G. M. Kohls coll.; RML 22118; (USNMENT01760605, USNMENT01760606, USNMENT01760607).

***usitata, Trombicula Brennan, 1965a: 81***

**Holotype (L)**

USA • Texas State, Uvalde County, Frio Bat Cave; 17 Nov. 1956; ex *Mormoops megalophylla* (Peters) (Chiroptera: Mormoopidae); (USNMENT01760608).

***utahensis, Euschoengastia Brennan and Beck, 1955: 18***

**Holotype (L)**

USA • Utah State, Juab County; 14 Aug. 1951; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); RML 30161; (USNMENT01760609).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01760610, USNMENT01760611).

***vacillata*, *Eutrombicula* Brennan and Reed, 1974b: 707****Holotype (L)**

VENEZUELA • Mérida State; 10 Feb. 1966; ex *Didelphis albiventris* Lund (Didelphimorphia: Didelphidae); RML 49037; (USNMENT01760612).

**Paratypes (L)**

VENEZUELA • 7; same data as holotype; (USNMENT01760613, USNMENT01760614, USNMENT01760615, USNMENT01760616, USNMENT01760617, USNMENT01760618, USNMENT01760619).

***valida*, Fonseca (*Parasecia*) Brennan, 1969b: 663****Holotype (L)**

BRAZIL • Pará State, Bragança; 1 Apr. 1968; ex *Oryzomys capito* (Olfers) (= *Hylaeamys megacephalus* [Fischer]) (Rodentia: Cricetidae); T. H. G. Aitken coll.; RML 49092; (USNMENT01760620).

**Paratype (L)**

BRAZIL • 8; same data as holotype; (USNMENT01760621, USNMENT01760622, USNMENT01760623, USNMENT01760624, USNMENT01760625, USNMENT01760626, USNMENT01760627, USNMENT01760628).

***vanderhammeni*, *Odontacarus* (*Odontacarus*) Reed and Brennan, 1975: 24****Holotype (L)**

VENEZUELA • Mérida State; 11 Feb. 1966; ex *Oryzomys minutus* Tomes (= *Microryzomys minutus*) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 49039; (USNMENT01760629).

**Paratypes (L)**



VENEZUELA • 2; same data as holotype; (USNMENT01760630, USNMENT01760631). 1; Trujillo State; 24 Jun. 1966; ex *Oryzomys albigularis* (Tomes) (= *Nephelomys albigularis*) (Rodentia: Cricetidae); RML 48915; (USNMENT01760632). 1; same locality and host; 20 Jan. 1966; RML 48902; (USNMENT01760633). 1; same locality; 24 Jan. 1966; ex *Thomasomys lugens* (Thomas) (= *Aepeomys lugens*) (Rodentia: Cricetidae); RML 48931; (USNMENT01760634). 1; same data; RML 48918; (USNMENT01760635). 1; same locality; 22 Jan. 1966; ex *Marmosa* sp. (Didelphimorphia: Didelphidae); RML 48909; (USNMENT01760636).

***vangelderi*, *Eusaperium* Brennan, 1970d: 807**

**Holotype (L)**

BOLIVIA • Beni Department; 2 Aug. 1964; ex *Oryzomys capito* (Olfers) (= *Hylaeamys megacephalus* [Fischer]) (Rodentia: Cricetidae); RML 50154; (USNMENT01760637).

**Paratypes (L)**

BOLIVIA • 6; same data as holotype; (USNMENT01760638, USNMENT01760639, USNMENT01760640, USNMENT01760641, USNMENT01760642, USNMENT01760643).

***variabilis*, *Eutrombicula* Brennan and Reed, 1974b: 707**

**Holotype (L)**

VENEZUELA • Mérida State; 17 May 1966; ex *Thomasomys lugens* (Thomas) (= *Aepeomys lugens*) (Rodentia: Cricetidae); RML 48281; (USNMENT01760644).

**Paratypes (L)**

VENEZUELA • 8; same data as holotype; (USNMENT01760645, USNMENT01760646, USNMENT01760647, USNMENT01760648, USNMENT01760649, USNMENT01760650, USNMENT01760651, USNMENT01760652).

***variaculum*, (*Trombiculindus*) *Leptotrombidium* Traub and Nadchatram, 1967b: 432**

**Holotype (L)**

MALAYSIA • Perak State, Kledang Saiong Forest Eco Park Malaysia; 20 Sep. 1958; ex *Rattus rajah* Thomas (= *Maxomys rajah*) (Rodentia: Muridae); RT B 49259; (USNMENT01760653).

**Paratypes (L)**

MALAYSIA • 2; same data as holotype; (USNMENT01760654, USNMENT01760655). 2; Perak State, Manjung District, Pangkor Island; 3 Apr. 1959; ex *Rattus sabanus* Thomas (= *Leopoldamys sabanus*) (Rodentia: Muridae); RT B 50279; (USNMENT01760656, USNMENT01760657). 1; Kedah State, Langkawi District, Langkawi Island; 19 Jul. 1958; same host; RT B 48749; (USNMENT01760658).

***varians*, *Trombicula (Neotrombicula)* Brennan and Wharton, 1950: 188**

**Holotype (L)**

USA • Montana State, Missoula County; 17 Apr. 1945; ex *Cygnus columbianus* (Ord) (Anseriformes: Anatidae); RML 21679; (USNMENT01760659).

**Paratypes (L)**

USA • 5; same data as holotype; (USNMENT01760660, USNMENT01760661, USNMENT01760662, USNMENT01760663, USNMENT01760664).

***varmai*, *Traubacarus* Audy and Nadchatram, 1957b: 203**

**Paratypes (L)**

MALAYSIA • 1; Pahang State, Raub District, Fraser's Hill; 13 Nov. 1956; ex *Rattus bowersi* Anderson (= *Berylmys bowersi*) (Rodentia: Muridae); CORU 43203; (USNMENT01760665). 1 larva same; locality and host; 11 Apr. 1956; CORU 44013; (USNMENT01760666).

***veanda*, *Trombicula* Brennan, 1965b: 112**

**Holotype (L)**

USA • Nevada State, Nye County, Mercury; 13 Aug. 1961; ex *Neotoma lepida* Thomas (Rodentia: Cricetidae); RML 39764; (USNMENT01760667).

***velascoi*, *Trombicula* Boshell and Kerr, 1942: 9**

**Syntypes (P)**

COLOMBIA • 2♂; Meta Department, Restrepo; 14 Aug. 1937; “in soil”; USNM 53025; (USNMENT01760668, USNMENT01760669).

***velata*, *Euschoengastia* Brennan and Yunker, 1966b: 338****Holotype (L)**

USA • Montana State, Ravalli County; 30 Nov. 1964; ex *Neotoma cinerea* (Ord) (Rodentia: Cricetidae); C. E. Yunker coll.; RML 39019; (USNMENT01760670).

**Paratypes (L)**

USA • 14; same data as holotype; (USNMENT01760671, USNMENT01760672, USNMENT01760673, USNMENT01760674, USNMENT01760675, USNMENT01760676, USNMENT01760677, USNMENT01760678, USNMENT01760679, USNMENT01760680, USNMENT01760681, USNMENT01760682, USNMENT01760683, USNMENT01760684).

***vellae*, *Hannemania* Dumbleton, 1946: 409****Paratype (L)**

SOLOMON ISLANDS • 1; Western Province, Vella Lavella; 11 Jan. 1944; ex “unidentified bat” (Chiroptera); (USNMENT01760685).

***vellosus*, *Aitkenius* Brennan, 1970e: 1695****Holotype (L)**

BRAZIL • Pará State, Belém; 7 Dec. 1967; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); T. H. G. Aitken coll.; RML 48876; (USNMENT01760686).

**Paratypes (L)**

BRAZIL • 9; same data as holotype; (USNMENT01760687, USNMENT01760688, USNMENT01760689, USNMENT01760690, USNMENT01760691, USNMENT01760692, USNMENT01760693, USNMENT01760694, USNMENT01760695).

***venezuelensis*, *Eutrombicula* Brenna and Reed, 1974: 707**

**Holotype (L)**

VENEZUELA • Mérida State; 16 Mar. 1966; ex *Oryzomys minutus* Tomes (= *Microrizomys minutus*) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 51868; (USNMENT01760696).

**Paratypes (L)**

VENEZUELA • 2; same data as holotype; (USNMENT01760697, USNMENT01760698). 1; same locality and host; 17 Mar. 1966; RML 51859; (USNMENT01760699). 1; same locality and host; 22 Mar. 1966; RML 48123; (USNMENT01760700). 1; same data; RML 48118; (USNMENT01760701). 1; same locality, 15 Mar. 1966; ex *Oryzomys* sp. (Rodentia: Cricetidae); RML 52789; (USNMENT01760702). 1; same data; RML 51857; (USNMENT01760703). 2; same data; RML 49051; (USNMENT01760704, USNMENT01760705). 1; same locality and date; ex *Thomasomys laniger* (Thomas) (Rodentia: Cricetidae); RML 49049; (USNMENT01760706). 1; same locality and host; 16 Mar. 1966; RML 51854; (USNMENT01760707).

***ventricosa, Microtrombicula* Traub and Nadchatram, 1966a: 308****Holotype (L)**

PAKISTAN • Khyber Pakhtunkhwa Province, Mansehra District, Naran; 14 Oct. 1962; ex *Hyperacrius fertilis* (True) (Rodentia: Cricetidae); (USNMENT01760708).

***vercammeni, Leeuwenhoekia (Leeuwenhoekia)* Brennan and Dalmat, 1960: 183****Paratypes (L)**

GUATEMALA • 2; Chimaltenango Department, Yepocapa; 11 May 1949; ex *Heteromys desmarestianus* Gray (Rodentia: Heteromyidae); RML 31466; (USNMENT01760709, USNMENT01760710).

***vercammeni, Traubacarus* Audy and Nadchatram, 1957b: 191****Paratypes (L)**

MALAYSIA • 1; Pahang State, Raub District, Fraser's Hill; 12 Apr. 1956; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); CORU 43604; (USNMENT01760711) 1; same data; CORU 44132; (USNMENT01760712).

***vergrandi*, *Odontacarus* (*Odontacarus*) Reed and Brennan, 1975: 25****Holotype (L)**

VENEZUELA • Mérida State; 15 Feb. 1966; ex *Thomasomys laniger* (Thomas) (Rodentia: Cricetidae); RML 52811; (USNMENT01760713).

**Paratypes (L)**

VENEZUELA • 9; same data as holotype; (USNMENT01760714, USNMENT01760715, USNMENT01760716, USNMENT01760717, USNMENT01760718, USNMENT01760719, USNMENT01760720, USNMENT01760721, USNMENT01760722). 2; same locality and host; 16 Feb. 1966; RML 52813; (USNMENT01760723, USNMENT01760724). 1; same locality and date; ex *Oryzomys minutus* Tomes (= *Microryzomys minutus*) (Rodentia: Cricetidae); RML 52812; (USNMENT01760725). 3; same locality and host; 15 Feb. 1966; RML 52810; (USNMENT01760726, USNMENT01760727, USNMENT01760728). 4; Trujillo State; 21 Oct. 1965; ex *Lonchorhina aurita* Tomes (Chiroptera: Phyllostomidae); RML 52808; (USNMENT01760729, USNMENT01760730, USNMENT01760731, USNMENT01760732).

***vesperuginis*, *Hoperella* Brennan and Jones, 1960: 533****Holotype (L)**

TRINIDAD AND TOBAGO • Saint George County, Port of Spain City, Belmont; 10 Jan. 1959; ex *Artibeus jamaicensis trinitatis* K. Andersen (Chiroptera: Phyllostomidae); RML 34184; (USNMENT01760733).

**Paratypes (L)**

TRINIDAD AND TOBAGO • 1; same data as holotype; (USNMENT01760734). 9; Mayaro County, Cuche River; 6 Dec. 1957; ex *Desmodus rotundus* (É. Geoffroy) (Chiroptera: Phyllostomidae); RML 34667; (USNMENT01760735, USNMENT01760736, USNMENT01760737, USNMENT01760738, USNMENT01760739, USNMENT01760740, USNMENT01760741, USNMENT01760742, USNMENT01760743). 2; Sangre Grande Region, Waller Air Force Base; 15 Apr. 1957; same host; RML 34424; (USNMENT01760744, USNMENT01760745). 1; Sangre Grande Region Matura; 28 Feb. 1958, same host; RML 34674; (USNMENT01760746). 12;

Borough of Arima Region, Arima, Verdant Valley; 16 May 1959; same host; RML 34427; (USNMENT01760747, USNMENT01760748, USNMENT01760749, USNMENT01760750, USNMENT01760751, USNMENT01760752, USNMENT01760753, USNMENT01760754, USNMENT01760755, USNMENT01760756, USNMENT01760757, USNMENT01760758). 11; same locality and host; 22 Aug. 1956; RML 34161; (USNMENT01760759, USNMENT01760760, USNMENT01760761, USNMENT01760762, USNMENT01760763, USNMENT01760764, USNMENT01760765, USNMENT01760766, USNMENT01760767, USNMENT01760768, USNMENT01760769). 2; same locality and host; 13 Nov. 1959; RML 34663; (USNMENT01760770, USNMENT01760771). 9; Saint Patrick County, Granville; 12 Mar. 1958; same host; RML 34679; (USNMENT01760772, USNMENT01760773, USNMENT01760774, USNMENT01760775, USNMENT01760776, USNMENT01760777, USNMENT01760778, USNMENT01760779, USNMENT01760780). 4; same locality and host; 12 Mar. 1955; RML 34675; (USNMENT01760781, USNMENT01760782, USNMENT01760783, USNMENT01760784). 8; Sangre Grande Region, Cunapo; 14 Mar. 1958; same host; RML 34681; (USNMENT01760785, USNMENT01760786, USNMENT01760787, USNMENT01760788, USNMENT01760789, USNMENT01760790, USNMENT01760791, USNMENT01760792). 8; Rio Claro–Mayaro Region, Rio Claro City, Tabaquite Road; 18 Mar. 1958; same host; RML 34685; (USNMENT01760793, USNMENT01760794, USNMENT01760795, USNMENT01760796, USNMENT01760797, USNMENT01760798, USNMENT01760799, USNMENT01760800). 3; Princes Town Region, Penal Rock; 19 Mar. 1958; same host; RML 34686; (USNMENT01760801, USNMENT01760802, USNMENT01760803). 8; Manzanilla Bay, Manzanilla Beach; 11 Oct. 1957; same host; RML 34593; (USNMENT01760804, USNMENT01760805, USNMENT01760806, USNMENT01760807, USNMENT01760808, USNMENT01760809, USNMENT01760810, USNMENT01760811). 6; Couva-Tabaquite-Talparo Region, San Raphael; 26 Jun. 1956; same host; RML 34783; (USNMENT01760812, USNMENT01760813, USNMENT01760814, USNMENT01760815, USNMENT01760816, USNMENT01760817). 10; Tunapuna–Piarco Region, Las Lomas;

27 Jun. 1958; same host; RML 34785; (USNMENT01760818, USNMENT01760819, USNMENT01760820, USNMENT01760821, USNMENT01760822, USNMENT01760823, USNMENT01760824, USNMENT01760825, USNMENT01760826, USNMENT01760827). 10; same locality; 27 Jun. 1958; ex *Carollia perspicillata* (L.) (Chiroptera: Phyllostomidae); RML 34786; (USNMENT01760828, USNMENT01760829, USNMENT01760830, USNMENT01760831, USNMENT01760832, USNMENT01760833, USNMENT01760834, USNMENT01760835, USNMENT01760836, USNMENT01760837). 1; Sangre Grande Region, Vega de Oropouche; 11 Feb. 1959; same host; RML 35090; (USNMENT01760838). 1; Couva–Tabaquite–Talparo Region, Gran Couva City, Tortuga Road; 11 May 1956; same host; RML 33892; (USNMENT01760839). 2; Mayaro-Rio Claro Region, Charuma; 13 Feb. 1959; same host; RML 35089; (USNMENT01760840, USNMENT01760841). 3; Tunapuna–Piarco Region, Blanchisseuse; 2 Apr. 1958; same host; RML 35098; (USNMENT01760842, USNMENT01760843, USNMENT01760844). 2; Trinidad; Chacachacare Island; 7 Dec. 1958; same host; RML 35061; (USNMENT01760845, USNMENT01760846). 4; Sangre Grande Region, Melajo Forest Reserve; 9 Mar. 1956; same host; RML 33782; (USNMENT01760847, USNMENT01760848, USNMENT01760849, USNMENT01760850). 10; Saint George County, Port of Spain City, Belmont; 26 Feb. 1958; same host; RML 34673; (USNMENT01760851, USNMENT01760852, USNMENT01760853, USNMENT01760854, USNMENT01760855, USNMENT01760856, USNMENT01760857, USNMENT01760858, USNMENT01760859, USNMENT01760860). 1; same locality and host; 2 Aug. 1957; RML 34587; (USNMENT01760861). 2; same locality and host; 28 Nov. 1956; RML 34178; (USNMENT01760862, USNMENT01760863). 16; San Juan–Laventille Region, Santa Cruz; 23 Oct. 1956; same host; RML 34172; (USNMENT01760864, USNMENT01760865, USNMENT01760866, USNMENT01760867, USNMENT01760868, USNMENT01760869, USNMENT01760870, USNMENT01760871, USNMENT01760872, USNMENT01760873, USNMENT01760874, USNMENT01760875, USNMENT01760876, USNMENT01760877, USNMENT01760878, USNMENT01760879). 1; Diego Martin

Region, Maraval; 27 Nov. 1956; same host; RML 34177; (USNMENT0176080). 1; Couva-Tabaquite-Talparo Region, Brazil Arena Road; 12 Jan. 1957; same host; RML 34182; (USNMENT01760881). 5; same locality and host; 8 Jan. 1957; RML 34181; (USNMENT01760882, USNMENT01760883, USNMENT01760884, USNMENT01760885, USNMENT01760886). 6; same locality and host; 3 Jan. 1957; RML 34182; (USNMENT01760887, USNMENT01760888, USNMENT01760889, USNMENT01760890, USNMENT01760891, USNMENT01760892). 1; Sangre Grande Region, Valencia; 28 Jan. 1959; same host; RML 35083; (USNMENT01760893). 7; Manzanilla Bay, Manzanilla Beach; 19 May 1958; ex *Vampyrum spectrum* (L.) (Chiroptera: Phyllostomidae); RML 34782; (USNMENT01760894, USNMENT01760895, USNMENT01760896, USNMENT01760897, USNMENT01760898, USNMENT01760899, USNMENT01760900). 1; Saint Patrick County; 23 Jun. 1956; ex *Micronycteris hirsuta* (Peters) (Chiroptera: Phyllostomidae); RML 34034; (USNMENT01760901). 1; Sangre Grande Region, Rio Grande stream; 31 Aug. 1956; ex “unidentified rat” (Rodentia); RML 34167; (USNMENT01760902).

***vesudor*, *Colicus* Goff and Brennan, 1978c: 566**

**Holotype (L)**

VENEZUELA • Amazonas State, Tamatama, 21 May 1967; ex *Proechimys guyannensis* (É. Geoffroy) (Rodentia: Echimyidae); RML 56026; (USNMENT01760903).

**Paratypes (L)**

VENEZUELA • 2; same data as holotype; (USNMENT01760904, USNMENT01760905).

***vieta*, *Schoengastia* Gater, 1932: 154**

**Paratypes (L)**

MALAYSIA • 2; Selangor State, Petaling District, Sungai Buloh; 22 Feb. 1930; ex *Rattus rattus* (L.) (Rodentia: Muridae); USNM 1052; (USNMENT01760906, USNMENT01760907).

***villosus*, *Odontacarus* Goff and Loomis, 1973: 333**

**Holotype (L)**



USA • California State, Plumas County; 8 Jun. 1951; ex *Peromyscus boylii* (Baird) (Rodentia: Cricetidae); RML 28956; (USNMENT01760908).

***viperina*, *Ascoschoengastia* Lawrence, 1949: 462**

**Paratype (L)**

SOUTH AFRICA • 1; KwaZulu-Natal Province Pietermaritzburg; no date; ex *Causus rhombeatus* (Lichtenstein) (Squamata: Viperidae); NM 3772; (USNMENT01760909).

***vorca*, *Trombicula* Traub and Audy, 1954a: 47**

**Holotype (L)**

MALAYSIA • Sabah State, Mount Kinabalu; 1 Aug. 1951; ex “unidentified bird” (Aves); R. Traub coll.; USNM 2013; (USNMENT01760910).

**Paratypes (L)**

MALAYSIA • 2; same data as holotype; (USNMENT01760911, USNMENT01760912).

***wadei*, *Euschoengastoides* Loomis, 1969: 7**

**Paratype (L)**

MEXICO • 1; Campeche State; 15 Jul. 1962; ex *Ototylomys phyllotis* Merriam (Rodentia: Cricetidae); KU 92352; (USNMENT01760913).

***wagamiya*, *Helenicula* Nadchatram and Traub, 1971: 580**

**Paratypes (L)**

PAKISTAN • 2; Khyber Pakhtunkhwa Province, Swat District; 3 Oct. 1966; ex *Apodemus* sp. (Rodentia: Muridae); BPBM 9495; (USNMENT01760914, USNMENT01760915).

***wallacei*, *Leptotrombidium* (*Leptotrombidium*) Mitchell and Nadchatram, 1966: 66**

**Paratypes (L)**

INDIA • 2; Madhya Pradesh State, Kanha National Park; 20 Dec. 1964; ex *Rattus blanfordi* (Thomas) (= *Madromys blanfordi*) (Rodentia: Muridae); BPBM 6626; (USNMENT01760916, USNMENT01760917).

***watkinsi, Tecomatlana (Tecomatlana) Vercammen-Grandjean, 1967: 851*****Holotype (L)**

USA • California State, San Bernardino County, Mountaineer Mine; 30 Jan. 1964; ex *Macrotus* sp. (Chiroptera: Vespertilionidae); (USNMENT01760918).

**Paratypes (L)**

USA • 9; same data as holotype; (USNMENT01760919, USNMENT01760920, USNMENT01760921, USNMENT01760922, USNMENT01760923, USNMENT01760924, USNMENT01760925, USNMENT01760926, USNMENT01760927).

***wauensis, Guntheria (Domrowana) Goff, 1980b: 69*****Paratypes (L)**

PAPUA NEW GUINEA • 3; Morobe Province, Bulldog Track; 9 Aug. 1979; ex *Rattus niobe* Thomas (Rodentia: Muridae); BPBM 11561; (USNMENT01760928, USNMENT01760929, USNMENT01760930).

***waynensis, Trombicula (Neotrombicula) Brennan and Wharton, 1950: 189*****Syntypes (L)**

USA • 2; Pennsylvania State, Wayne County; 3 Aug. 1946; ex *Melospiza georgiana* (Latham) (Passeriformes: Emberizidae); F. Harper coll.; USNM 1845; (USNMENT01760931, USNMENT01760932).

***webbi, Euschoengastoides Loomis, 1971: 702*****Holotype (L)**

MEXICO • Baja California State; 14 Jun. 1967; ex *Perognathus fallax* Merriam (= *Chaetodipus fallax*) (Rodentia: Heteromyidae); RML 56221; (USNMENT01760933).

***webbi, Eutrombicula Brennan and Reed, 1974b: 709*****Holotype (L)**

VENEZUELA • Trujillo State; 21 Jan. 1966; ex *Oryzomys albigularis* (Tomes) (= *Nephelomys albigularis*) (Rodentia: Cricetidae); Smithsonian Army coll.; RML 48905; (USNMENT01760934).

**Paratypes (L)**

VENEZUELA • 7; same data as holotype; (USNMENT01760935, USNMENT01760936, USNMENT01760937, USNMENT01760938, USNMENT01760939, USNMENT01760940, USNMENT01760941). 2; same locality and host; 18 Jan. 1966; RML 48896; (USNMENT01760942, USNMENT01760943). 9; same locality and host; 20 Jan. 1966; RML 48902; (USNMENT01760944, USNMENT01760945, USNMENT01760946, USNMENT01760947, USNMENT01760948, USNMENT01760949, USNMENT01760950, USNMENT01760951, USNMENT01760952). 1; same data; RML 48901; (USNMENT01760953). 13; same locality and host; 24 Jan. 1966; RML 48915; (USNMENT01760954, USNMENT01760955, USNMENT01760956, USNMENT01760957, USNMENT01760958, USNMENT01760959, USNMENT01760960, USNMENT01760961, USNMENT01760962, USNMENT01760963, USNMENT01760964, USNMENT01760965, USNMENT01760966). 1; same locality and host; 26 Jan. 1966; RML 48921; (USNMENT01760967). 9; same data; RML 48923; (USNMENT01760968, USNMENT01760969, USNMENT01760970, USNMENT01760971, USNMENT01760972, USNMENT01760973, USNMENT01760974, USNMENT01760975, USNMENT01760976). 10; same locality and host, 28 Jan. 1966; RML 49027; (USNMENT01760977, USNMENT01760978, USNMENT01760979, USNMENT01760980, USNMENT01760981, USNMENT01760982, USNMENT01760983, USNMENT01760984, USNMENT01760985, USNMENT01760986).

***weberi weberi*, *Healslipia* Vercammen-Grandjean and Audy, 1957: 166**

**Paratypes (L)**

RWANDA • 3; Rubavu District, Gisenyi; 20 Mar. 1954; ex *Capella media* (Latham) (= *Gallinago media*) (Charadriiformes: Scolopacidae); (USNMENT01760987, USNMENT01760988, USNMENT01760989). 17; same locality and host; 9 Mar. 1954;

(USNMENT01760990, USNMENT01760991, USNMENT01760992,  
 USNMENT01760993, USNMENT01760994, USNMENT01760995,  
 USNMENT01760996, USNMENT01760997, USNMENT01760998,  
 USNMENT01760999, USNMENT01761000, USNMENT01761001,  
 USNMENT01761002, USNMENT01761003, USNMENT01761004,  
 USNMENT01761005, USNMENT01761006).

***wetmorei*, *Blankaartia* Brennan and Yunker, 1966a: 250**

**Holotype (L)**

PANAMA • Panama province; 20 Jul. 1961; ex *Nyctanassa violacea* (L.) (Pelecaniformes: Ardeidae); RML 43234; (USNMENT01761007).

**Paratypes (L)**

PANAMA • 2; same data as holotype; (USNMENT01761008, USNMENT01761009).

***whartoni*, *Pseudoschoengastia* Brennan, 1960b: 489**

**Holotype (L)**

MEXICO • Coahuila State; 9 Dec. 1950; ex *Peromyscus* sp. (Rodentia: Cricetidae); G. W. Wharton coll.; RML 35552; (USNMENT01761010).

**Paratypes (L)**

MEXICO • 2; same data as holotype; (USNMENT01761011, USNMENT01761012). 3; same locality and date; ex *Neotoma* sp. (Rodentia: Cricetidae); RML 35551; (USNMENT01761013, USNMENT01761014, USNMENT01761015).

***whartoni*, *Sauracarella* Lawrence, 1949: 450**

**Paratype (L)**

SOUTH AFRICA • 1; KwaZulu-Natal Province, uKhahlamba-Drakensberg Park, Bushman's Peak; no date; ex *Pseudocordylus subviridis* Smith (Squamata: Cordylidae); NM 4829; (USNMENT01761016).

***whartoni*, *Trombicula* Ewing, 1929a: 296**

**Syntype (L)**

USA • 1; South Carolina State, Dorchester County, Summerville; 15 Feb. 1929; ex “unidentified bird” (Aves); USNM 999; (USNMENT01761017).

***whartoni*, *Whartonia* Hoffmann, 1951a: 33**

**Holotype (L)**

MEXICO • Puebla State, Izúcar de Matamoros; 12 Sep. 1950; ex *Baiomys musculus* (Merriam) (Rodentia: Cricetidae); G. W. Wharton coll.; (USNMENT01761018).

***whitakeri*, *Euschoengastia* Wrenn, 1984: 15**

**Holotype (L)**

USA • Indiana State, Crawford County, Harrison-Crawford State Forest; 29 Jul. 1982; ex *Sorex fumeus* G.M. Miller (Eulipotyphla: Soricidae); (USNMENT01761019).

**Paratype (L)**

USA • 1; same locality and host; 22 Oct. 1982; (USNMENT01761020).

***willmanni*, *Riedlinia* (*Riedlinia*) Vercammen-Granjean and Mitchell, 1964: 484**

**Holotype (L)**

KENYA • Nairobi County, Nairobi; Sep. 1959; ex *Hipposideros caffer* (Sundevall) (Chiroptera: Hipposideridae); D. H. Hinter coll.; (USNMENT01761021).

**Paratype (L)**

KENYA • 1; same data as holotype; (USNMENT01761022).

***willmanni*, *Schoengastia* Radford, 1947: 216**

**Paratype (L)**

UGANDA • 1; Toro Sub-region, Queen Elizabeth National Park, Katwe craters, Katwe; 29 Jul. 1946; ex *Arvicanthis abyssinicus* (Rüppell) (Rodentia: Muridae); G. H. E. Hopkins coll.; (USNMENT01761023).

***wissemani*, *Chatia* (*Shunsennia*) Traub and Nadchatram, 1966b: 378**

**Holotype (L)**

PAKISTAN • Kaghan Valley, Mansehra District; 17 Aug. 1963; ex *Alticola roylei* Gray (Rodentia: Cricetidae); (USNMENT01761024).

**Paratype (L)**

PAKISTAN • 1; same data as holotype; (USNMENT01761025).

***wolfenbarger*, *Eutrombicula* Brennan and Reed, 1974b: 709**

**Holotype (L)**

VENEZUELA • Mérida State; 21 Mar. 1966; ex *Cryptotis thomasi* (Merriam) (Eulipotyphla: Soricidae); Smithsonian Army coll.; RML 49056; (USNMENT01761026).

**Paratypes (L)**

VENEZUELA • 7; same data as holotype; (USNMENT01761027, USNMENT01761028, USNMENT01761029, USNMENT01761030, USNMENT01761031, USNMENT01761032, USNMENT01761033). 1; same locality and host; 13 Mar. 1966; RML 51865; (USNMENT01761034). 12; same locality and host; 20 Mar. 1966; RML 51852; (USNMENT01761035, USNMENT01761036, USNMENT01761037, USNMENT01761038, USNMENT01761039, USNMENT01761040, USNMENT01761041, USNMENT01761042, USNMENT01761043, USNMENT01761044, USNMENT01761045, USNMENT01761046). 3; same locality and host; 22 Mar. 1966; RML 48122; (USNMENT01761047, USNMENT01761048, USNMENT01761049). 3; same locality and host; 23 Mar. 1966. RML 48117; (USNMENT01761050, USNMENT01761051, USNMENT01761052).

***womersleyi*, *Whartonia* Brennan and Dalmat, 1960: 185**

**Paratypes (L)**

GUATEMALA • 2; Alta Verapaz Department; 31 May 1948; ex *Balantiopteryx io* Thomas (Chiroptera: Emballonuridae); RML 34056; (USNMENT01761053, USNMENT01761054).

***worthi*, *Leptotrombidium* (*Leptotrombidium*) Nadchatram, 1970b: 148**

**Paratype (L)**

NEPAL • 1; Rapti Zone Rapti River; no data; ex *Rattus brunneusculus* (Hodgson) (= *Rattus tanezumi* Temminck) (Rodentia: Muridae); BPBM 8890; (USNMENT01761055).

***wrenni*, *Guntheria (Domrowana)* Goff, 1981g: 530**

**Paratypes (L)**

PAPUA NEW GUINEA • 6; Southern Highlands District, Monte Giluwe; 25 Feb. 1973; ex *Melomys levipes* (Thomas) (= *Paramelomys levipes*) (Rodentia: Muridae); A. B. Mirza coll.; BPBM 12114; (USNMENT01761056, USNMENT01761057, USNMENT01761058, USNMENT01761059, USNMENT01761060, USNMENT01761061).

***wrenni*, *Microtrombicula* Loomis, 1963: 332**

**Holotype (L)**

USA • California State, Riverside County, Joshua Tree National Park; 9 Feb. 1962; ex *Peromyscus eremicus* (Baird) (Rodentia: Cricetidae); W. J. Wrenn coll.; RML 38398; (USNMENT01761062).

**Paratypes (L)**

USA • 2; same data as holotype; (USNMENT01761063, USNMENT01761064).

***xerophila*, *Otorhinophila* Loomis and Wrenn, 1973: 179**

**Holotype (L)**

USA • California State, Riverside County, Joshua Tree National Park; 11 Jul. 1961; ex *Perognathus fallax* Merriam (= *Chaetodipus fallax*) (Rodentia: Heteromyidae); RML 60180; (USNMENT01761065).

***yemenensis*, *Neoschoengastia* Radford, 1954: 305**

**Holotype (L)**

YEMEN • Ta'izz; 17 Jan. 1951; ex *Meriones rex* Yerbury and Thomas (Rodentia: Muridae); H. Hoogstraal coll.; (USNMENT01761066).

***yooni*, *Leptotrombidium (Trombiculindus)* Traub and Nadchatram, 1967b: 423**

**Holotype (L)**

MALAYSIA • Pahang State, Raub District, Fraser's Hill, Jeriau Waterfall; 16 Apr. 1956; ex *Rattus edwardsi* Rochebrune (= *Malacomys edwardsi*) (Rodentia: Muridae); R. Traub coll.; RT B 45071; (USNMENT01761067).

**Paratype (L)**

MALAYSIA • 1; same data as holotype; (USNMENT01761068).

***yuhensis*, *Trombicula* Abonnenc and Taufflieb, 1957: 560**

**Paratypes (L)**

CHAD • 1; Mayo-Kebbi Est Region; no date; ex *Numida Meleagris* (L.) (Galliformes: Numididae); (USNMENT01761069). 2; Mayo-Kebbi Est Region, Mont Illi Departments, Fianga; no date; ex *Mastomys coucha* (Smith) (Rodentia: Muridae); RML 24155; (USNMENT01761070, USNMENT01761071).

***yunker*, *Loomisia* Brennan and Reed, 1972b: 798**

**Holotype (L)**

VENEZUELA • Bolivar State, Icabaru, 8 May 1968; ex *Peropteryx kappleri* Peters (Chiroptera: Emballonuridae); C. E. Yunker coll.; RML 49833; (USNMENT01761072).

**Paratypes (L)**

VENEZUELA • 12; same data as holotype; (USNMENT01761073, USNMENT01761074, USNMENT01761075, USNMENT01761076, USNMENT01761077, USNMENT01761078, USNMENT01761079, USNMENT01761080, USNMENT01761081, USNMENT01761082, USNMENT01761083, USNMENT01761084).

***zanzibarica*, *Schoutedenichia* (*Brennanichia*) Vercammen-Granjean, 1958: 36**

**Paratypes (L)**

TANZANIA • 3; Zanzibar Archipelago; no date; ex *Galago senegalalensis zanzibaricus* Matschie (= *Galagoides zanzibaricus*) (Primates: Galagidae); (USNMENT01761085, USNMENT01761086, USNMENT01761087).

***zeta*, *Trombicula* (*Leptotrombidium*) Traub, Morrow and Lipovsky, 1958: 148**



**Holotype (L)**

SOUTH KOREA • Gyeonggi Province, Munsan; 6 Nov. 1953; ex *Apodemus agrarius* (Pallas) (Rodentia: Muridae); USNM 2232; (USNMENT01761088).

**Paratypes (L)**

SOUTH KOREA • 2; same data as holotype; (USNMENT01761089, USNMENT01761090). 1; same data; RT B 25903; (USNMENT01761091). 1; same data; RT B 25904; (USNMENT01761092). 1; same data; RT B 25885; (USNMENT01761093); 1; Gwandong Region, Gangwon Province, Kumwha City; 2 Dec. 1953; same host; RT B 26314; (USNMENT01761094). 1; same data; RT B 26312; (USNMENT01761095).

***zona, Pseudoschoengastia Brennan, 1960b: 490*****Holotype (L)**

PANAMA • Panama province, Panama City, Curundú; 8 Aug. 1954, ex *Liomys adpersus* (Peters) (= *Heteromys adpersus*) (Rodentia: Heteromyidae); RML 35292; (USNMENT01761096).

**Paratypes (L)**

PANAMA • 1; same data as holotype; (USNMENT01761097). 3; Panama province, Panama City, Corozal; 21 Oct. 1954; same host; RML 35225; (USNMENT01761098, USNMENT01761099, USNMENT01761100). 3; Panama province, Soberanía National Park; 20 Apr. 1955; same host; RML 35239; (USNMENT01761101, USNMENT01761102, USNMENT01761103). 1; same locality and host; 9 Mar. 1955; RML 35325; (USNMENT01761104). 2; same locality and host; 21 Dec. 1954; RML 35230; (USNMENT01761105, USNMENT01761106). 1; Coclé province, El Valle de Antón; 26 Jun. 1954; ex *Tylomys panamensis* (Gray) (Rodentia: Cricetidae); RML 35290; (USNMENT01761107).

***zulia, Kymocta Brennan and Bronswijk, 1973: 451*****Holotype (L)**

VENEZUELA • Zulia State, Sierra de Perijá National Park; 20 Apr. 1968; ex *Heteromys anomalus* (Thompson) (Rodentia: Heteromyidae); RML 49106; (USNMENT01761108).

**Paratypes (L)**

VENEZUELA • 8; same data as holotype; (USNMENT01761109, USNMENT01761110, USNMENT01761111, USNMENT01761112, USNMENT01761113, USNMENT01761114, USNMENT01761115, USNMENT01761116). 7; same data; RML 49112; (USNMENT01761117, USNMENT01761118, USNMENT01761119, USNMENT01761120, USNMENT01761121, USNMENT01761122, USNMENT01761123). 13; same locality and host; 19 Apr. 1968; RML 49015; (USNMENT01761124, USNMENT01761125, USNMENT01761126, USNMENT01761127, USNMENT01761128, USNMENT01761129, USNMENT01761130, USNMENT01761131, USNMENT01761132, USNMENT01761133, USNMENT01761134, USNMENT01761135, USNMENT01761136).

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**Table 1.** List of the host's names updated.

	<b>Old name</b>	<b>Updated name</b>
<b>Amphibia: Anura</b>		
Bufonidae	<i>Bufo orientalis</i>	<i>Sclerophrys arabica</i>
Hylidae	<i>Hyla arenicolor</i>	<i>Dryophytes arenicolor</i>
Dicroglossidae	<i>Rana macrodon</i>	<i>Limnonectes macrodon</i>
Phrynobatrachidae	<i>Arthroleptis minutus</i>	<i>Phrynobatrachus minutus</i>
Ranidae	<i>Rana pipiens</i>	<i>Lithobates pipens</i>
	<i>Rana sphenoccephala</i>	<i>Lithobates sphenoccephalus</i>
<b>Reptilia: Squamata</b>		
Crotaphytidae	<i>Crotaphytus wislizenii</i>	<i>Gambelia wislizenii</i>
Colubridae	<i>Coluber radiatus</i>	<i>Coelognathus radiatus</i>
Gekkonidae	<i>Gymnodactylus lousiadensis</i>	<i>Cyrtodactylus lousiadensis</i>
	<i>Oedura nivarica</i>	<i>Afroedura nivarica</i>
	<i>Phyllodactylus siamensis</i>	<i>Dixonius siamensis</i>
Lacertidae	<i>Ichnotropis squamulosa</i>	<i>Meroles squamulosus</i>
Natricidae	<i>Natrix trianguligera</i>	<i>Xenochrophis trianguligerus</i>
Scincidae		

	<i>Dasia smaragdina</i>	<i>Lamprolepis smaragdina</i>
	<i>Eumeces fasciatus</i>	<i>Plestiodon fasciatus</i>
	<i>Eumeces laticeps</i>	<i>Plestiodon laticeps</i>
	<i>Leiolopisma albertisii</i>	<i>Carlia bicarinata</i>
	<i>Lygosoma grande</i>	<i>Oligosoma grande</i>
	<i>Lygosoma olivaceum</i>	<i>Dasia olivacea</i>
	<i>Mabuya multifasciata</i>	<i>Eutropis multifasciata</i>
	<i>Mabuya striata</i>	<i>Trachylepis striata</i>
	<i>Mabuya varia</i>	<i>Trachylepis brauni</i>
	<i>Riopa bowringi</i>	<i>Lygosoma bowringii</i>
Teiidae		
	<i>Cnemidophorus tigris</i>	<i>Aspidoscelis tigris</i>
Tropiduridae		
	<i>Tropidurus peruviano</i>	<i>Microlophus peruvianus</i>

### **Aves: Charadriiformes**

#### Scolopacidae

<i>Capella media</i>	<i>Gallinago media</i>
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#### Laridae

<i>Sterna fuscata</i>	<i>Onychoprion fuscatus</i>
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### **Aves: Galliformes**

#### Phasianidae

<i>Francolinus squamatus</i>	<i>Pternistis squamatus</i>
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### **Aves: Gruiformes**

#### Rallidae

<i>Rallus torquatus</i>	<i>Hypotaenidia torquata</i>
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### **Aves: Pelecaniformes**

#### Ardeidae

<i>Demigretta sacra</i>	<i>Egretta sacra</i>
<i>Egretta intermedia</i>	<i>Ardea intermedia</i>

### **Aves: Procellariiformes**

Diomedeidae

*Diomedea immutabilis*      *Phoebastria immutabilis*

**Aves: Passeriformes**

Fringillidae

*Psittrostra cantans*      *Telespiza cantans*

Passerellidae

*Zonotrichia coronata*      *Zonotrichia atricapilla*

Timaliidae

*Pomatorhinus hypoleucos*      *Erythrogenys hypoleucos*

Turdidae

*Hylocichla ustulata*      *Catharus ustulatus*  
*ustulata*      *ustulatus*

**Mammalia: Carnivora**

Mustelidae

*Helictis everetti*      *Melogale everetti*

Viverridae

*Paradoxurus*      *Paradoxurus*  
*philippinensis*      *hermaphroditus*

**Mammalia:**

**Cetartiodactyla**

*Cervulus aureus*      *Muntiacus muntjak*

**Mammalia: Chiroptera**

Hipposideridae

*Rhinonictoris aurantius*      *Rhinonictoris aurantia*

Molossidae

*Tadarida femorasacca*      *Nyctinomops femorosacca*  
*Tadarida laticaudata*      *Nyctinomops laticaudatus*

Mormoopidae

*Chilonycteris rubiginosa*      *Pteronotus (Phyllodia)*  
*parnellii rubiginosus*

Phyllostomidae *Mormoops tumidiceps* *Mormoops megalophylla*

Vespertilionidae *Barticonycteris daviesi* *Glyphonycteris daviesi*

*Pipistrellus hesperus* *Parastrellus hesperus*

*Pipistrellus savii coreensis* *Hypsugo alaschanicus*

*Pipistrellus subflavus* *Perimyotis subflavus*

*Pizonyx vivesi* *Myotis vivesi*

## **Mammalia:**

### **Didelphimorphia**

Didelphidae

*Marmosa fuscata* *Marmosops fuscatus*

### **Mammalia: Eulipotyphla**

Soricidae

*Soriculus caudatus* *Episoriculus caudatus*

*Suncus caeruleus* *Suncus murinus*

*Tupaia belangeri versurae* *Tupaia belangeri*

Talpidae

*Talpa leucura* *Parascaptor leucura*

*Talpa mucrura* *Euroscaptor micrura*

### **Mammalia: Hyracoidea**

Procaviidae

*Heterohyrax syriacus* *Heterohyrax brucei*

### **Mammalia: Macroscelidea**

Macroscelididae

*Nasilio brachyrhynchus* *Elephantulus  
brachyrhynchus*

### **Mammalia: Primates**

Galagidae

*Galago senegalalensis*  
*zanzibaricus*

*Galagoides zanzibaricus*

## Mammalia: Rodentia

### Cricetidae

*Akodon longipilis*

*Abrothrix longipilis*

*Akodon urichi*

*Necromys urichi*

*Akodon [sic] lasiurus*

*Necromys lasiurus*

*Bolomys lasiurus*

*Necromys lasiurus*

*Clethrionomys*  
*californicus*

*Myodes californicus*

*Clethrionomys rufocanus*

*Myodes rufocanus*

*Hepesromys ducilla*

*Calomys lepidus*

*Neotoma ferruginea*

*Neotoma mexicana*

*Oryzomys albigularis*

*Nephelomys albigularis*

*Oryzomys caliginosus*

*Melanomys caliginosus*

*Oryzomys capito*

*Hylaeamys megacephalus*

*Oryzomys flavescens*

*Oligoryzomys flavescens*

*Oryzomys fornesi*

*Oligoryzomys fornesi*

*Oryzomys keaysi*

*Nephelomys keaysi*

*Oryzomys macconnelli*

*Euryoryzomys macconnelli*

*Oryzomys minutus*

*Microryzomys minutus*

*Oryzomys subflavus*

*Cerradomys subflavus*

*Oryzomys talamancae*

*Transandinomys*  
*talamancae*

*Oryzomys yunganus*

*Hylaeamys yunganus*

*Peromyscus maniculatus*  
*artemisiae*

*Peromyscus maniculatus*

*Peromyscus nudipes*

*Peromyscus mexicanus*

*Peromyscus oaxacensis*

*Peromyscus aztecus*

*Phyllotis boliviensis*

*Auliscomys boliviensis*

*Phyllotis phaeus*

*Phyllotis osilae*



	<i>Phyllotis pictus</i>	<i>Auliscomys pictus</i>
	<i>Thomasomys fuscatus</i>	<i>Handleyomys fuscatus</i>
	<i>Thomasomys lugens</i>	<i>Aepeomys lugens</i>
	<i>Zygodontomys cherrei</i>	<i>Zygodontomys brevicauda</i>
	<i>Zygodontomys lasiurus</i>	<i>Necomys lasiurus</i>
	<i>Zygodontomys microtinus</i>	<i>Zygodontomys brevicauda</i>
Chinchillidae		
	<i>Lagidium peruanum</i>	<i>Lagidium viscacia</i>
Cuniculidae		
	<i>Agouti paca</i>	<i>Cuniculus paca</i>
Echimyidae		
	<i>Echimys armatus</i>	<i>Makalata didelphoides</i>
	<i>Proechimys hendeei</i>	<i>Proechimys simonsi</i>
Erethizontidae		
	<i>Coendou rothschildi</i>	<i>Coendou quichua</i>
Heteromyidae		
	<i>Liomys adpersus</i>	<i>Heteromys adpersus</i>
	<i>Liomys irroratus</i>	<i>Heteromys irroratus</i>
	<i>Liomys pictus</i>	<i>Heteromys pictus</i>
	<i>Perognathus californicus</i>	<i>Chaetodipus californicus</i>
	<i>Perognathus fallax</i>	<i>Chaetodipus fallax</i>
	<i>Perognathus formosus</i>	<i>Chaetodipus formosus</i>
	<i>Perognathus goldmani</i>	<i>Chaetodipus goldmani</i>
	<i>Perognathus intermedius</i>	<i>Chaetodipus intermedius</i>
	<i>Perognathus parnix</i>	<i>Chaetodipus parnix</i>
Geomyidae		
	<i>Thomomys neglectus</i>	<i>Cratogeomys fumosus</i>
Muridae		
	<i>Acomys cahirinus</i>	<i>Acomys dimidiatus</i>
	<i>dimidiatus</i>	
	<i>Chiropodomys legatus</i>	<i>Chiropodomys major</i>

<i>Dipodillus campestris</i>	<i>Gerbillus campestris</i>
<i>Lophuromys aquilus</i>	<i>Lophuromys flavopunctatus</i>
<i>Melomys levipes</i>	<i>Paramelomys levipes</i>
<i>Melomys lorentzii</i>	<i>Paramelomys lorentzii</i>
<i>Melomys platyops</i>	<i>Paramelomys platyops</i>
<i>Melomys rubex</i>	<i>Paramelomys rubex</i>
<i>Pogonomys forbesi</i>	<i>Chiruromys forbesi</i>
<i>Rattus alticola</i>	<i>Maxomys alticola</i>
<i>Rattus assimilis</i>	<i>Rattus fuscipes</i>
<i>Rattus berdmorei</i>	<i>Berylmys berdmorei</i>
<i>Rattus blanfordi</i>	<i>Madromys blanfordi</i>
<i>Rattus bowersi</i>	<i>Berylmys bowersi</i>
<i>Rattus brunneusculus</i>	<i>Rattus tanezumi</i>
<i>Rattus canus</i>	<i>Lenothrix canus</i>
<i>Rattus cremoriventer</i>	<i>Niviventer cremoriventer</i>
<i>Rattus edwardsi</i>	<i>Malacomys edwardsi</i>
<i>Rattus flavipectus yunnanensis</i>	<i>Rattus tanezumi</i>
<i>Rattus mulleri</i>	<i>Sundamys muelleri</i>
<i>Rattus niviventer</i>	<i>Niviventer niviventer</i>
<i>Rattus panglima</i>	<i>Maxomys panglima</i>
<i>Rattus rajah</i>	<i>Maxomys rajah</i>
<i>Rattus rattoides</i>	<i>Rattus pyctoris</i>
<i>Rattus rattus alexandrinus</i>	<i>Rattus rattus</i>
<i>Rattus rattus fulvescens</i>	<i>Niviventer fulvescens</i>
<i>Rattus rattus sladeni</i>	<i>Rattus tanezumi</i>
<i>Rattus ruber</i>	<i>Rattus feliceus</i>
<i>Rattus sabanus</i>	<i>Leopoldamys sabanus</i>
<i>Rattus surifer</i>	<i>Maxomys surifer</i>

<i>Rattus whiteheadi</i>	<i>Maxomys whiteheadi</i>
<i>whiteheadi</i>	
<i>Tatera brantsii</i>	<i>Gerbilliscus brantsii</i>
<i>Tatera leucogaster</i>	<i>Gerbilliscus leucogaster</i>
<i>Thallomys namaquensis</i>	<i>Micaelamys namaquensis</i>
<i>grahami</i>	
<i>Thamnomys surdaster</i>	<i>Grammomys dolichurus</i>
<i>Uromys lamington</i>	<i>Uromys caudimaculatus</i>

## Sciuridae

<i>Callosciurus mindanensis</i>	<i>Sundasciurus mindanensis</i>
<i>Callosciurus tenuis</i>	<i>Sundasciurus tenuis</i>
<i>Citellus beecheyi</i>	<i>Otospermophilus beecheyi</i>
<i>Citellus beldingi</i>	<i>Urocitellus beldingi</i>
<i>Citellus columbianus</i>	<i>Urocitellus columbianus</i>
<i>Citellus lateralis</i>	<i>Callospermophilus lateralis</i>
<i>Citellus richardsonii</i>	<i>Urocitellus richardsonii</i>
<i>Citellus tridecemlineatus</i>	<i>Ictidomys tridecemlineatus</i>
<i>Nannosciurus whiteheadi</i>	<i>Exilisciurus whiteheadi</i>
<i>Sciuropterus sagitta</i>	<i>Hylopetes sagitta</i>
<i>Sciurus hudsonicus</i>	<i>Tamiasciurus hudsonicus</i>
<i>richardsoni</i>	<i>richardsoni</i>

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**Table 2.** List of the localities' names updated.

<b>Old name</b>	<b>Updated name</b>
Congo Belge	Democratic Republic of the Congo
Dutch New Guinea	Indonesia
Palestine territory	Israel
Borneo, British North Borneo or Malaya	Malaysia
Burma or North Burma	Myanmar
South West Africa	Namibia
Western Pakistan	Pakistan
New Guinea	Papua New Guinea
Rhodesia	Zimbabwe
Transvaal Region	Gauteng Province
Mafeking City	Mahikeng City

**Table 3.** Chiggers's types collected from domestic animals.

<b>Species</b>	<b>Authors</b>	<b>Host</b>
<i>Acomatacarus galli</i>	Ewing, 1946a	Chicken
<i>Euschoengastia latchmani</i>	Brennan and Yunker, 1964	Dogs and Horses
<i>Gahrlipeia (Gahrlipeia) marshi</i>	Traub and Morrow, 1957	Pigs
<i>Hexidionis garfieldi</i>	Goff and McKown, 1997	Cats
<i>Neoschoengastia israelensis</i>	Goff, 1986	Sheeps and Goats
<i>Neotrombicula (Neotrombicula) dicoxalae</i>	Vercammen-Grandjean et al., 1971	Sheeps
<i>Odontacarus mastigophorus</i>	Brennan and Dalmat, 1960	Chicken
<i>Schoengastia guyanensis</i>	Floch and Abonnenc, 1941	Dogs
<i>Trombicula canis</i>	Floch and Abonnenc, 1941	Dogs
<i>Trombicula pastora</i>	Boshell and Kerr, 1942	Chicken
<i>Trombicula shannoni</i>	Ewing, 1929b	Cats
<i>Vargatula pacifica</i>	Goff and Loomis, 1982	Pigs

### 3. CHAPTER 2 - REDESCRIPTION OF *Apolonia tigipioensis* TORRES AND BRAGA, 1938 (TROMBIDIFORMES: LEEUWENHOEKIIDAE)

Acarina 26 (2): 197–204

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#### REDESCRIPTION OF *APOLONIA TIGIPIOENSIS* TORRES AND BRAGA, 1938 (TROMBIDIFORMES: LEEUWENHOEKIIDAE)

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**ABSTRACT:** The genus *Apolonia* is only known from the single species, *Apolonia tigipioensis* Torres et Braga, occurring in Venezuela and northeastern Brazil. The larval stage is primarily a parasite of birds, but they may parasitize mammals, including humans. This species can cause nodular lesions in birds. In the present study, we are redescribing the species *A. tigipioensis* based on the slides deposited at the Acari Collection of the Butantan Institute. Furthermore, we designate a lectotype and paralectotype for this species.

**KEY WORDS:** Chiggers, ectoparasites, birds, Brazil.

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#### INTRODUCTION

*Apolonia* Torres et Braga, 1938 is a monotypic genus represented by the species *Apolonia tigipioensis* Torres et Braga, 1938, which has been reported from Venezuela and northeastern Brazil. This species parasitizes birds, yet it may also parasitize mammals, including humans (Ornelas-Almeida *et al.* 2007). *Apolonia* was first cited parasitizing *Gallus gallus domesticus* (Galliformes: Phasianidae) by Torres and Braga (1938). A year later, this genus and its respective type species, *Apolonia tigipioensis* Torres and Braga, 1938, were formally described (Torres and Braga 1939). Torres and Braga (1938, 1939) and Carneiro (1949, 1952) reported this species as potential pests on poultry farms, causing nodular lesions, which could lead to the death of their hosts.

According to Torres and Braga (1938), the name of the genus was given in honor of the Secretary of Agriculture of the state of Pernambuco, Brazil, Apolônio Jorge de Faria Sales (1904–1982). The name of the species refers to the place where this chigger was collected—the district of Tejipió, in the municipality of Recife, state of Pernambuco (Torres and Braga 1938). This species was recorded three more times parasitizing wild birds in Pernambuco state. Carneiro (1952) recorded *A. tigipioensis* parasitizing *Nothura maculosa cearensis* (Passeriformes: Tinamiformes), as well as biting humans in the municipality of Limoeiro. Ornelas-Almeida

*et al.* (2007) reported this chigger parasitizing *Struthio camelus* (Struthioniformes: Struthionidae) and *Passer domesticus* (Passeriformes: Passeridae) in the municipality of Petrolina.

The only records of *A. tigipioensis* parasitizing mammals were made in Venezuela by Brennan and Reed (1975). These authors found the above species on *Leptonycteris curasoae* (Chiroptera: Phyllostomidae), *Mus musculus* (Rodentia: Muridae) and *Sylvilagus floridanus* (Lagomorpha: Leporidae).

A description of *A. tigipioensis* was needed because the original description omitted some characters and did not provide sufficient detail for other characters. More specifically, the following items were omitted from the original description: setae between the coxal fields II and III; tarsus of the legs I without a companion seta and  $\epsilon$  distal to  $\omega$ . Here, we are redescribing the species *A. tigipioensis* based on the slides deposited on the Acari Collection of the Instituto Butantan (IBSP). Furthermore, we designate a lectotype and paralectotype for this species.

#### MATERIAL AND METHODS

An examination of the Acari Collection of the Instituto Butantan was carried out, and two specimens of the type series (IBSP 1954) of *Apolonia tigipioensis* were found. The material was recovered according to the technique described by Jaci-

### 3.1 INTRODUCTION

*Apolonia* Torres and Braga, 1938 - a monotypic genus represented by the species *Apolonia tigipioensis* Torres and Braga, 1938, has been reported from Venezuela and northeastern Brazil. This species parasitizes birds, but may parasitize mammals, including humans (Ornelas-Almeida et al. 2007). *Apolonia* was first cited parasitizing *Gallus gallus domesticus* (Galliformes: Phasianidae) by Torres and Braga (1938), and a year later this genus and its respective type species, *Apolonia tigipioensis* Torres and Braga, 1938, were formally described (Torres and Braga 1939). Torres and Braga (1938, 1939) and Carneiro (1949, 1952) reported this species as potential pests on poultry farms, causing nodular lesions, which could lead to the death of their hosts.

According to Torres and Braga (1938), the name of the genus was given in honor of the Secretary of Agriculture of the state of Pernambuco, Brazil, Apolônio Jorge de Faria Sales (1904 - 1982). The specific epithet of the species refers to the place where this chigger was collected - the district of Tejipió, in the municipality of Recife, state of Pernambuco (Torres and Braga 1938). This species was recorded three more times parasitizing wild birds in Pernambuco state. Carneiro (1952) recorded *A. tigipioensis* parasitizing *Nothura maculosa cearensis* (Passeriformes: Tinamiformes), as well as biting humans in the municipality of Limoeiro. Ornelas-Almeida et al. (2007) reported this chigger parasitizing *Struthio camelus* (Struthioniformes: Struthionidae) and *Passer domesticus* (Passeriformes: Passeridae) in the municipality of Petrolina.

The only records of *A. tigipioensis* parasitizing mammals were made in Venezuela by Brennan and Reed (1975). These authors found the above species on *Leptonycteris curasoae* (Chiroptera: Phyllostomidae), *Mus musculus* (Rodentia: Muridae) and *Sylvilagus floridanus* (Lagomorpha: Leporidae).

A description of *A. tigipioensis* was needed because the original description omitted some characters and did not provide sufficient detail for other characters. More specifically, the following items were omitted from the original description: setae between the coxal fields II and III; tarsus of the legs I without a companion seta and  $\epsilon$  distal to  $\omega$ . Here, we are redescribing the species *A. tigipioensis* based on the slides deposited on the Acari Collection of the Instituto Butantan (IBSP). Furthermore, we are designated a lectotype and paralectotype for this species.

### 3.2 MATERIAL AND METHODS

An examination of the Acari Collection of the Instituto Butantan was carried out, and two specimens of the type series (IBSP 1954) of *Apolonia tigipioensis* were found. The material was recovered according to the technique described by Jacinavicius et al. (2013), and slide-mounted with Hoyer's medium according to Walter and Krantz (2009). In addition, materials from at the Ohio State Acarology Laboratory (OSAL) and the United States National Museum collections (the latter one housed at the Systematic Entomology Laboratory (USDA-ARS, BARC)) were examined to confirm the identification. The morphological illustrations were made using Leica DFC 500 digital camera attached to an optical microscope Leica DM4000B. Extended focal range images were composed with Leica Application Suite version 2.5.0. The images were prepared with Adobe Photoshop v. 13.0, and Inkscape V.2.

For descriptions of the specimens, we relied on the terminology of Goff et al. (1982), with adaptations (Stekolnikov 2008, Stekolnikov and Daniel 2012). For the description of specialized and opisthosomal setae and prodorsal sclerite setae we adopted the nomenclature proposed by Kethley (1990), Wohltmann et al. (2006, 2007), and Bassini-Silva et al. (2017).

### 3.3 SYSTEMATICS

#### **Family Leeuwenhoekiidae Womersley, 1944**

#### **Genus *Apolonia* Torres and Braga, 1938**

*Apollonia* Torres and Braga, 1938: 171; Carneiro 1949: 111 misspelling.

*Apolonia* Torres and Braga, 1938: 172; 1939: 37; Ewing 1944: 347; Womersley, 1945: 97; Wharton 1947: 381; Wharton et al. 1951: 26; Wharton and Fuller 1952: 90; Carneiro 1952: 9; Brennan and Reed 1975: 48; Goff 1983: 5; Brennan and Goff 1977: 556; Goff, Sievert and Sileo 1989: 486; Kudryashova 1998: 28; Brown 2006: 217; Ornelas-Almeida et al. 2007: 375; Jacinavicius et al. 2018: 4; Zajkowska, Moniuszko and Makol 2018: 151.

Type species: *Apolonia tigipioensis* Torres and Braga, 1938

**Diagnosis.** Palptarsus with seven branched setae (plus  $\omega$ ,  $\zeta$ ), odontus trifurcate; prodorsal sclerite with nasus and two *vi* setae; a pair of *se* (= PL) off the prodorsal sclerite; a pair of sternal setae (2a); femur legs I-III each divided into a basifemur and

telofemur; each leg terminated with a pair of claws and a clawlike empodium with onychotriches, genu of the legs I each with two  $\sigma$ .

***Apolonia tigipioensis* Torres and Braga, 1938**

Figs 1-2

*Apollonia tegipioensis* Torres and Braga, 1938: 171; Carneiro, 1952: 1949: 111 misspelling.

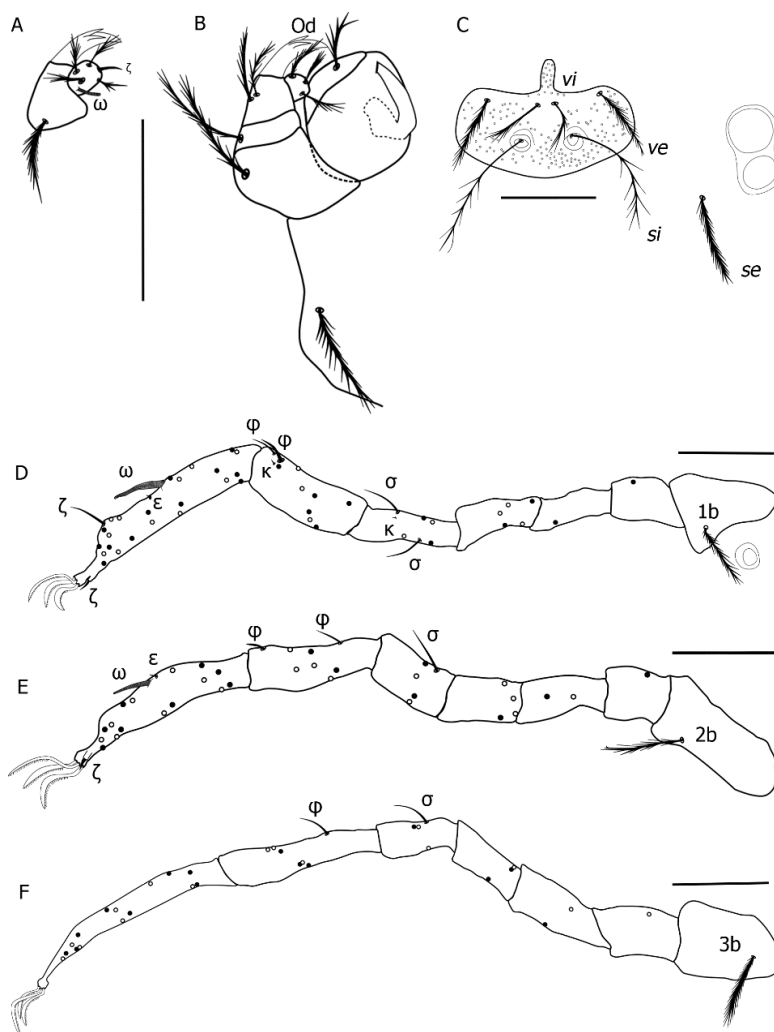
*Apolonia tigipioensis* Torres and Braga, 1938: 171; 1939: 37; Womersley, 1945: 97; Wharton 1947: 381; Wharton *et al.* 1951: 26; Wharton and Fuller 1952: 90; Carneiro 1952: 9; Brennan and Reed 1975: 48; Goff 1983: 5; Goff, Sievert and Sileo 1989: 486; Kudryashova 1998: 28; Brown 2006: 217; Ornelas-Almeida *et al.* 2007: 375; Jacinavicius *et al.* 2018; Zajkowska, Moniuszko and Makol 2018: 151.

**Diagnosis.** All palp setae branched, galeal setae branched; ventral podosoma with setae between the coxal field II and III; tarsus of the legs I with a famulus positioned distal to  $\omega$  and without companion seta; tarsus of the leg III without mastisetae.

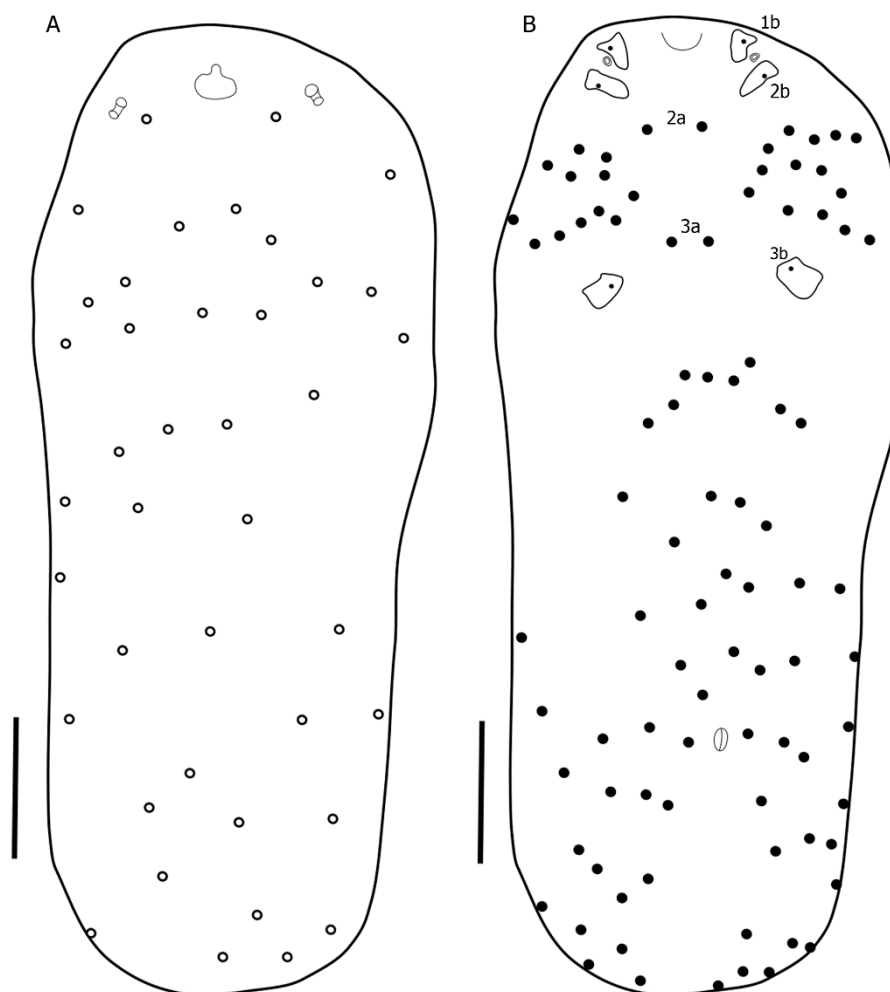
**Redescription:** Larva (Lectotype and Paralectotype). **Gnathosoma** - palp setal formula B/B/BBB/7B $\zeta\omega$ ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate (Figs. 1A-B); galeal setae branched (Fig. 1B). **Idiosoma** - eyes 2/2 set in an ocular plate, anterior eye larger; prodorsal sclerite with 1 pair of flagelliform internal scapular setae or trichobothria (*si*), 1 pair of *vi* (= AM), 1 pair of *ve* (= AL) seta and 1 pair of *se* (= PL) off the prodorsal sclerite; *si* > *se* > *ve* > *vi*; half of the *si* with long and slender setules (Fig. 1C); the anterior margin of the prodorsal sclerite undulating with nasus, and the lateral margins slightly concave, posterior margin concave (Fig. 1C). The idiosoma hypertrichous with 127 setae, 38 dorsal opisthosomal setae not arranged in rows; ventral idiosoma with 89 setae, 2 pairs of sternal setae (2a and 3a), 26 setae between the coxal fields II and III, 30 setae located anterior to the anus and 29 setae located posterior to the anus (Figs. 2A-B). **Legs** - femur legs I-III each divided into a basifemur and telofemur, each leg terminated with a pair of claws and a clawlike empodium, with onychotriches, coxal fields not striate. Leg I - coxal field with 1 branched seta 1b (1B); trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 2  $\sigma$ , with  $\kappa$ ; tibia 8B, 2  $\phi$ , with  $\kappa$ ; tarsus 23B, with  $\omega$ ,  $\varepsilon$ , dorsal eupathid ( $\zeta$ ) without a companion seta (*z*) and terminating with a subterminal eupathid ( $\zeta$ ), famulus ( $\varepsilon$ ) distal to  $\omega$  (Fig. 1D). Leg II - coxal field seta 2b (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu



4B,  $\sigma$ ; tibia 6B, 2  $\phi$ ; tarsus 16B, with  $\omega$ ,  $\varepsilon$ , and a subterminal eupathid ( $\zeta$ ), base of  $\varepsilon$  proximal to  $\omega$  (Fig. 1E). Leg III - coxal field seta 3b (1B) on anterior margin, trochanter 1B; basifemur 2B; telofemur 3B; genu 3B,  $\sigma$ ; tibia 6B,  $\phi$ ; tarsus 15B (Fig. 1F).

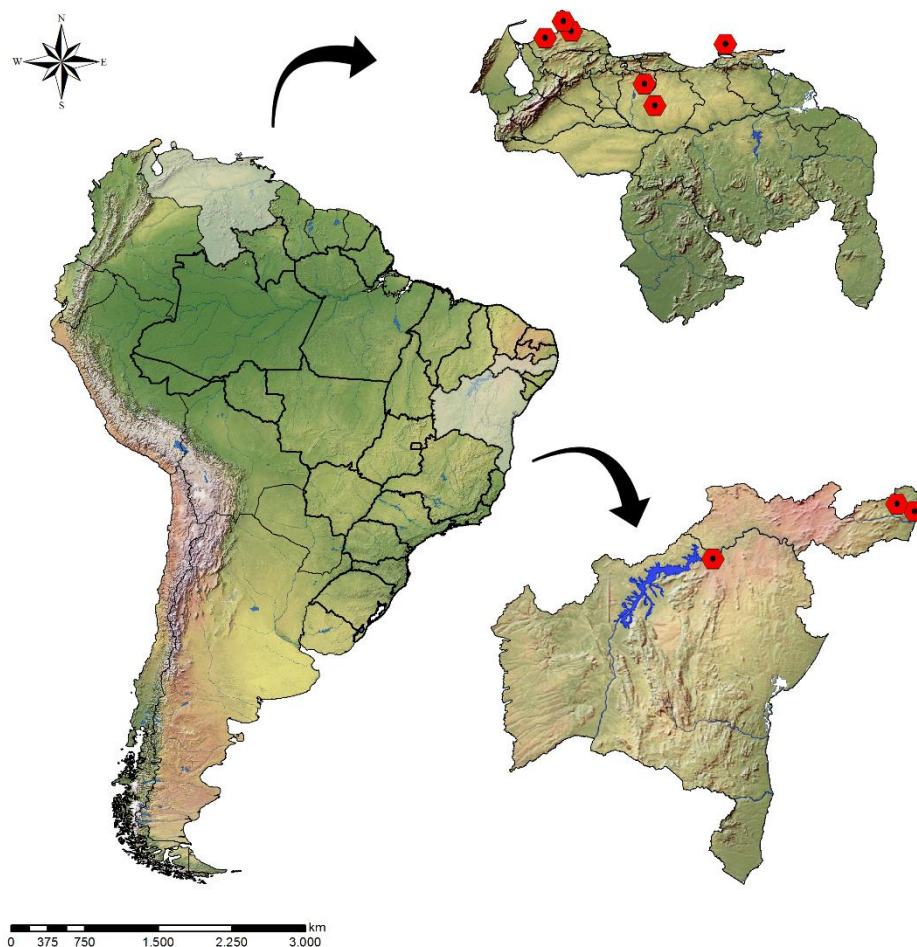


**Figure 1.** Morphological details of *Apolonia tigipioensis*. A. ventral view of palp tarsus; B. dorsal view of gnathosoma; C. prodorsal sclerite; D. Leg I; E. Leg II; F. Leg III; Symbols:  $\zeta$  = eupathid of palp tarsus;  $\omega$  = solenidion of palp tarsus; Od = odontus;  $vi$  = internal vertical setae;  $ve$  = external vertical setae;  $se$  = external scapular setae;  $si$  = internal scapular setae or trichobothria;  $\sigma$  = solenidia on genu of the legs I, II and III;  $\kappa$  = microsetae on genu and tibia of the legs I and II;  $\phi$  = solenidia on tibia of the legs I, II and III;  $\omega$  = solenidion on tarsus of the legs I and II;  $\varepsilon$  = famulus on tarsus of the legs I and II;  $\zeta$  = dorsal eupathid on the tarsus of the leg I, subterminal eupathid on tarsus of the legs I and II; 1b = seta of the coxal field of the leg I; 2b = seta of the coxal field of the leg II; 3b = seta of the coxal field of the leg III; Scales: A-F 50  $\mu\text{m}$ .



**Figure 2.** Morphological details of *Apolonia tigipioensis*. A. dorsal view of idiosoma; B. ventral view of idiosoma. Black spots = ventral setae of the idiosoma; white spots = dorsal setae of the idiosoma. Symbols: 1b = seta of the coxal field of the leg I; 2b = seta of the coxal field of the leg II; 3b = seta of the coxal field of the leg III; 2a = setae between the coxal fields of the leg II; 3a = setae between the coxal fields of the leg III; Scales: A and B 100  $\mu$ m.

**Distribution** (Fig 3). **Brazil** - Tejipló, Recife, Pernambuco ( $8^{\circ} 05' 21.0''$  S,  $34^{\circ} 57' 35.6''$  W) (Torres and Braga 1938); Limoeiro, Pernambuco ( $7^{\circ} 52' 30''$  S,  $35^{\circ} 27' 0''$  W) (Carneiro 1949); and Petrolina, Pernambuco ( $9^{\circ} 23' 34''$  S,  $40^{\circ} 30' 28''$  W) (Ornelas-Almeida et al. 2007). **Venezuela** - Barbacoas, Aragua ( $9^{\circ} 28' 56.09''$  N,  $66^{\circ} 58' 34.13''$  W); Coro, Falcón ( $11^{\circ} 25' 0''$  N,  $69^{\circ} 40' 0''$  W); Capatárída, Falcón ( $11^{\circ} 10' 27''$  N,  $70^{\circ} 37' 0''$  W); Peninsula of Paraguaná, Falcón ( $12^{\circ} 0' 0''$  N,  $70^{\circ} 0' 0''$  W); Guarico ( $8^{\circ} 42' 0''$  N,  $66^{\circ} 36' 36''$  W); and Nueva Esparta ( $10^{\circ} 57' 0''$  N,  $64^{\circ} 0' 36''$  W) (Brennan and Reed 1975).



**Figure 3.** Geographical distribution of *Apolonia tigipioensis* Torres and Braga, 1938. The red spots are the literature records.

**Type material.** 1 larva lectotype (IBSP 1954), ex. *Gallus gallus domesticus* (Galliformes: Phasianidae), Brazil: Tejipió, Recife, Pernambuco, May 1937, coll. S. Torres and W. Braga. 1 larva paralectotype (IBSP 1954), same data.

**Non-type material.** OSAL: 16 larvae, Recife, Pernambuco, Brazil, *G. g. domesticus* (Galliformes: Phasianidae), V-1940, Sylvio Torres coll.; 2 larvae (RML 52788 - OSAL), Coro city, Falcón state, Venezuela, 15-VI-1968, *Sylvilagus floridanus* (Lagomorpha: Leporidae), Smithsonian army coll. USDA-ARS, BARC: 16 larvae (RML 52833), Barbacoas city, Aragua state, Venezuela, 2-III-1966, *Sylvilagus floridanus* (Lagomorpha: Leporidae), Smithsonian army coll.; 19 larvae (RML 52788), Coro city, Falcón state, Venezuela, 15-VII-1968, same host; 10 larvae (RML 53291), same locality and host, 11-VII-1968; 12 larvae (RML 53292), same data; 10 larvae

(RML 53293), same data; 10 larvae (RML 53294), same locality and host, 17-VII-1968; 10 larvae (RML 53295), Falcón, Venezuela, 13-VII-1968, same host; 10 larvae (RML 53296), same data; 5 larvae (RML 53494), same locality and host, 17-VII-1968; 5 larvae (RML 53304), same data; 5 larvae (RML 53298), same locality and host, 15-VII-1968; 9 larvae (RML 53299), same data; 10 larvae (RML 53300), same data; 5 larvae (RML 53301), same data; 10 larvae (RML 53302), same data; 5 larvae (RML 53358), same date; 8 larvae (RML 53359), same locality and host, 16-VII-1968; 10 larvae (RML 53303), same data; 1 larva (RML 53297), same locality, 15-VII-1968, *Oryzomys* sp.; 3 larvae (RML 53574), Capatárida city, Falcón state, Venezuela, 20-VI-1968, *Sylvilagus brasiliensis* (Lagomorpha: Leporidae); 2 larvae (RML 53575), same date; 3 larvae (RML 53576), same locality and host, 1-VII-1968; 9 larvae (RML 53577), same data; 4 larvae (RML 53578), Falcón, Venezuela, same data and host; 4 larvae (RML 52503), Nueva Esparta state, Venezuela, 30-I-1967, same host.

### 3.4 DISCUSSION

The original description did not establish a holotype for *A. tigipioensis* and, according to the recommendation of the ICZN (1999, Articles 72.1 and 74), “all the specimens of the type series are automatically syntypes if neither a holotype nor lectotype has been fixed”. In this way, the specimens that were deposited in the Acari Collection of the Instituto Butantan are syntypes, however we are assigning a lectotype and paralectotype for this species. Besides that, in the redescription of the species *A. tigipioensis*, Vercammen-Grandjean and Koleboniva (1968) just declared presence of the holotype in the United States National Museum collection. However, this slide cited by the authors was not listed in the list of primary or secondary types by Goff (1989), nor was it physically present in the United States National Museum collection.

The genus *Apolonia* is unique due to the combination of the following characters: palptarsus with seven branched setae (plus  $\omega$  and  $\zeta$ ); prodorsal sclerite with nasus and two *vi* setae; a pair of *se* off the prodorsal sclerite; genu legs I each with two  $\sigma$ . *Apolonia* is similar to *Womersia* Wharton, 1947 in having the prodorsal sclerite with nasus and the *se* off the prodorsal sclerite. However, *Womersia* differs in having each genu leg I with only one  $\sigma$  (vs. two  $\sigma$ ); palptarsus with five branched setae without  $\zeta$  (vs. seven branched setae with  $\zeta$ ); and one *vi* setae (vs. two *vi* setae).

*Apolonia* is closer to *Vargatula* Brennan and Yunker, 1966, *Straelensia* Vercammen-Grandjean and Kolebinova, 1968 and *Afropolonia* Goff, 1983 in having:  $\zeta$  on the palptarsus, all palptibia setae branched, odontus trifurcate and *se* off the prodorsal sclerite. But they differ from *Apolonia* in having only one (vs. two)  $\sigma$  on genu of legs I.

The genera *Straelensia* and *Afropolonia* do not have onychotriches or a dorsal eupathid on tarsus leg I (*Apolonia* have both of these structures). In addition, in genera *Straelensia* and *Vargatula*, the palptarsus has five branched setae without the  $\zeta$  (in *Apolonia*, the palptarsus has seven branched setae with  $\zeta$ ).

The redescription of *A. tigipioensis* by Vercammen-Grandjean and Kolebinova (1968), incorrectly reported nude lateral setae on the palptibia and branched companion setae on the tarsus of leg I. Our examination of the types and other materials revealed the lateral setae of the palptibia to be branched and the branched companion setae are only normal setae on the tarsus of the leg I.

Unfortunately, no material of *A. tigipioensis* was available for molecular preparations. However, future samples from the type locality will be used to acquire molecular sequences.

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## 4. CHAPTER 3 - TAXONOMIC NOTES ON *Neoschoengastia esorhina* BRENNAN, 1971 (TROMBIDIFORMES: TROMBICULIDAE), A CHIGGER SPECIES FROM BRAZIL

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### Taxonomic notes on *Neoschoengastia esorhina* Brennan, 1971 (Trombidiformes: Trombiculidae), a chigger species from Brazil

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#### ABSTRACT

*Neoschoengastia* is a genus of chiggers that mainly parasitizes birds and is comprised of more than 70 described species widely distributed throughout the world. Here we improve the description of the species *Neoschoengastia esorhina* based on the type series, also providing drawings of these types. This species is known only from the type series, which was collected in Ananindeua City, Pará State, parasitizing *Automolus infuscatus* (Passeriformes: Furnariidae).

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#### KEYWORDS

Chiggers; ectoparasites; birds; Brazil; redescription

#### Introduction

*Neoschoengastia* Ewing, 1929 (Trombidiformes: Trombiculidae) is widely distributed, with more than 70 described species (Wharton and Hardcastle 1946; Wharton and Fuller 1952; Vercammen-Grandjean 1965; Hoffmann 1990). It usually parasitizes birds, but there are also records of parasitism on mammals and reptiles (Jacinavicius et al. 2020). The main diagnostic characters of this genus are: seven branched setae with ζ on the palptarsus, trifurcate odontus, striations on the subrectangular prodorsal sclerite and two or three σ on the genu of leg I. At present, *Neoschoengastia esorhina* Brennan, 1971 was described from Brazil with no additional records (Brennan 1971). This species was found in the nasal passages of the olive-backed foliage-gleaner, *Automolus infuscatus* (Sclater, 1856) (Passeriformes: Furnariidae) in Ananindeua City, Pará State.

Brennan's (1971) original description of *N. esorhina* was only partially illustrated. In the present study, we redescribe and illustrate *N. esorhina*, based on the type series.

#### Materials and methods

The specimens examined are housed in the Smithsonian National Chigger Collection, National Museum of Natural History, Washington, DC, USA (USNM), located in the Systematic Entomology Laboratory (BARC-USDA-ARS), Beltsville, MD, USA.

Drawings were made using a Leica DM4000B microscope with Phase Contrast. Measurements and character photographs were made using an attached Leica DFC 500 digital camera. Focus stacked images were composed with Leica Application Suite version 2.5.0. Measurements are shown in Tables 1–4. The measurements in Tables 2 and Tables 3 were not provided by Brennan (1971). The figures were prepared with Adobe Photoshop v. 13.0 and Inkscape v.1.0.1. The terminology of the dorsal opisthosomal setae and setae on the prodorsal sclerite follows Grandjean (1939) with adaptations by Kethley (1990), and Grandjean (1935, 1947) for the specialized setae on the legs and palps.

Follows the abbreviations of the collections/institutes used in this manuscript:

**FMNHUSA**, Illinois, Chicago, Field Museum of Natural History Chicago.

**NHMUK** United Kingdom, London, South Kensington, The Natural History Museum [formerly British Museum (Natural History)] (cited in original description as BMNH or BM).

**USNMUSA**, Washington D.C., National Museum of Natural History, [formerly United States National Museum], housed at the Systematic Entomology Laboratory (BARC-USDA-ARS), Beltsville, Maryland, USA.

Paratypes listed in the original description of *N. esorhina* were deposited in the RML (Rocky Mountain Laboratories, Montana, USA) and in the BPBM (Bernice Pauahi Bishop Museum, Hawaii, USA) collections. These are now incorporated in the USNM collection.

#### Systematics Family Trombiculidae Ewing, 1944 *Neoschoengastia* Ewing, 1929

**Type species.** *Schoengastia americana* Hirst, 1921.

***Neoschoengastia esorhina* Brennan, 1971** (Figures 1–5, Tables 1–5)

*Neoschoengastia esorhina* Brennan 1971: 666; Bassini-Silva et al. 2017: 7; Bassini-Silva et al. 2018b: 354; Jacinavicius et al. 2018b: 11

#### Diagnosis

Palpgenu with single-branched seta; dorsal and lateral setae of palptibia nude; ventral setae of palptibia branched; adoral (cs) setae branched; clavate expanded trichobothria (si) with long and thin triangular setules; C row with ten setae; D and E rows with six setae each; F row with four setae; 80 to 84 opisthosomal setae, including 48 to 50 ventral opisthosomal setae; one pair of anterior (1a) and two pairs of posterior sternal setae (3a); base famulus (ε) on Ta I and II distal and proximal to solenidion (ω), respectively; Cx III with two or three setae.

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**NHMUK** United Kingdom, London, South Kensington, The Natural History Museum [formerly British Museum (Natural History)] (cited in original description as BMNH or BM).

**USNM** USA, Washington D.C., National Museum of Natural History, [formerly United States National Museum], housed at the Systematic Entomology Laboratory (BARC-USDA-ARS), Beltsville, Maryland, USA.

Paratypes listed in the original description of *N. esorhina* were deposited in the RML (Rocky Mountain Laboratories, Montana, USA) and in the BPBM (Bernice Pauahi Bishop Museum, Hawaii, USA) collections. These are now incorporated in the USNM collection.

#### 4.3 SYSTEMATICS

##### **Family Trombiculidae Ewing, 1944**

##### ***Neoschoengastia* Ewing, 1929**

**Type species.** *Schoengastia americana* Hirst, 1921.

##### ***Neoschoengastia esorhina* Brennan, 1971**

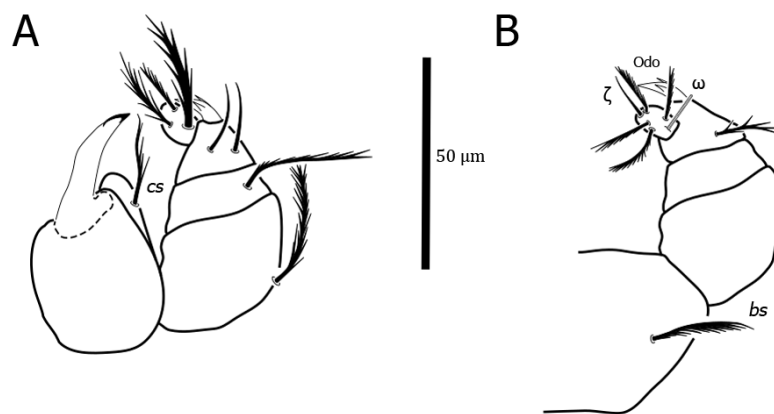
**(Figures 1-5, Tables 1-5)**

*Neoschoengastia esorhina* Brennan 1971: 666; Bassini-Silva et al. 2017: 7; 2018b: 354; Jacinavicius et al. 2018b: 11

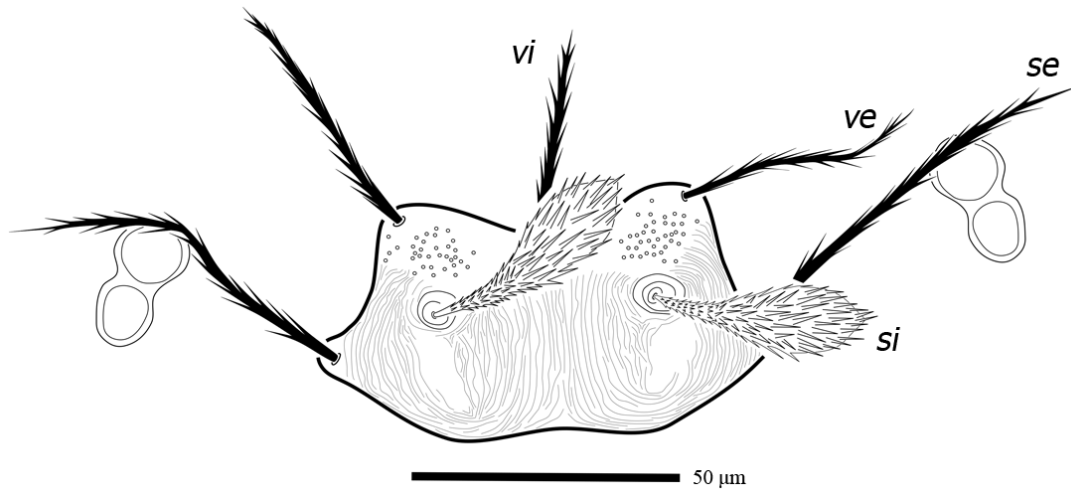
**Diagnosis.** Palpgenu with single branched seta; dorsal and lateral setae of palptibia nude; ventral setae of palptibia branched; adoral (*cs*) setae branched; clavate expanded trichobothria (*si*) with long and thin triangular setules; C row with ten setae; D and E rows with six setae each; F row with four setae; 80 to 84 opisthosomal setae, including 48 to 50 ventral opisthosomal setae; one pair of anterior (*Ia*) and two pairs of posterior sternal setae (*3a*); base famulus ( $\epsilon$ ) on Ta I and II distal and proximal to solenidion ( $\omega$ ), respectively; Cx III with two or three setae.

**Redescription.** Larvae (holotype and 13 paratypes). *Gnathosoma* – fPp = B/B/NNB/7B $\omega$  $\zeta$ ; odontus trifurcate; cheliceral blade with tricuspoid cap; gnathobase with punctations, subcapitular (*bs*) and adoral (*cs*) setae branched (Figs. 1A and B). *Idiosoma* – eyes 2/2, each pair set on ocular plate separate from prodorsal sclerite, anterior lens larger; subrectangular prodorsal sclerite with extensive longitudinal striations from posterior margin about *si* setae, and circular striations around *si* bases, anterior lateral shoulders sparsely punctate (Fig.2 and

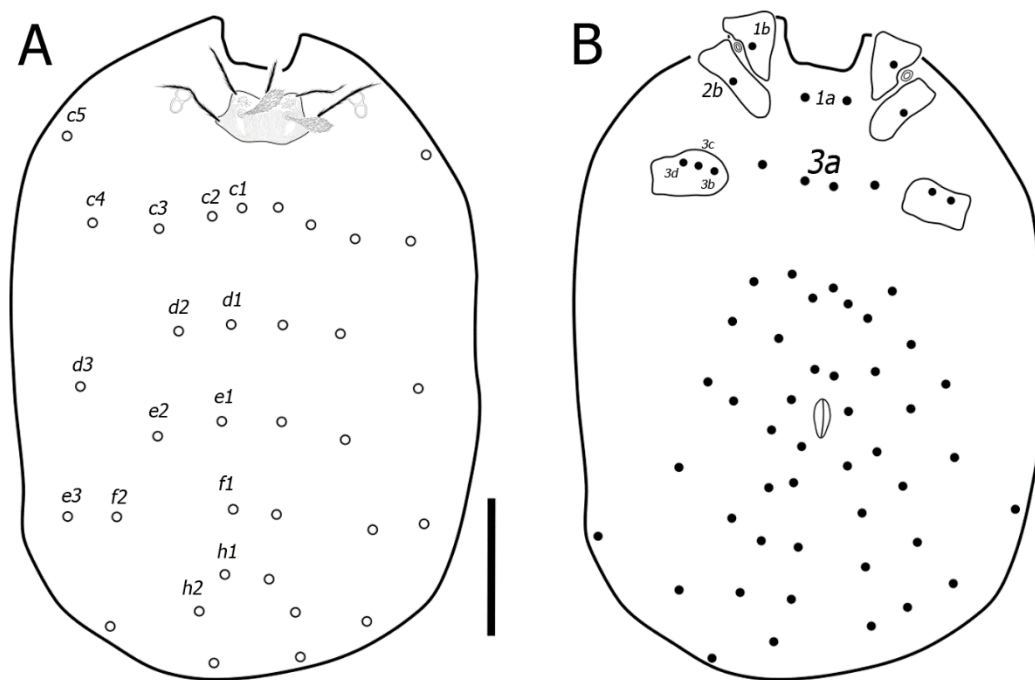
5A), wider than long, with pair of clavate expanded trichobothria (*si*) with long and thin triangular setules, and 5 branched normal setae [pair of *ve* (= AL) seta; pair of *se* (= PL) seta; and single *vi* (= AM) seta];  $se > ve > si > vi$ ; lateral margins of prodorsal sclerite slightly concave and anterior and posterior margins sinuous. Opisthosoma (Figs. 3A and B) with 80 to 84 setae; dorsal opisthosoma with 32 or 34 setae, C row with 5 pairs of setae, with *c*<sub>5</sub> pair in an anterior position (= humeral setae), D row with 3 pairs of setae, E row with 3 pairs of setae, F row with 2 pairs of setae and H row with 2 setae, but can appear to be 3 or 4 pairs due to engorgement or mounting techniques, and 48 to 50 ventral opisthosoma setae (20 setae anterior and 28 to 30 setae posterior to anus). One pair of anterior sternal setae (*1a*) (Fig. 5B) and two pairs of posterior sternal setae (*3a*) (Fig. 5C) between coxal fields I and III. *Legs* – femur of legs I-III each divided into basifemur and telofemur, each leg terminated with pair of claws with onychotriches and claw-like empodium, coxal fields punctate; *Leg I* – coxal field seta *1b* branched (1B); trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3  $\sigma$  and  $\kappa$ ; tibia 8B, 2  $\phi$  at same level of  $\kappa$ ; tarsus 23B with  $\omega$ ,  $\varepsilon$ , dorsal eupathidium ( $\zeta'$ ) without companion seta (*z*) and with subterminal eupathidium ( $\zeta''$ ), base of famulus ( $\varepsilon$ ) distal to solenidion ( $\omega$ ) (Fig. 4A and 5D). *Leg II* – coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B,  $\sigma$ ; tibia 6B, 2  $\phi$  at same level; tarsus 16B with  $\omega$ ,  $\varepsilon$  and subterminal eupathidium ( $\zeta$ ), base of  $\varepsilon$  proximal to  $\omega$  (Fig. 4B). *Leg III* – coxal field seta *3b* (2B or 3B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B,  $\sigma$ , tibia 6B,  $\phi$ ; tarsus 15B (Fig. 4C and D).



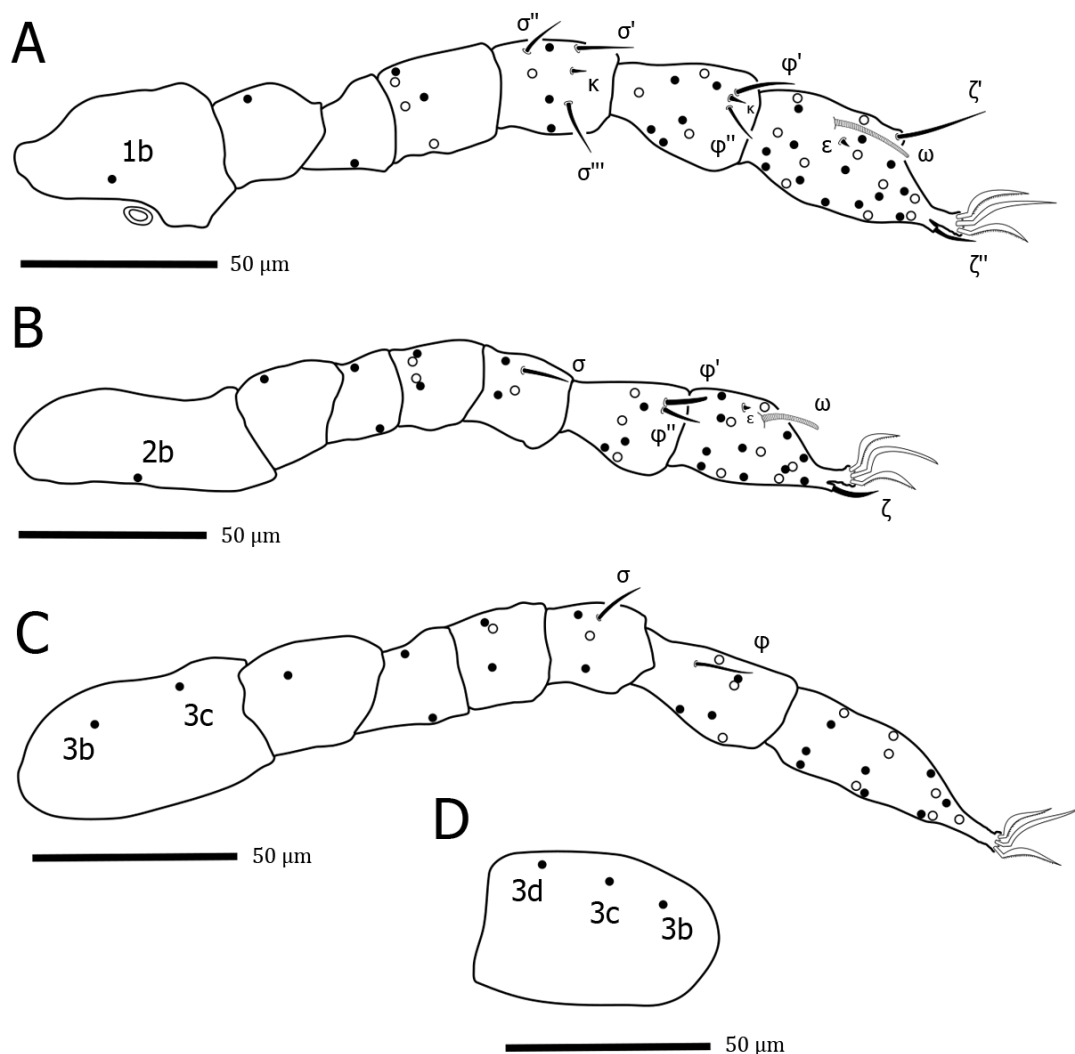
**Figure 1.** *Neoschoengastia esorhina* Brennan, 1971 (Holotype); A – dorsal view of gnathosoma; B – ventral view of palp. Symbols:  $\omega$  = solenidion on palptarsus; Odo = odontus; *cs* = adoral setae; *bs* = subcapitular setae.



**Figure 2.** *Neoschoengastia esorhina* Brennan, 1971 (Holotype); prodorsal sclerite. Symbols: *ve* = external vertical setae; *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular setae (trichobothria). Scales: 50  $\mu\text{m}$ .



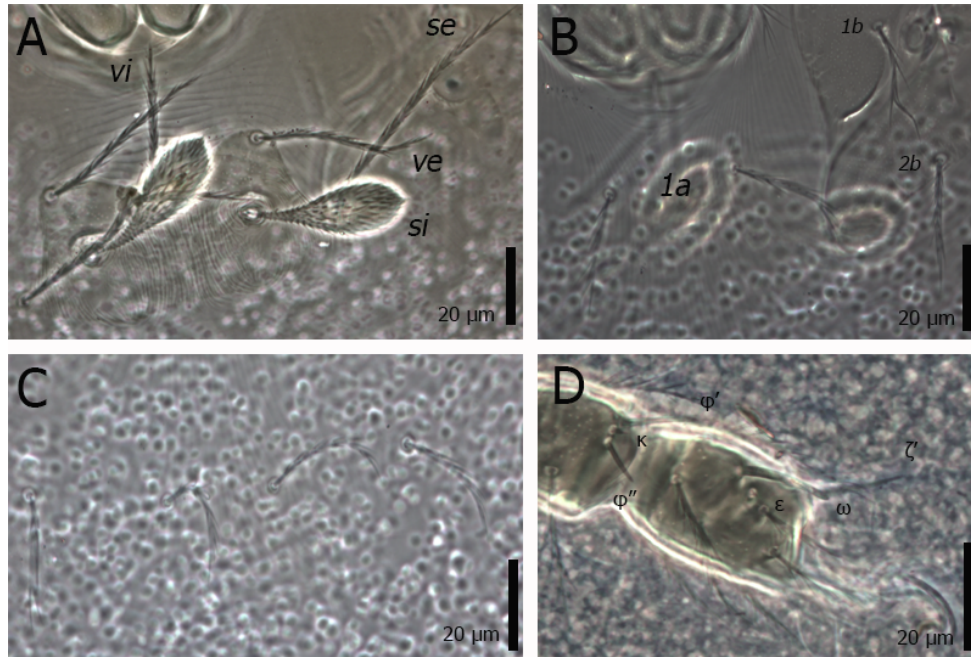
**Figure 3.** *Neoschoengastia esorhina* Brennan, 1971 (Holotype); A – dorsal view of idiosoma; B – ventral view of idiosoma. Solid circles = ventral setae; open circles = dorsal setae; Symbols: *c*<sub>1</sub>-*c*<sub>5</sub> = C row setae; *d*<sub>1</sub>-*d*<sub>3</sub> = D row setae; *e*<sub>1</sub>-*e*<sub>3</sub> = E row setae; *f*<sub>1</sub>-*f*<sub>2</sub> = F row setae; *h*<sub>1</sub>, *h*<sub>2</sub> = H row setae; *1a* = anterior sternal setae; *3a* = posterior sternal setae; *1b* = coxal field I seta; *2b* = coxal field II seta; *3b*, *3c* and *3d* = coxal field III setae. Scales: A and B 100  $\mu\text{m}$ .



**Figure 4.** *Neoschoengastia esorhina* Brennan, 1971 (Holotype); A – Leg I; B – Leg II; C – Leg III (right); D – Left coxal field of the Leg III. Solid circles = ventral leg setae; open circles = dorsal leg setae; Symbols:  $\zeta'$  = dorsal eupathidium on Ta I;  $\zeta''$  = subterminal eupathidium on Ta I;  $\omega$  = solenidion on Ta I and II;  $\sigma$ ,  $\sigma'$ ,  $\sigma''$ ,  $\sigma'''$  = solenidia on Ge I-III;  $\kappa$  = microsetae on Ge and Ti I;  $\phi$ ,  $\phi'$ ,  $\phi''$  = solenidia on Ti I-III;  $\epsilon$  = famulus on Ta I and II;  $1b$  = coxal field I seta;  $2b$  = coxal field II seta;  $3b$ ,  $3c$  and  $3d$  = coxal field III setae. Scales: A-D 50  $\mu\text{m}$ .

**Type examined.** HOLOTYPE: larva (USNMENT01751742). Ananindeua City, Pará State, Brazil; 28 Jul. 1970; ex *Automolus infuscatus* (Sclater) (Passeriformes: Furnariidae); T. H. G. Aitken coll.; RML 56193. PARATYPES: 13 larvae all with same data as holotype (USNMENT01751743, USNMENT01751744, USNMENT01751745, USNMENT01751746, USNMENT01751747, USNMENT01751748, USNMENT01751749, USNMENT01751750, USNMENT01751751, USNMENT01751752, USNMENT01751753); USNMENT01751754; (original number RML 56194); USNMENT01751755 (original number RML 56195).





**Figure 5.** Phase contrast images of *Neoschoengastia esorhina* Brennan, 1971 (Paratype); A – prodorsal sclerite; B – proximal region of the ventral idiosoma; C – posterior sternal setae (*3a*); D – Ti and Ta I. Symbols: *ve* = external vertical setae; *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular setae (trichobothria); *1a* = anterior sternal setae; *1b* = coxal field I seta; *2b* = coxal field II seta;  $\phi'$ ,  $\phi''$  = solenidia on Ti I;  $\kappa$  = microsetae on Ti I;  $\omega$  = solenidion on Ta I;  $\epsilon$  = famulus on Ta I;  $\zeta'$  = dorsal eupathidium on Ta I. Scales: A-D 20  $\mu\text{m}$ .

#### 4.4 DISCUSSION

The species was well described in the original description, but incompletely illustrated, without information about the variation of setae and measurements. In the present study, we show the variation of the measurements and the setal number on the opisthosoma based on the entire type series housed at the USNM collection. Brennan (1971) presented only the holotype data. After examining the types, small differences were noticed between the measurements made by Brennan (1971) and herein presented. Also, the microscope used 50 years ago is completely different from the one now. Thus, measurement variations are dependent on the type of optical instrument used, the mounting media, the taxonomist's accuracy and intraspecific variation. Relying solely on measurements to separate species can be problematic especially when only a few specimens are involved, but should instead complement the species description. The quandary of absolute measurements is that it is necessary that both the species being described and the species being compared be measured



using the same optical instrument and by the same taxonomist. It is worth remembering that here we highlight the use of measures alone, that this does not apply to the use of proportions.

Differences were found when reviewing the original description of *N. esorhina* specifically the number of setae in the rows of dorsal setae on the opisthosoma: 10 setae in C row, 6 in D row, 6 in E row, 4 in F row are the same. However, the apparent variation in the H row, which usually has 2 pairs of setae, is due to ventral setae appearing dorsal due to the degree of engorgement or slide-mounting technique. The individual differences in the type series are displayed in Table 5. The total opisthosomal setae of *N. esorhina* ranges from 80 to 84, which was not reported in the original description. We noticed variation in the number of setae on the coxal field III which was not reported by Brennan (1971). Our examination of the types revealed that this species has two or three setae on the coxal field III. The specimens examined had three setae on the left side and two setae on the right side (Fig. 4C and D).

*Neoschoengastia esorhina* is similar to *Neoschoengastia electron* Brennan and Yunker, 1966 in that both species were collected from birds, the former from Brazil, and the latter from Panama. Both species have the same palpal formula as B/B/NNB, branched adoral setae, and 2 pairs of posterior sternal setae. *Neoschoengastia esorhina* differs from *N. electron* in having 10 setae in C row and a total of 80 to 84 opisthosomal setae, while *N. electron* has 15 setae in C row and more than 95 opisthosomal setae.

Currently, there are 73 chigger species reported from Brazil (Bassini-Silva et al., 2018a; Jacinavicius et al., 2018a; 2019; 2020), and of these, only four are intranasal (Nadchatram, 1970), including two from rodents, *Kymocta brasiliensis* (Fonseca, 1936) and *Kymocta faitkeni* Brennan, 1968, and one from a tamandua, *Rhinibius tamandua* Brennan & Yunker, 1969. Only *N. esorhina* was intranasal in a bird. In a country like Brazil with an enormous biodiversity there are likely to be more bird species with intranasal chiggers.

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**Table 1.** Standard measurements of the types of *Neoschoengastia esorhina* Brennan, 1971. \* measurements made in this study.

	AW	PW	SB	ASB	PSB	SD	P-PL	AP	<i>vi</i>	<i>ve</i>	<i>se</i>	<i>si</i>	<i>1a</i>	<i>3a</i>	DMIN	DMAX	VMIN	VMAX
<b>Brennan, 1971 (H)</b>	58	76	41	22	19	41	-	26	35	47	67	45	-	-	40	66	-	-
<b>Holotype*</b>	54	83	40	18	22	40	12	30	33	48	71	43	36	34	45	70	19	32
<b>Minimum*</b>	50	78	40	17	20	39	11	29	33	44	69	42	33	30	44	-	18	-
<b>Maximum*</b>	54	83	41	18	22	40	12	30	34	48	71	43	36	34	-	72	-	35
<b>Mean*</b>	52	80	40	17	21	38	11	29	34	46	70	42	34	32	-	-	-	-

Legend: AW = distance between the bases of *ve* setae; PW = distance between the bases of *se* setae; SB = distance between the trichobothria (*si*) bases; ASB = distance from trichobothria (*si*) bases to extreme anterior margin of prodorsal sclerite; PSB = distance from trichobothria (*si*) bases to extreme posterior margin of prodorsal sclerite; SD = ASB + PSB; P-PL = distance from posterolateral to extreme posterior margin of prodorsal sclerite; AP = distance between the bases of *ve* and *se*; *vi* = anteromedian seta; *ve* = anterolateral setae; *se* = posterolateral setae; *si* = trichobothria; *1a* = anterior sternal setae; *3a* = posterior sternal setae; DMIN = minimum length of dorsal opisthosomal setae; DMAX = maximum length of dorsal opisthosomal setae; VMIN = minimum length of ventral idiosomal setae; VMAX = maximum length of ventral idiosomal setae.

**Table 2.** Standard measurements of the types of *Neoschoengastia esorhina* Brennan, 1971. Measurements made in this study.

	Cx I	Tr I	BFe I	TFe I	Ge I	Ti I	Ta I (L)	Ta I (W)	Cx II	Tr II	BFe II	TFe II	Ge II	Ti II	Ta II (L)	Ta II (W)	II
<b>Holotype</b>	53	28	23	30	31	37	54	24	59	27	19	24	25	31	44	23	
<b>Minimum</b>	50	28	21	30	30	37	54	23	58	23	19	24	22	30	36	22	
<b>Maximum</b>	58	29	23	34	31	38	58	25	60	27	20	25	25	34	44	23	
<b>Mean</b>	54	28	22	32	30	37	56	22	60	25	20	24	23	32	40	22	

Legend: Cx I - length of coxa on leg I; Tr I - length of trochanter on leg I; BFe I - length of basifemur on leg I; TFe I - length of telofemur on leg I; Ge I - length of genu on leg I; Ti I - length of tibia on leg I; Ta I (L) - length of tarsus on leg I; Ta I (W) - width of tarsus on leg I; Cx II - length of coxa on leg II; Tr II - length of trochanter on leg II; BFe II - length of basifemur on leg II; TFe II - length of telofemur on leg II; Ge II - length of genu on leg II; Ti II - length of tibia on leg II; Ta II (L) - length of tarsus on leg II; Ta II (W) – width of tarsus on leg II.

**Table 3.** Standard measurements of the types of *Neoschoengastia esorhina* Brennan, 1971. Measurements made in this study.

	<b>Cx III</b>	<b>Tr III</b>	<b>BFe III</b>	<b>TFe III</b>	<b>Ge III</b>	<b>Ti III</b>	<b>TaIII (L)</b>	<b>Ta III (W)</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IP</b>
<b>Holotype</b>	57	37	27	24	28	36	54	16	203	170	206	748
<b>Minimum</b>	55	36	27	21	27	32	53	16	200	154	196	713
<b>Maximum</b>	61	40	33	24	29	36	63	18	213	175	225	792
<b>Mean</b>	58	38	30	22	28	34	58	17	207	165	211	753

Legend: Cx III - length of coxa on leg III; Tr III - length of trochanter on leg III; BFe III - length of basifemur on leg III; TFe III - length of telofemur on leg III; Ge III - length of genu on leg III; Ti III - length of tibia on leg III; Ta III (L) - length of tarsus on leg III; Ta III (W) - width of tarsus on leg III; I = length of leg I (trochanter to tarsus); II = length of leg II (trochanter to tarsus); III = length of leg III (trochanter to tarsus); IP - sum of leg lengths.

**Table 4.** Standard measurements of the types of *Neoschoengastia esorhina* Brennan, 1971. \* measurements made in this study.

	$\sigma$ I	$\kappa$ I	$\varphi'$ I	$\varphi''$ I	$\kappa$ I	$\omega$ I	$\varepsilon$ I	$\zeta'$ I	$\zeta''$ I	$\sigma$ II	$\varphi'$ II	$\varphi''$ II	$\omega$ II	$\varepsilon$ II	$\zeta$ II	$\sigma$ III	$\varphi$ III
<b>Brennan, 1971 (H)</b>	11	3	14	9	3	20	2	18	11	12	13	9	14	2	11	14	14
<b>Holotype*</b>	12	4	15	8	4	19	2	22	10	16	11	9	14	2	12	10	15
<b>Minimum*</b>	9	4	14	8	4	19	2	19	10	13	11	9	14	2	12	10	14
<b>Maximum*</b>	12	4	16	12	4	20	2	22	10	16	11	10	15	2	12	11	15
<b>Mean*</b>	10	4	14	10	4	19	2	20	10	14	11	9	14	2	12	10	14

Legend: I =  $\sigma$  I,  $\sigma$  II,  $\sigma$  III = length of the solenidia on genu of the leg I-III;  $\kappa$  I = length of microseta on genu and tibia of the leg I;  $\varphi'$  I,  $\varphi''$  I = length of the solenidia on tibia of the leg I;  $\kappa$  I = length of microseta on tibia of the leg I;  $\omega$  I = length of solenidion on tarsus of the leg I;  $\varepsilon$  I = length of famulus on tarsus of the leg I;  $\zeta'$  I = length of dorsal eupathidium on tarsus of the leg I;  $\zeta''$  I = length of subterminal eupathidium on tarsus of the leg I;  $\varphi'$  II,  $\varphi''$  II = length of the solenidia on tibia of the leg II;  $\omega$  II = length of solenidion on tarsus of the leg II;  $\varepsilon$  II = length of famulus on tarsus of the leg II;  $\zeta$  II = length of subterminal eupathidium on tarsus of the leg II;  $\varphi$  III = length of solenidion on tarsus of the leg II

**Table 5.** Numbers of opisthosomal setae. (H) represents the holotype.

Species	Identifications	C row	D row	E row	F row	Total Dorsals	Preanals	Postanals	Total Ventrals	Total
<i>Neoschoengastia esorhina</i>	USNMENT01751742(H)	10	6	6	4	34	20	28	48	82
	USNMENT01751743	10	6	6	4	34	20	28	48	82
	USNMENT01751744	10	6	6	4	34	20	30	50	84
	USNMENT01751745	10	6	6	4	34	20	28	48	82
	USNMENT01751746	10	6	6	4	32	20	30	50	82
	USNMENT01751747	10	6	6	4	32	20	30	50	82
	USNMENT01751748	10	6	6	4	34	20	30	50	82
	USNMENT01751749	10	6	6	4	32	20	28	48	80
	USNMENT01751750	10	6	6	4	32	20	28	48	80
	USNMENT01751751	10	6	6	4	34	20	28	48	82
	USNMENT01751752	10	6	6	4	34	20	30	50	84
	USNMENT01751753	10	6	6	4	34	20	28	48	82
	USNMENT01751754	10	6	6	4	32	20	30	50	82
USNMENT01751755	10	6	6	4	32	20	30	50	82	



5. CHAPTER 4 - A NEW SPECIES OF THE GENUS *Eutrombicula* EWING, 1938 (TROMBIDIFORMES: TROMBICULIDAE) AND NEW RECORDS FOR THE SPECIES *Eutrombicula batatas* (LINNAEUS, 1758) IN BRAZIL



## A new species of the genus *Eutrombicula* Ewing, 1938 (Trombidiformes: Trombiculidae) and new records for the species *Eutrombicula batatas* (Linnaeus, 1758) in Brazil

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### ABSTRACT

The genus *Eutrombicula* consists of more than 80 known species worldwide. Species of this genus parasitize amphibians, reptiles, birds and mammals. In the present study, we describe *Eutrombicula daemorni* n. sp. collected on the social flycatcher, *Myiozetetes similis* (Passeriformes) from southeast region of Brazil and partial sequence of the 18S gene was obtained for this mite species. In addition, we provide new locality records and hosts for *Eutrombicula batatas* (L.) in Brazil.

**Keywords** new records; chigger mites; bird; host: *Myiozetetes similis*; parasite; Brazil

**Zoobank** <http://zoobank.org/DC1A4B29-31DB-498C-8F9F-63A12E4E7C13>

### Introduction

Currently, the genus *Eutrombicula* Ewing, 1938, is represented by more than 80 species worldwide (Stekolnikov and González-Acuña 2010). Species of this genus have been recorded as parasites of amphibians, reptiles, birds and mammals (Hoffmann 1990). Thirty-seven species of the genus have been recorded from South America; of these, five species were listed from Brazil (Jacinavicius *et al.* 2018). Brazil is divided into five administrative regions: north, northeast, central-west, southeast and south (Contel 2014). *Eutrombicula bruyanti* (Oudemans, 1910) was recorded from the southeast region of the country, while *Eutrombicula goeldii* (Oudemans, 1910) and *Eutrombicula tinami* (Oudemans, 1910) were described from Brazil without specific locality information (Oudemans 1910). However, Jacinavicius *et al.* (2018) recorded *E. tinami* from the state of São Paulo, in the southeast region. The other two species found in Brazil are *Eutrombicula alfreddugesi* (Oudemans, 1910) and *Eutrombicula batatas* (Linnaeus, 1758). Specimens of *E. alfreddugesi* were recorded from the central-west region in

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## 5.1 INTRODUCTION

Currently, the genus *Eutrombicula* Ewing, 1938, is represented by more than 80 species worldwide (Stekolnikov and González-Acuña 2010). Species of this genus have been recorded as parasites of amphibians, reptiles, birds and mammals (Hoffmann 1990). Thirty-seven species of the genus have been recorded from South America; of these, five species were listed from Brazil (Jacinavicius *et al.* 2018). Brazil is divided into five administrative regions: north, northeast, central-west, southeast and south (Contel 2014). *Eutrombicula bruyanti* (Oudemans, 1910) was recorded from the southeast region of the country, while *Eutrombicula goeldii* (Oudemans, 1910) and *Eutrombicula tinami* (Oudemans, 1910) were described from Brazil without specific locality information (Oudemans 1910). However, Jacinavicius *et al.* (2018) recorded *E. tinami* from the state of São Paulo, in the southeast region. The other two species found in Brazil are *Eutrombicula alfreddugesi* (Oudemans, 1910) and *Eutrombicula batatas* (Linnaeus, 1758). Specimens of *E. alfreddugesi* were recorded from the central-west region in the states of Goiás (Carvalho *et al.* 2006) and Mato Grosso (Fonseca 1932); from the northeast region in the states of Bahia (Menezes *et al.*, 2009; Delfino *et al.* 2011) and Maranhão (Faccini *et al.* 2017); and in the southeast region in the states of Minas Gerais (Carvalho *et al.* 2006) and São Paulo (Fonseca 1932). *Eutrombicula batatas* was recorded from the north region, in the states of Amazonas (Ewing 1925) and Pará (Ewing 1925; Bequaert 1926); from the northeast region in the state of Maranhão (Faccini *et al.* 2017); from the central-west region in the state of Mato Grosso (Confalonieri and Benez 1976); and from the southeast region in the state of Rio de Janeiro (Confalonieri and Carvalho 1973).

A new species of *Eutrombicula* is described based on a larva found on a social flycatcher, *Myiozetetes similis* (Aves: Passeriformes: Tyrannidae) collected in Fazenda Volta Grande, Santa Bárbara do Monte Verde Municipality, Minas Gerais state located in the southeast region of Brazil and a partial sequence of the 18S gene was obtained for this species. In addition, new records of localities and hosts for *E. batatas* in Brazil are provided.

## 5.2 MATERIAL AND METHODS

### 5.2.1 Collection of mites and morphological study

Eight specimens (holotype and paratypes) of a chigger (Acari: Trombidiformes: Trombiculidae) were found on one specimen of a bird species, *Myiozetetes similis* (Passeriformes: Tyrannidae), collected with a mist net in Fazenda Volta Grande, Santa Bárbara do Monte Verde (21° 58' S, 43° 41' W, elevation 736 m), Minas Gerais State, Brazil, in September of 2014. The bird was identified using Ridgely and Tudor (2009). Of the material collected and stored in ethanol 100%, two specimens were mounted on slides in Hoyer's medium according to Walter and Krantz (2009) for identification and were deposited in the Acari Collection of the Instituto Butantan (IBSP), four specimens were prepared according to Walter and Krantz (2009) for scanning electron microscopy (SEM) which were coated with gold. After imaging, the specimens were removed from the stubs with acetone and stored in alcohol and deposited in the IBSP collection. The SEM micrographs were obtained with a Digital Scanning Microscope FEI, Quanta 250, located at the Laboratório de Biologia Celular, Instituto Butantan. In addition, two specimens were retained for molecular analysis.

Drawings and measurements of the new species were made with a Leica DFC 500 digital camera. Extended focal range images were composed with Leica Application Suite version 2.5.0. All the measurements are in micrometers ( $\mu\text{m}$ ), followed by the mean and standard deviation. The holotype measurements are highlighted. The images were prepared with Adobe Photoshop v. 13.0, and Inkscape V.2.

Other species from the genus *Eutrombicula* deposited at the IBSP collection was examined for comparison with the new species. The specimens were identified using Brennan and Goff's (1977) key to the genera and Brennan and Reed's (1974) key to species of Venezuela, as well as original descriptions of the species of the genus *Eutrombicula*. For species with incomplete descriptions, such as *Eutrombicula bruyanti* (Oudemans, 1910), *Eutrombicula batatas* (Linnaeus, 1790), *Eutrombicula goeldii* (Oudemans, 1910) and *Eutrombicula tinami* (Oudemans, 1910), we used redescriptions by Oudemans (1912) and Jenkins (1949) and illustrations by Brennan and Reed (1974).

Terminology generally follows Goff *et al.* (1982) with additions and modifications by Stekolnikov 2008, Stekolnikov and Daniel 2012. The nomenclature for specialized and opisthosomal setae follows Kethley (1990), Wohltmann *et al.* (2006, 2007) and Bassini-Silva *et al.* (2017).

## 5.2.2 Molecular analysis

The DNA of two specimens of *Eutrombicula daemoni* n. sp., was extracted using the Guanidine Isothiocyanate lysis protocol (Chomczynski 1993). Each mite was placed in an Eppendorf microtube, and punctured in the idiosomal region with a sterile needle (1.20 \* 40 – 18G). After DNA extraction, the exuvia were recovered, mounted on slides, and kept as vouchers. A conventional PCR targeting a  $\approx$ 500-pb fragment of the 18S ribosomal RNA gene was performed using primers Mite18S-1F (3'-ATATTGGAGGGCAAGTCTGG-5') and Mite18S-1R (3'-TGGCATCGTTTATGGTTAG-5'), as described by Otto and Wilson (2001). Positive samples were pooled and subsequently subjected to a second PCR analysis attempted to target  $\approx$ 560-680-pb fragment of the cytochrome oxidase I gene (COI) using primers bcdF01 (CATTTTCHACTAAAYCATAARGATATTGG) and bcdR04 (TATAAACYTCDGGATGNCCAAAAAA) following the protocol of Dabert *et al.* (2010) and Dabert *et al.* (2008), respectively, with modifications of Moniuszko *et al.* (2015). For each reaction, negative (Milli-Q water free of DNA), and positive controls. All PCRs were performed on a Mastercycler Gradient (Eppendorf® California, USA). PCR products with concentrations higher than 20 ng/ $\mu$ l, were selected and purified with ExoSap-IT (GE Healthcare Pittsburgh, PA). Sanger sequencing of the samples were performed in the “Centro de Pesquisa sobre Genoma Humano e Células Tronco do Instituto de Biociências da USP”. Obtained sequences were assembled with Sequencing Analysis 5.3.1 software and submitted to BLAST analyses (Altschul *et al.* 1990) in order to infer similarities with that of other mites available in GenBank. Different haplotypes were visually discriminated after an alignment using CLUSTAL W algorithm (Thompson *et al.* 1994) implemented in Geneious R9 (Kearse *et al.* 2012).

### 5.2.3 Ethical approval

The bird host of the new species was caught and manipulated in accordance with the recommendations of the Ethical Principles in Animal Experimentation adopted by the Brazilian College of Animal Experimentation (COBEA) and was approved by the Ethics Committee on Animal Experimentation (CEEA) of the Dean of the Universidade Federal de Juiz de Fora, MG (UFJF) – n°042/2012 (SISBio n° 29268-6).

## 5.3 RESULTS

### 5.3.1 Morphological study

The recent material collected consisting the type series, four slide-mounted specimens (two directly mounted after collection, and two after DNA extraction) and four specimens (SEM), that were deposited as voucher at the Acari Collection at the Instituto Butantan (IBSP) under the number IBSP 12374B. The four slide-mounted specimens were used for the measurements and the new species is described below.

In addition, material previously deposited in the IBSP was identified as *Eutrombicula batatas*. These represent the first records of *E. batatas* parasitizing *Nyctibius griseus* (Nyctibiiformes: Nyctibiidae), *Didelphis aurita* (Didelphimorphia: Didelphidae) and *Cavia aperea* (Rodentia: Caviidae) from the following localities: São Paulo and Cotia municipality, São Paulo state; Wenceslau Braz municipality, Parana state; Santa Cruz do Sul municipality, Rio Grande do Sul state and Tucuruí municipality, Pará state.

### ***Eutrombicula* Ewing, 1938**

*Eutrombicula* Ewing, 1938: 293; Loomis & Wrenn, 1984: 152; Domrow & Lester, 1985: 8; Hoffmann, 1990: 42; Stekolnikov & González-Acuña, 2015: 3.

Type species: *Microthrombidium alfreddugesi* Oudemans, 1910

### ***Eutrombicula daemoni* n. sp. Bassini-Silva and Jacinavicius**

**Larva** (Figures 1-5, Table 1, 2 and 3)

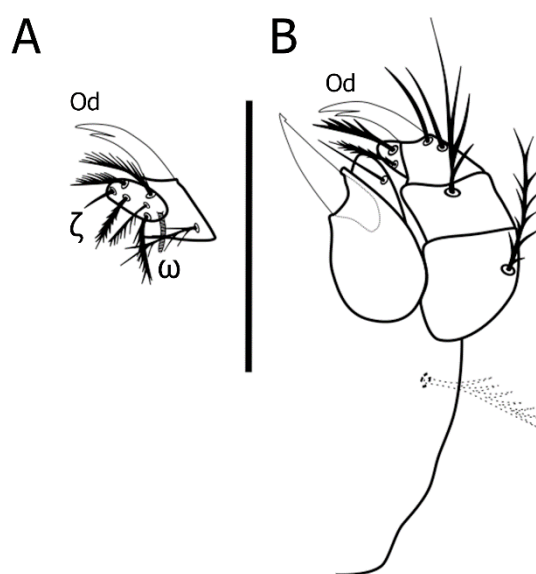
**Diagnosis.** Palptibia with the dorsal and lateral nude setae, and a ventral branched seta, palptarsus with seven branched setae (plus  $\omega$ ,  $\zeta$ ), galeal (adoral) setae nude, odontus bifurcated; the first row (C) of dorsal opisthosoma setae with 10 setae, the second and third rows (D and E) with 8 setae each; genu legs I each with three  $\sigma$ , tarsus of the legs I each with a  $\varepsilon$  positioned distal to  $\omega$ , tibia of the legs III each with two mastisetae, tarsus of the legs III each with four mastisetae.

**Description** (Figures 1-5)

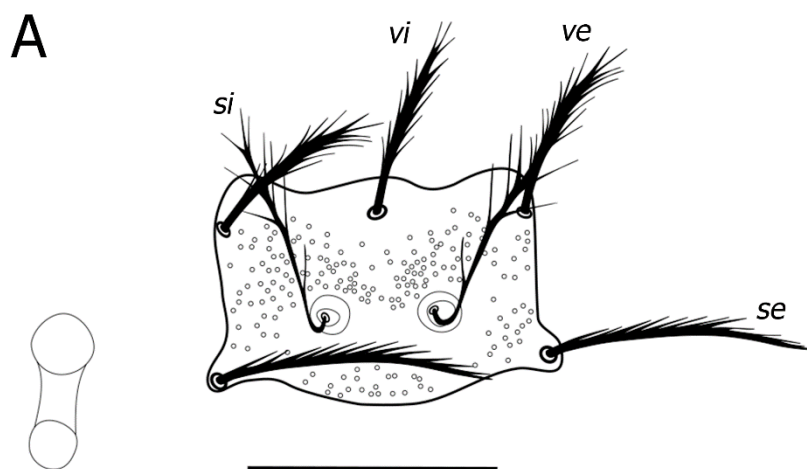
**Gnathosoma** - palp setal formula B/B/NNB/7B $\zeta\omega$ ; odontus bifurcate; cheliceral blade with tricuspid cap; gnathobase punctate (Figs. 1A-B and 5D), galeal (adoral) setae nude (Fig. 1B).

**Idiosoma** – eyes 2/2 set in an ocular plate, anterior eye larger; prodorsal sclerite (= *scutum*) with 1 pair of flagelliform trichobothria (*si*), 1 pair of *ve* (= AL), 1 pair of *se* (= PL) and a

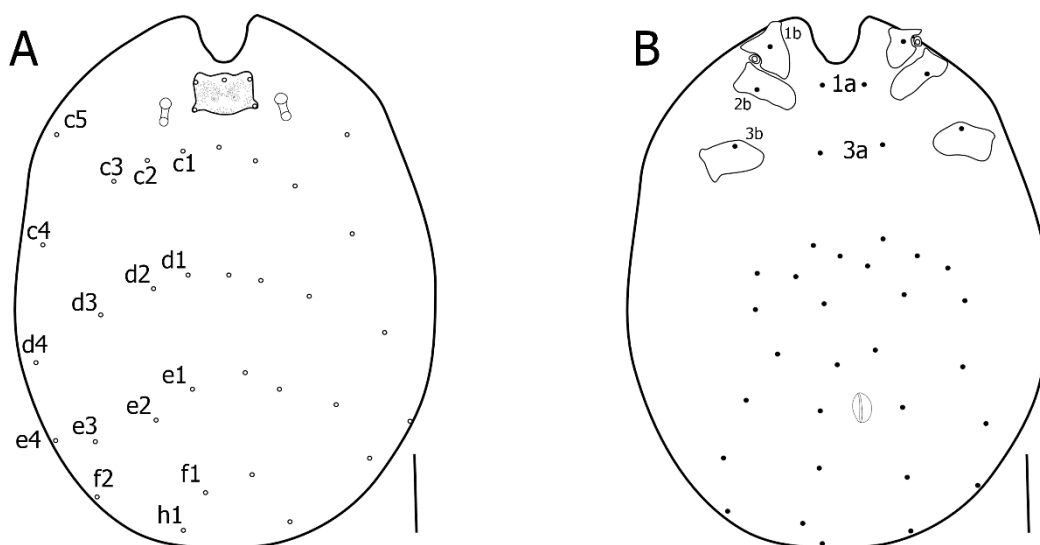
single  $vi$  (= AM) seta,  $si > se > vi > ve$ ; all of the trichobothria with long and slender setules, but not so densely distributed; the anterior margin of the prodorsal sclerite undulating, and the lateral margins slightly concave posteriorly, posterior margin convex and the posterolateral corners are peninsulate each with a  $se$  seta (Figs. 2A and 5C). Sixty two to sixty six idiosomal setae, dorsal opisthosoma with 5 pairs of setae in the C row, with the  $c_5$  pair of seta in an anterior position (= humeral setae), D row with 4 pairs of setae, E row with 4 pairs of setae, F row with 3 pairs of setae, the H row with a pair of  $h_1$  setae, totaling 32 dorsal opisthosomal setae 2 pairs of sternal setae (1a, 3a), and 16 to 18 setae located anterior of the anus and 10 to 12 setae located posterior of the anus, totaling 26 to 30 ventral setae (Figs 3A-B, 5E and Table 1). **Legs** - femur legs I-III each divided into a basifemur and telofemur, each leg terminated with a pair of claws and a claw-like empodium, without onychotriches, coxal fields not striate. *Leg I* – coxal field with 1 branched seta 1b (1B); trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3  $\sigma$  with  $\kappa$ ; tibia 8B, 2  $\phi$  with  $\kappa$ ; tarsus 21B, with  $\omega$ ,  $\epsilon$ , dorsal eupathidium ( $\zeta$ ) with a companion seta  $z$  and terminating with a subterminal eupathidium ( $\zeta$ ), famulus ( $\epsilon$ ) distal to  $\omega$  (Figs. 4A and 5A). *Leg II* – coxal field seta 2b (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B,  $\sigma$ ; tibia 6B, 2  $\phi$ ; tarsus 15B, with  $\omega$ ,  $\epsilon$ , and a subterminal eupathidium ( $\zeta$ ), base of  $\epsilon$  proximal to  $\omega$  (Fig. 4B). *Leg III* – coxal field seta 3b (1B) on anterior margin, trochanter 1B; basifemur 2B; telofemur 3B; genu 3B,  $\sigma$ , tibia 4B,  $\phi$  and 2 mastisetae; tarsus 12B and 4 mastisetae (Figs. 4C and 5B).



**Figure 1.** Morphological details of *Eutrombicula daemonei* n. sp. A. ventral view of palp tarsus; B. dorsal view of gnathosoma. Symbols:  $\zeta$  = eupathidium of palp tarsus;  $\omega$  = solenidion of palp tarsus; Od = odontus. Scales: A and B 50  $\mu$ m.



**Figure 2.** Morphological details of *Eutrombicula daemonei* n. sp. A. prodorsal sclerite. Symbols: *ve* = anterolateral setae; *se* = posterolateral setae; *vi* = anteromedial seta; *si* = trichobothria. Scales: A 50  $\mu$ m.

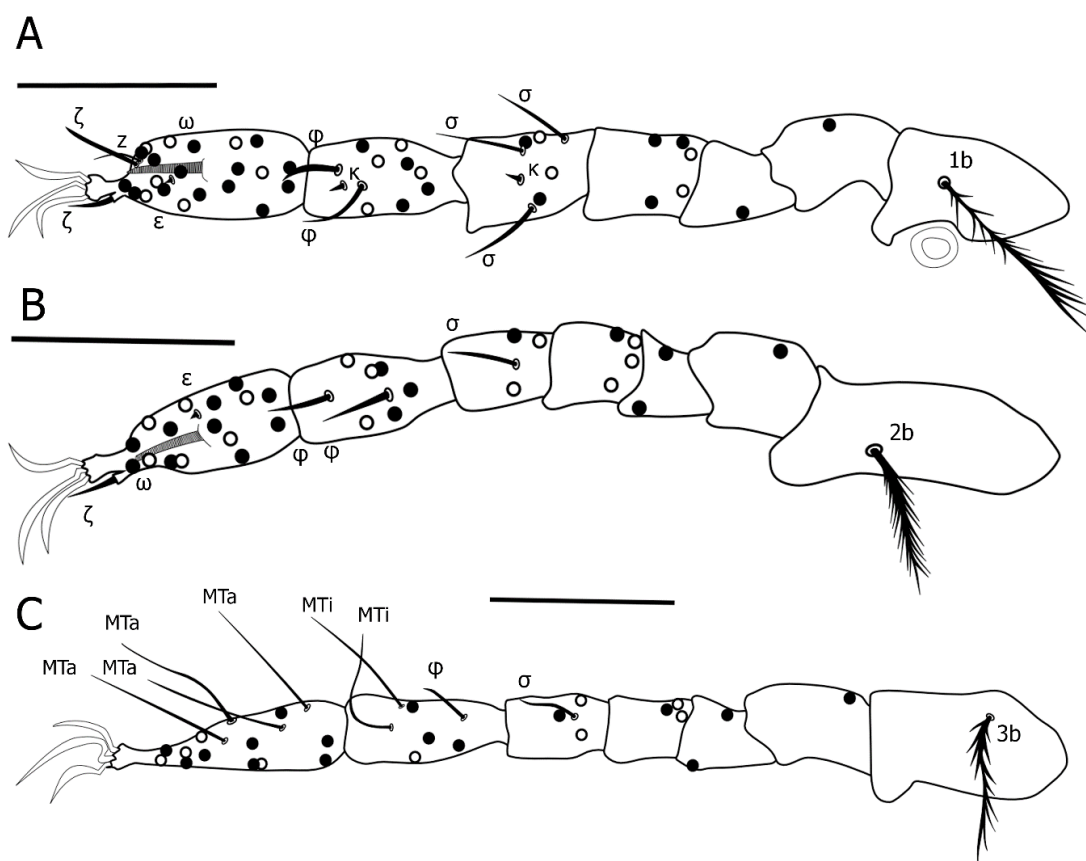


**Figure 3.** Morphological details of *Eutrombicula daemonei* n. sp. A. dorsal view of idiosoma; B. ventral view of idiosoma. Black spots = ventral setae of the idiosoma; white spots = dorsal setae of the idiosoma. Symbols: *c*<sub>1</sub>-*c*<sub>5</sub> = setae of the C row; *d*<sub>1</sub>-*d*<sub>4</sub> = setae of the D row; *e*<sub>1</sub>-*e*<sub>4</sub> = setae of the E row; *f*<sub>1</sub>-*f*<sub>2</sub> = setae of the F row; *h*<sub>1</sub> = setae of the H row; 1a = anterior sternal setae; 3a = posterior sternal setae; 1b = seta of the coxal field of the leg I; 2b = seta of the coxal field of the leg II; 3b = seta of the coxal field of the leg III; Scales: A and B 100  $\mu$ m.

**Table 1.** Number of idiosomal setae of *Eutrombicula daemoni* n. sp. (Total = sum of all columns). Note. The slide IBSP 12374B (1) belongs to the holotype, while the IBSP 12374B (3) and (4) are the paratypes.

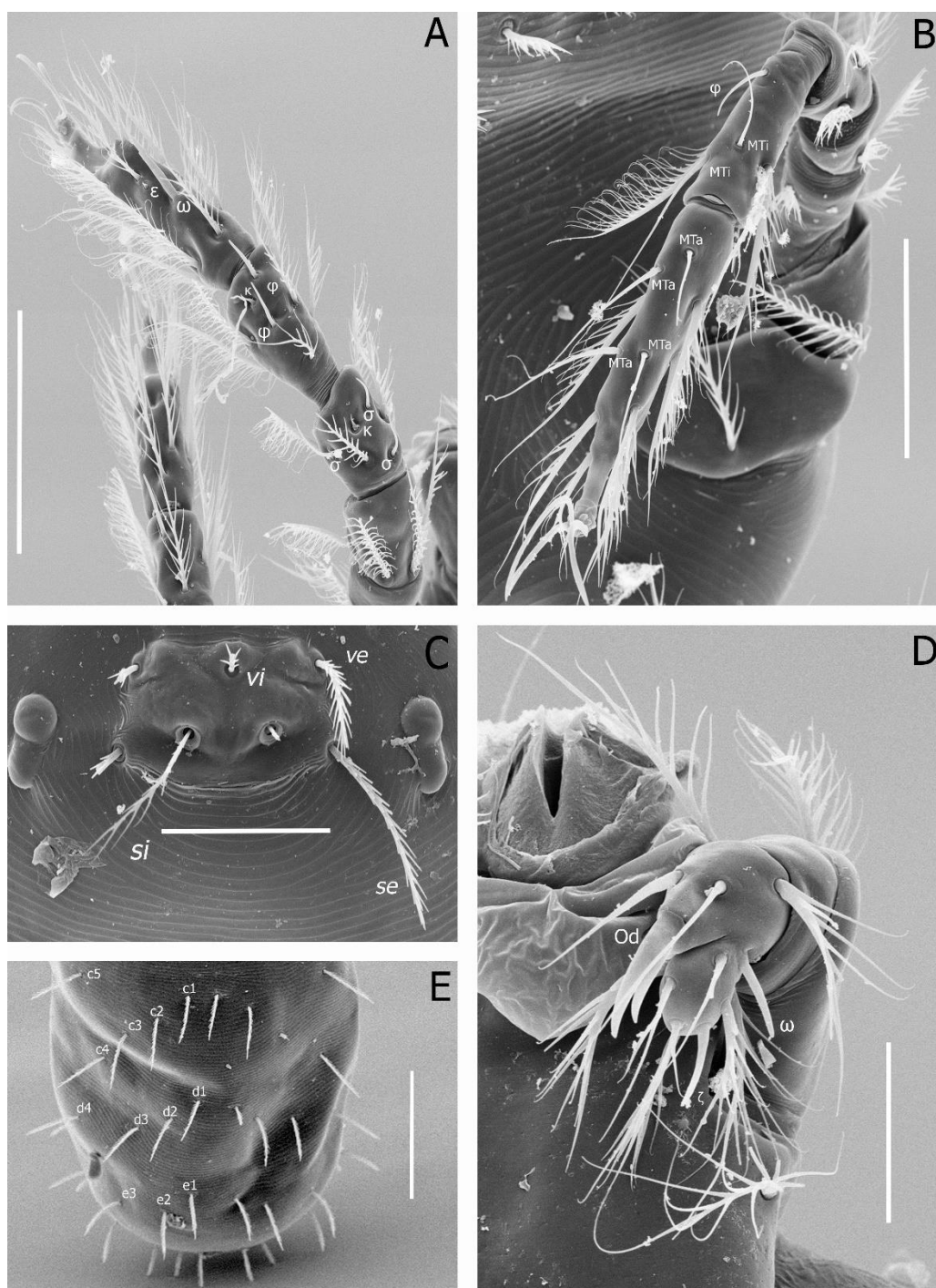
Identifications	C row	D row	E row	F & H rows	Sternals	Ventrals	Total
IBSP 12374B (1) *	10	8	8	6	4	28	64
IBSP 12374B (3) *	10	8	8	6	4	30	66
IBSP 12374B (4) *	10	8	8	6	4	26	62

\*The number in parenthesis represents a collection code.



**Figure 4.** Morphological details of *Eutrombicula daemoni* n. sp. A. Leg I; B. Leg II; C. Leg III. Black spots = ventral setae of the idiosoma; white spots = dorsal setae of the idiosoma. Symbols:  $\sigma$  = solenidia on the genu of the legs I, II and III;  $\kappa$  = microsetae on genu and tibia of the leg I;  $\phi$  = solenidia on the tibia of the legs I, II and III;  $\omega$  = solenidion on the tarsus of the legs I and II;  $\epsilon$  = famulus on the tarsus of the legs I and II;  $\zeta$  = dorsal eupathidium on the tarsus of the leg I, subterminal eupathidium on the tarsus of the legs I and II; z = companion seta on tarsus of the leg I; MTa = mastisetae on tarsus of the leg III; MTi = mastisetae on tibia of the leg III; 1b = seta of the coxal field of the leg I; 2b = seta of the coxal field of the leg II; 3b = seta of the coxal field of the leg III. Scales: A-C 50  $\mu$ m.





**Figure 5.** Morphological details of *Eutrombicula daemonei* n. sp. A. leg I; B. leg III; C. prodorsal sclerite; D. palp tibia and tarsus; E. dorsal opisthosomal setae. Abbreviations and symbols: A -  $\sigma$  = solenidia on the genu of the leg I;  $\kappa$  = microsetae on genu and tibia of the leg I;  $\phi$  = solenidia on the tibia of the leg I;  $\omega$  = solenidion on the tarsus of the leg I and  $\varepsilon$  = famulus on the tarsus of the leg I. B -  $\phi$  = solenidion on the tibia of the leg III, MTi: mastisetae on tibia of the leg III and MTa: mastisetae on tarsus of the leg III. C - *ve*: anterolateral setae; *vi*: anteromedian seta; *se*: posterolateral setae and *si*: trichobothria. D - Od: odontus;  $\zeta$  = eupathidium of palp tarsus and  $\omega$  = solenidion of palp tarsus. E - *c*<sub>1</sub>-*c*<sub>5</sub> = setae of the C row; *d*<sub>1</sub>-*d*<sub>4</sub> = setae of the D row; *e*<sub>1</sub>-*e*<sub>3</sub> = setae of the E row; The scale bars: A 50 $\mu$ m, B-D 40 $\mu$ m, E 100 $\mu$ m.

**Table 2.** Standard measurements of *Eutrombicula daemoni* n. sp. (n=4)

	AW	PW	SB	ASB	PSB	SD	P-PL	AP	vi	ve	se	si	C <sub>5</sub>	1a	3a	DMIN	DMAX	VMIN	VMAX	I	II	III	Ip	TaIII	TaW
<b>Holotype</b>	<b>62</b>	<b>59</b>	<b>23</b>	<b>16</b>	<b>5</b>	<b>21</b>	<b>13</b>	<b>20</b>	<b>32</b>	<b>33</b>	<b>49</b>	<b>57</b>	<b>44</b>	<b>40</b>	<b>38</b>	<b>38</b>	<b>45</b>	<b>26</b>	<b>32</b>	<b>228</b>	<b>216</b>	<b>255</b>	<b>699</b>	<b>65</b>	<b>15</b>
Minimum	59	56	22	14	5	21	10	20	32	30	44	54	43	40	38	36	40	25	30	198	180	222	642	59	13
Maximum	63	67	28	18	8	25	15	26	40	35	51	59	48	43	41	40	46	30	33	237	222	263	706	71	18
Mean	61	61	25	16	7	23	12	23	35	33	49	56	45	41	39	38	43	26	31	222	206	246	674	65	16
SD	1,4	3,8	2,1	1,1	1	1,7	1,5	2,4	2,3	2	2,1	1,7	1,8	1,1	1,2	1,2	2,3	1,9	0,8	12,8	13	13,4	24,7	3,2	1,3

Legend: AW = distance between the bases of the *ve* setae; PW = distance between the bases of the *se* setae; SB = distance between sensillary bases; ASB = distance from sensillary bases to extreme anterior margin of the prodorsal sclerite; PSB = distance from sensillary bases to extreme posterior margin of the prodorsal sclerite; SD = ASB + PSB; P-PL = distance from posterolateral to extreme posterior margin; AP = distance between the bases of *ve* and *se*; *vi* = anteromedial seta; *ve* = anterolateral setae; *se* = posterolateral setae; *si* = trichobothria; C<sub>5</sub> = humeral setae; 1a = anterior sternal setae; 3a = posterior sternal setae; DMIN = minimum length of dorsal opisthosomal setae; DMAX = maximum length of dorsal opisthosomal setae; VMIN = minimum length of ventral idiosomal setae; VMAX = maximum length of ventral idiosomal setae; I = length of leg I; II = length of leg II; III = length of leg III; Ip = sum of leg lengths (coxal field to tarsus); TaIII = length of tarsus of the leg III; TaW = width of tarsus of the leg III.

**Table 3.** Standard measurements of the specialized setae of *Eutrombicula daemoni* n. sp. (n=4)

	$\sigma$ I	$\kappa$ I	$\varphi$ I	$\kappa$ I	$\omega$ I	$\varepsilon$ I	$\zeta$ I	$\sigma$ II	$\varphi$ II	$\omega$ II	$\varepsilon$ II	$\zeta$ II	$\sigma$ III	$\varphi$ III	MTa	MTi
<b>Holotype</b>	<b>15</b>	<b>3</b>	<b>13</b>	<b>3</b>	<b>17</b>	<b>3</b>	<b>13</b>	<b>16</b>	<b>12</b>	<b>11</b>	<b>3</b>	<b>15</b>	<b>20</b>	<b>21</b>	<b>43</b>	<b>48</b>
Minimum	15	3	13	3	15	3	13	15	12	11	3	15	19	20	43	48
Maximum	16	3	14	3	19	4	16	17	13	12	4	17	20	21	46	49
Mean	16	3	14	3	17	3	14	16	12	11	3	16	20	21	44	49
SD	0,3	0,2	0,5	0,1	1,1	0,2	1	0,9	0,3	0,4	0,6	0,6	0,4	0,6	1,2	0,4

Legend:  $\sigma$  I = length of solenidia on genu of the leg I;  $\kappa$  I = length of microseta on genu of the leg I;  $\varphi$  I = length of solenidia on tibia of the leg I;  $\kappa$  I = length of microseta on tibia of the leg I;  $\omega$  I = length of solenidion on tarsus of the leg I;  $\varepsilon$  I = length of famulus on tarsus of the leg I;  $\zeta$  I = length of subterminal eupathidium on tarsus of the leg I;  $\sigma$  II = length of solenidion on genu of the leg II;  $\varphi$  II = length of solenidia on tibia of the leg II;  $\omega$  II = length of solenidion on tarsus of the leg II;  $\varepsilon$  II = length of famulus on tarsus of the leg II;  $\zeta$  II = length of subterminal eupathidium on tarsus of the leg II;  $\sigma$  III = length of solenidion on genu of the leg III;  $\varphi$  III = length of solenidion on tarsus of the leg III; MTa = length of mastisetae on tarsus of the leg III; MTi = length of mastisetae on tibia of the leg III.

Type data (IBSP 12374B)

Holotype: larva, Fazenda Volta Grande, Santa Bárbara do Monte Verde municipality, Minas Gerais state (21° 58'S, 43° 41'W), 25-IX-2014, *Myiozetetes similis* (Passeriformes: Tyrannidae), Maturano, R. coll. Paratypes: seven larvae (IBSP 12374B), same data.

**Etymology.** The name is given in honor to Brazilian researcher Erik Daemon, in recognition of his work on ectoparasites.

#### *Differential diagnosis*

The new species was compared with known Brazilian *Eutrombicula* species and with other South American species in the genus. *Eutrombicula daemonei* n. sp. can be separated from the other South American *Eutrombicula* species by the following combination of the characters: six mastisetae on the leg III - two on the tibia and four on the tarsus (1F and 2B), and five pairs of dorsal opisthosomal C row setae. It is similar to *Eutrombicula batatas*, which has two mastisetae on the tibia of leg III and five pairs of setae ( $c_1-c_5$ ) in C row on the dorsal opisthosoma, but differs in having four mastisetae on tarsus leg III compared to three in *E. batatas*. The new species, has a nude lateral palptibial seta, the inner prong smaller than the outer prong and four mastisetae on the tarsus of the leg III, whereas *Eutrombicula bruyanti* has a forked lateral palptibial seta the odontus with a long inner prong and a short outer prong arising in the middle part of shaft and bearing tarsus of the leg III with only one mastiseta. *Eutrombicula daemonei* n. sp. is similar to *Eutrombicula alfreddugesi* in having a branched ventral palptibial seta, but differs in having the inner prong of odontus arising in the middle part of shaft and four mastisetae on the tarsus of the leg III, whereas *E. alfreddugesi* has the bifurcation of outer prong of the odontus arises subapically to the inner prong, and only a single mastiseta on tarsus of leg III. The new species is also similar to *Eutrombicula tinami* in having branched ventral setae on the palptibia and the shape of the prongs of the odontus, but differs in having two mastisetae on the tibia of leg III (no mastisetae on tibia leg III in *E. tinami*) and four mastisetae on the tarsus of leg III (one mastiseta in *E. tinami*). The shape of the odontus in *Eutrombicula goeldii* is similar to that of the new species, but the new species differs because *E. goeldii* has nude ventral setae on the palptibia while in the new species this seta is branched. In addition, *E. bruyanti*, *E. alfreddugesi*, *E. tinami* and *E. goeldii* have 4 pairs ( $c_1-c_4$ ) of setae in the C row, differing from *Eutrombicula daemonei* n. sp. which has 5 pairs ( $c_1-c_5$ ) of setae in the C row.

We compared the new species to other South American *Eutrombicula* using Brennan and Reed's (1974) key to Venezuelan *Eutrombicula*. The three species most similar to *Eutrombicula daemonei* n. sp. were *Eutrombicula spipi* Brennan and Reed, 1974, *Eutrombicula vacillata* Brennan and Reed, 1974 and *Eutrombicula wolffenbarger* Brennan and Reed, 1974. These three species and the new species have mastisetae in the tibia of leg III, but only the new species and *E. spipi* have 5 pairs ( $c_1-c_5$ ) of setae in the dorsal opisthosomal C row and three *sigma* on leg I [(*E. vacillata* has 6 pairs ( $c_1-c_6$ ) of setae and two *sigma* and *E. wolffenbarger* has 7 pairs ( $c_1-c_7$ ) of setae and two *sigma*]; however, *E. spipi* differs from the new species in having only two mastisetae on the tarsus of the leg III.

Recently, Stekolnikov & González-Acuña (2015) described three new *Eutrombicula* species from Chile, *Eutrombicula nerudai* Stekolnikov & González-Acuña, 2015, *Eutrombicula mistrali* Stekolnikov & González-Acuña, 2015 and *Eutrombicula picunche* Stekolnikov & González-Acuña, 2015. We compared these with the new species. *Eutrombicula nerudai* and *E. mistrali* have one mastiseta on the tarsus of the leg III, a nude seta on the palpgenu, and the outer prong of odontus arising subapically from inner prong, while *E. daemonei* n. sp. has four mastisetae on the tarsus of the leg III, a branched seta on the palpgenu and the odontus arising in the middle part of shaft. *Eutrombicula picunche* and *E. alfreddugesi* differ from the new species by the same characters.

### ***Eutrombicula batatas* (Linnaeus, 1758)**

**New records.** 1 larva (IBSP 349D), Butantan, São Paulo municipality, São Paulo state, 09-VI-1935, "rodent" unidentified (Rodentia: Cricetidae); 1 larva (IBSP 350A), same locality, 06-VI-1935, "rodent" unidentified (Rodentia: Cricetidae); 2 larvae (IBSP 383), same locality, 09-X-1933, *Rattus norvegicus* (Rodentia: Muridae); 5 larvae (IBSP 484C), same locality, 29-X-1933, *Didelphis aurita* (Didelphimorphia: Didelphidae); 1 larva (IBSP 1690), same locality, *Crotophaga ani* (Cuculiformes: Cuculidae); 1 larva (IBSP 1647), Morro Grande, Cotia municipality, São Paulo state, 20-II-1939, "owl" unidentified (Strigiformes; Strigidae); 2 larvae (IBSP 1638), Wenceslau Braz municipality, Parana state, 03-III-1939, *Cavia aperea* (Rodentia: Caviidae); 2 larvae (IBSP 2128), Santa Cruz do Sul municipality, Rio Grande do Sul state, 04-XII-1951, *Hydrochoerus hydrochoeris* (Rodentia: Caviidae); 10 larvae (IBSP 13285), Tucuruí municipality, Pará state, no date, *Nyctibius griseus* (Nyctibiiformes: Nyctibiidae).

### *Molecular analysis*

Two samples (paratypes) of the new species were submitted to PCR and were positive to the 18S gene PCR and amplified two identical fragments of 409-bp (GenBank accession numbers: MG707783 and MG707784). BLAST comparisons of these sequences showed 99.7% (408/409-bp) of identity with homologous sequences from *Eutrombicula splendens* (KP325057) and 99.5% (407/409-bp) from *Quadrasetta brasiliensis* (MF113413; MF113412; KY934464). None of the samples amplified for the COI gene.

In addition, we obtained partial sequences for the 18S gene from the new species. These sequences are the first molecular identification of this genus for Brazil. At this time, it is still not possible to infer molecular differences between species that have a high similarity to *Eutrombicula daemonei* n. sp. based on an analysis of their 18S sequences, due to the slow rate of evolution of this gene, so different genera when compared have high similarity, which reflects that these species belong to a same family of mites.

Unfortunately, there are only these two species of *Eutrombicula* with 18S sequences deposited in Genbank. It is necessary to enrich the gene bank for species of this genus for future comparisons. Until now, we do not have recent material of *E. batatas* for molecular analysis and didn't possible comparisons with the new species.

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6. CHAPTER 5 – *Eutrombicula tinami* (OUDEMANS, 1910)  
(TROMBIDIFORMES: TROMBICULIDAE) IN BRAZIL: A NEGLECTED  
ECTOPARASITE OF SEVERAL ANIMALS INCLUDING HUMANS

**Acarologia**

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*Eutrombicula tinami* (Oudemans, 1910)  
(Trombidiformes: Trombiculidae) in  
Brazil: a neglected ectoparasite of  
several animals including humans

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Original research

ABSTRACT

The genus *Eutrombicula* comprises ca. 80 species worldwide, some of which have been reported as causative agents of severe irritation to the host's skin, known as trombiculiasis. Six species of *Eutrombicula* have been recorded from Brazil until present, with two reports of humans as hosts. In this study, *Eutrombicula tinami* (Oudemans) is redescribed and new records for the states of Minas Gerais, Rio de Janeiro, Santa Catarina and São Paulo as well as new parasite-host associations with Columbiformes, Cuculiformes, Passeriformes, Tinamiformes, Carnivora, Didelphimorphia and Lagomorpha are listed. Besides that, a two detailed report cases of trombiculiasis is provided.

**Keywords** Chiggers; ectoparasites; distribution; hosts; mammals; birds; trombiculiasis

Introduction

Some non-host specific chigger genera (Trombidiformes: Trombiculidae, Leeuwenhoekiiidae and Walchiidae) parasitize several vertebrates groups, including humans (Shatrov 2000). Infestation by these mites can causes severe itching known as trombiculiasis, and there is also a possibility disease transmission (Mullen and OConnor 2002). One genus is *Eutrombicula* Ewing, 1938 with more than 80 species, six of which are recorded in Brazil: *Eutrombicula alfreddugesi* (Oudemans, 1910), *Eutrombicula batatas* (Linnaeus, 1758), *Eutrombicula bruyanti* (Oudemans, 1910), *Eutrombicula daemont* (Bassini-Silva and Jacinavicius, 2018), *Eutrombicula goeldti* (Oudemans, 1910) and *Eutrombicula tinami* (Oudemans, 1910) (Stekolnikov and González-Acuña 2010; Bassini-Silva *et al.* 2018; Jacinavicius *et al.* 2018a).

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## 6.1 INTRODUCTION

Some non-host specific chigger genera (Trombidiformes: Trombiculidae, Leeuwenhoekidae and Walchiidae) parasitize several vertebrates groups, including humans (Shatrov 2000). Infestation by these mites can causes severe itching known as trombiculiasis, and there is also a possibility disease transmission (Mullen and OConnor 2002). One genus is *Eutrombicula* Ewing, 1938 with more than 80 species, six of which are recorded in Brazil: *Eutrombicula alfreddugesi* (Oudemans, 1910), *Eutrombicula batatas* (Linnaeus, 1758), *Eutrombicula bruyanti* (Oudemans, 1910), *Eutrombicula daemonei* (Bassini-Silva and Jacinavicius, 2018), *Eutrombicula goeldii* (Oudemans, 1910) and *Eutrombicula tinami* (Oudemans, 1910) (Stekolnikov and González-Acuña 2010; Bassini-Silva *et al.* 2018, Jacinavicius *et al.* 2018a).

The Neotropical species *E. tinami*, was described from Brazil by Oudemans (1910) and later recorded from Panama (Brennan and Lukoschus 1971), Surinam (Brennan and Lukoschus 1971) and Venezuela (Brennan and Reed 1974), parasitizing birds, rodents and marsupials (Oudemans 1910; Brennan and Lukoschus 1971; Brennan and Reed 1974; 1975; Jacinavicius *et al.* 2018a).

In the northern region of Brazil, locals use the term ‘micuim’ for chiggers, but in the southern region, there is no common name, suggesting most Brazilians including the medical community are unaware of chigger and their medical importance.

Here we redescribe *E. tinami*, with new locality and host records as well as new human trombiculiasis records.

## 6.2 MATERIAL AND METHODS

The Instituto Butantan houses the Acari Collection (IBSP) that receives material from various parts of the country. Specimens deposited in this collection are regularly prepared for identification. Of these, two hundred chiggers belonging to the genus *Eutrombicula*, previously stored in Ethanol (100%) were slide-mounting in Hoyer’s medium and some were prepared for scanning electron microscopy (SEM), both preparations according to Walter and Krantz (2009). Drawings were made with a Leica DFC 500 microscope. Extended focal range images were composed with Leica Application Suite version 2.5.0. The scanning electron microscope photographs were obtained using a Digital FEI-Quanta 250 at the Laboratório de Biologia Celular, Instituto Butantan, São Paulo. The distribution map was prepared using

DIVAGIS. All the images were prepared with Adobe Photoshop v. 13.0, and Inkscape V.2. Species identifications involved using the key by Brennan and Reed (1974), and original species descriptions. Additional sources included redescrptions of *Eutrombicula* by Oudemans (1912), Jenkins (1949) as well as illustrations by Brennan and Reed (1974). The terminology follows Bassini-Silva *et al.* (2018) and Jacinavicius *et al.* (2018b).

In the present study we also report the parasitism by *E. tinami* on two humans, one male 39 y/o and other female 31y/o, who were walking in the Atlantic Rain Forest (45°19'28" W, 23°33'42" S) between 9 am and 12 pm on an unspecified day November 2014.

## 6.3 RESULTS

### 6.3.1 Systematics

The chigger specimens were identified as *E. tinami* (Oudemans, 1910). Additional specimens from Minas Gerais, Rio de Janeiro, Santa Catarina and São Paulo states were studied and used to improve the redescription of *E. tinami* presented below.

#### ***Eutrombicula tinami* (Oudemans, 1910)**

*Microthrombidium tinami* Oudemans 1910: 84; 1912: 24.

*Trombicula tinami*: Methlagl 1928: 216, 223 and 224; Ewing 1931: 10.

*Eutrombicula tinami*: Ewing 1938: 294; Radford, 1942: 67; Fuller, 1952: 133; Brennan and Lukoschus 1971: 44; Brennan and Reed 1974: 710; Brennan and Reed 1975: 52; Loomis and Wrenn, 1984: 158; Jacinavicius *et al.* 2018a: 9.

*Otonyssus tinami*: Buitendijk 1945: 338.

*Eutrombicula (Eutrombicula) tinami*: Vercammen-Grandjean 1965: 32;

#### **Larva** (Figures 1-5, Tables 1 and 2)

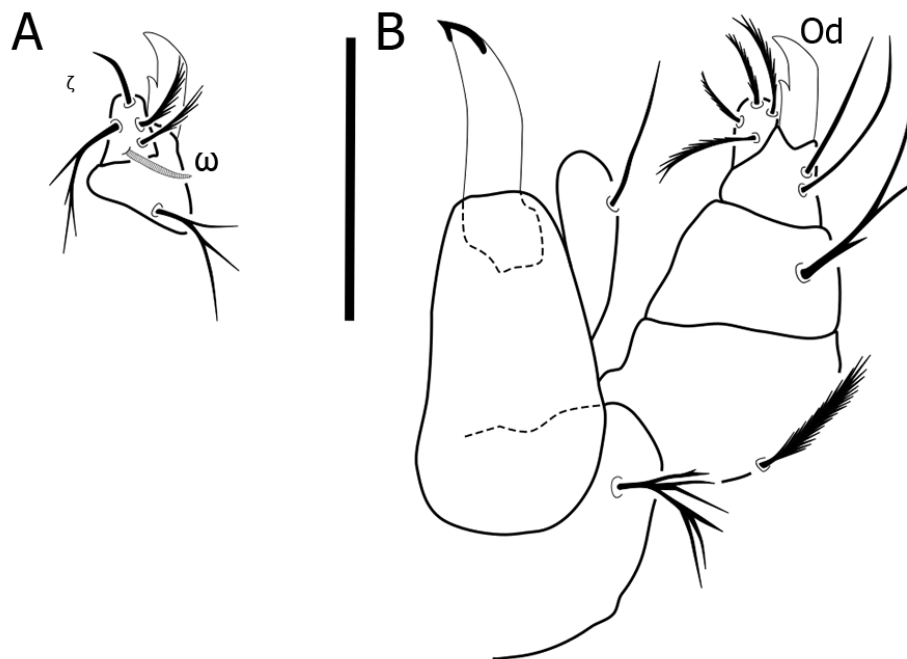
**Diagnosis** — Palptibia with nude dorsal and lateral setae, and a branched ventral seta; adoral setae nude; odontus bifurcate with the inner prong smaller than the outer prong; the first row (C) of dorsal opisthosoma setae with 8 setae; the second row (D) with 6 setae; tarsus of leg I with a  $\varepsilon$  distal to  $\omega$ , tibia of the leg III with one mastiseta.

**Redescription based on examined material** (Figures 1-5)

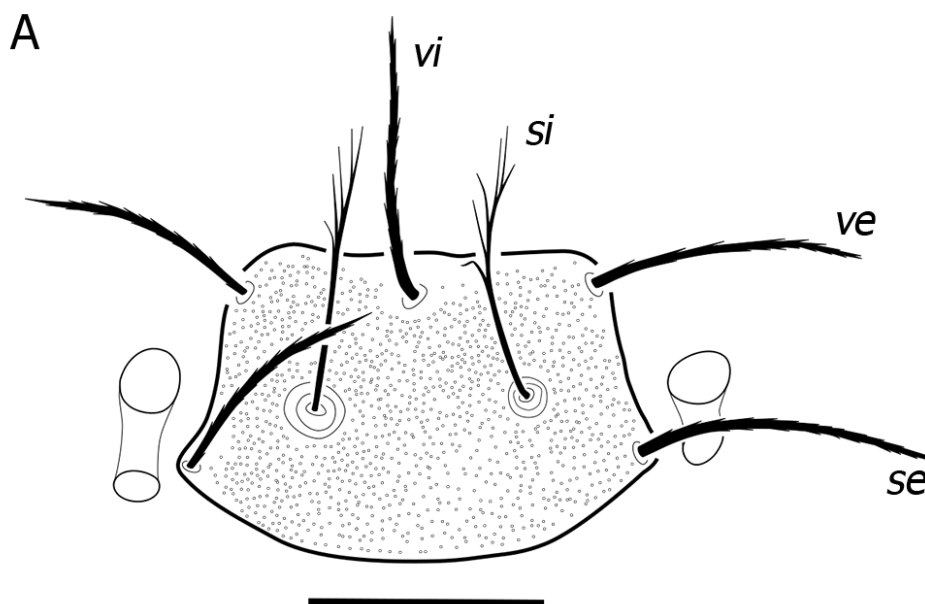
**Gnathosoma** – palp setal formula B/B/NNB/7B $\zeta\omega$ ; odontus (= palpal claw) bifurcate; cheliceral blade with tricuspid cap; gnathobase punctate; subcapitular setae branched, *elcp* not observed (Figs. 1A-B and 5A), adoral (= galeal) setae nude (Fig. 1B).

**Idiosoma** – eyes 2/2 set in an ocular plate, anterior eye larger; prodorsal sclerite (= scutum) with 1 pair of flagelliform trichobothridial (= sensilla) setae (*si*) with widely distributed long and slender setules, and 5 normal setae (a pair of *ve* (= AL), a pair of *se* (= PL) and a single *vi* (= AM) seta), *se* > *ve* > *si* > *vi*; the anterior margin of the prodorsal sclerite slightly undulating, and the lateral margins slightly concave posteriorly, posterior margin convex (Figs. 2A and 5C). Thirty-four opisthosomal setae, dorsal opisthosoma with 4 pairs of setae in the C row, with the *c*<sub>4</sub> pair in an anterior position (= humeral setae), D row with 3 pairs of setae, E row with 1 pair of setae, F row with 1 pair of setae, totaling 18 dorsal opisthosomal setae, and 16 ventral opisthosomal setae (10 setae anterior to the anus and 6 setae posterior) (Figs 3A-B, 5B). Two pairs of sternal setae (1a, 3a) between coxal fields.

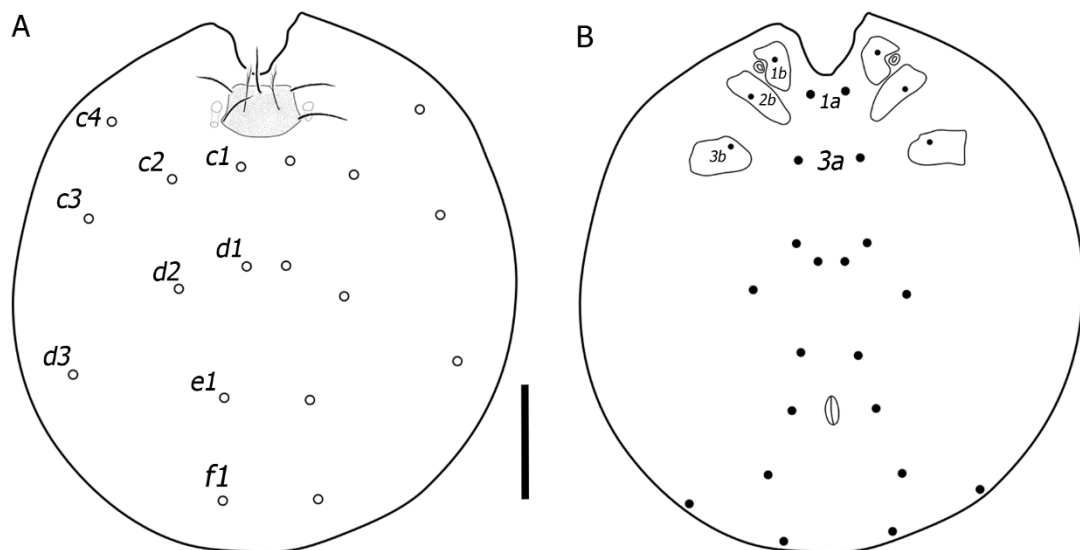
**Legs** – femur legs I-III each divided into a basifemur and telofemur, each leg terminated with a pair of claws and a claw-like empodium, without onychotriches, coxal fields striate. *Leg I* - coxal field with 1 branched seta 1b (1B), *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3  $\sigma$  with  $\kappa$ ; tibia 8B, 2  $\phi$  with  $\kappa$ ; tarsus 21B, with  $\omega$ ,  $\epsilon$ , dorsal eupathidium ( $\zeta'$ ) with a companion seta *z* and terminating with a subterminal eupathidium ( $\zeta''$ ), base of famulus ( $\epsilon$ ) distal to  $\omega$  (Figs. 4A). *Leg II* - coxal field seta 2b (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B,  $\sigma$ ; tibia 6B, 2  $\phi$ ; tarsus 15B, with  $\omega$ ,  $\epsilon$ , and subterminal eupathidium ( $\zeta$ ), base of  $\epsilon$  proximal to  $\omega$  (Fig. 4B). *Leg III* - coxal field seta 3b (1B) on anterior margin, trochanter 1B; basifemur 2B; telofemur 3B; genu 3B,  $\sigma$ , tibia 6B,  $\phi$ ; tarsus 14B and one mastiseta (Figs. 4C and 5E).



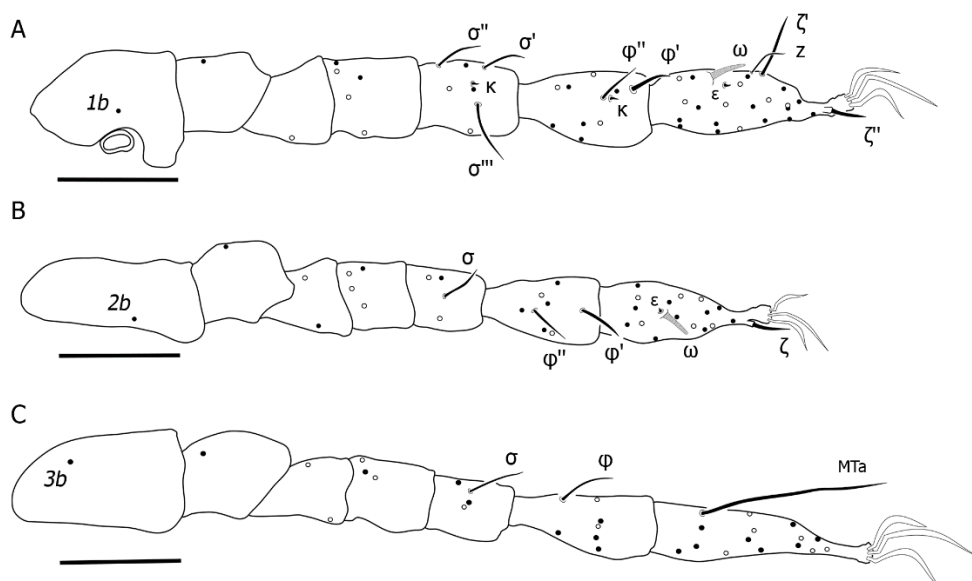
**Figure 1.** Morphological details of *Eutrombicula tinami* (Oudemans, 1910): A – ventral view of palptarsus; B – dorsal view of gnathosoma; symbols:  $\omega$  = solenidion of palptarsus;  $\zeta$  = subterminal eupathid of palptarsus; Od = odontus. Scales: A and B 50  $\mu\text{m}$ .



**Figure 2.** Morphological details of *Eutrombicula tinami* (Oudemans, 1910): A – prodorsal sclerite; symbols: *ve* = external vertical setae; *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular trichobothridial setae. Scales: 50  $\mu\text{m}$ .

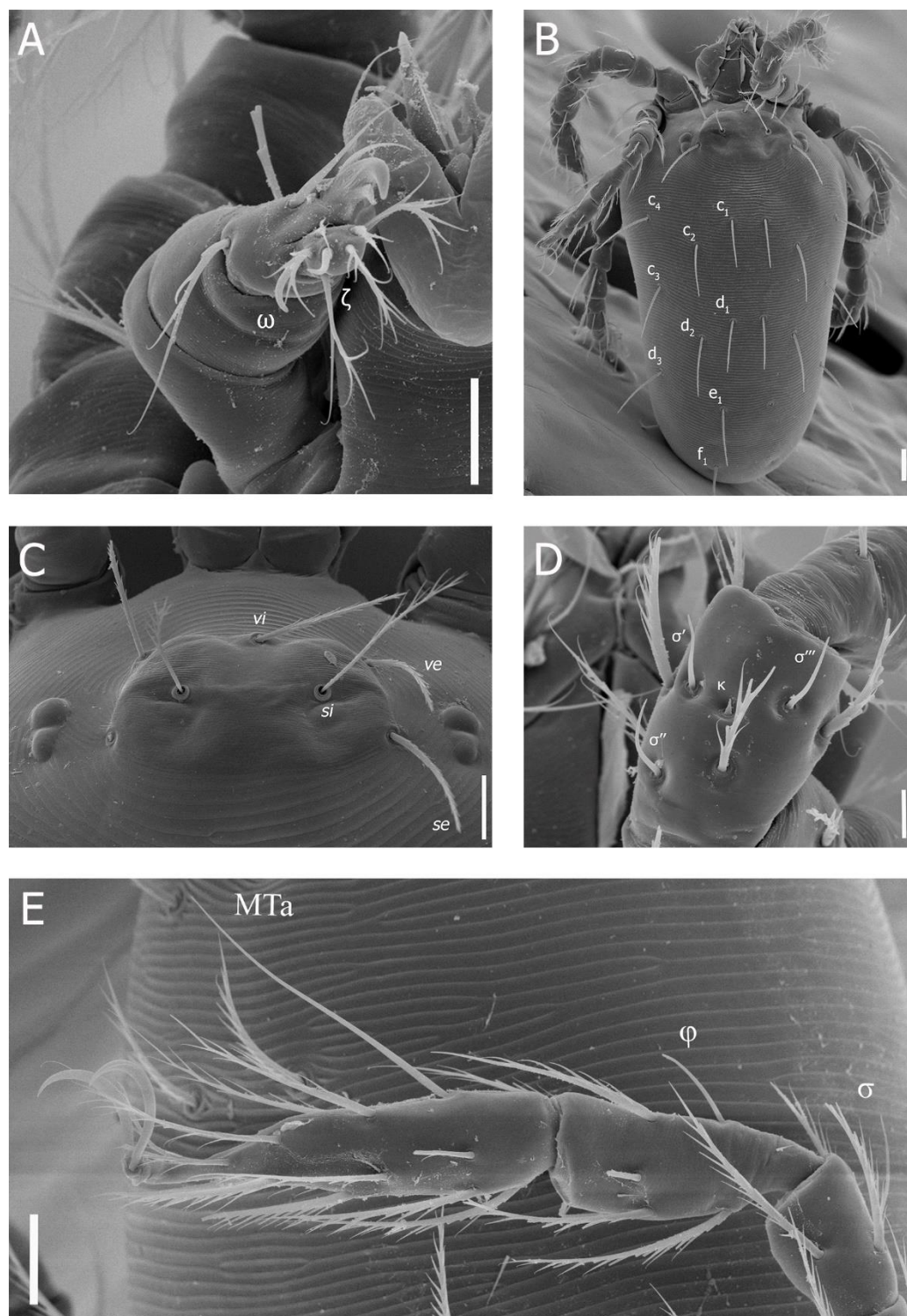


**Figure 3.** Morphological details of *Eutrombicula tinami* (Oudemans, 1910); A – dorsal view of idiosoma; B – ventral view of idiosoma. Solid circles = ventral setae; open circles = dorsal setae. Symbols:  $c_1$ - $c_4$  = C row setae;  $d_1$ - $d_3$  = D row setae;  $e_1$  = E row setae;  $f_1$  = F row;  $1a$  = anterior sternal setae;  $3a$  = posterior sternal setae;  $1b$  = coxal field I seta;  $2b$  = coxal field II seta;  $3b$  = coxal field III seta. Scales: A and B 100  $\mu$ m.



**Figure 4.** Morphological details of *Eutrombicula tinami* (Oudemans, 1910); A – Leg I; B – Leg II; C – Leg III. Solid circles = ventral leg setae; open circles = dorsal leg setae; symbols:  $\zeta'$  = dorsal eupathid tarsus leg I;  $\zeta''$ ,  $\zeta$  = subterminal eupathid tarsus legs I and II, respectively;  $\omega$  = solenidion tarsus legs I and II;  $\sigma$ ,  $\sigma'$ ,  $\sigma''$  and  $\sigma'''$  = solenidia on the genu of legs I, II and III;  $\kappa$  = microsetae on genu and tibia of leg I;  $\phi$ ,  $\phi'$ ,  $\phi''$  = solenidia on tibiae legs I, II and III;  $\epsilon$  = famulus on tarsi of legs I and II;  $z$  = companion seta on tarsi of leg I;  $1b$  = coxal field I seta;  $2b$  = coxal field II seta;  $3b$  = coxal field III seta; MTa = masetae on tarsus leg III. Scales: A-C 50  $\mu$ m.





**Figure 5.** Scanning electron micrographs of *Eutrombicula tinami* (Oudemans, 1910); A – ventral view of palptarsus; B – dorsal view of idiosoma; C – prodorsal sclerite; D – genu of leg I; E – genu, tibia and tarsus of the leg III. Symbols:  $\omega$  = palptarsal solenidion;  $\zeta$  = palptarsal subterminal eupathid;  $c_1$ - $c_4$  = C row setae;  $d_1$ - $d_3$  = D row setae;  $e_1$  = E row setae;  $f_1$  = F row setae;  $ve$  = external vertical setae;  $se$  = external scapular setae;  $vi$  = internal vertical setae;  $si$  = internal scapular trichobothridial setae;  $\sigma$  = solenidia on genu of legs I and III;  $\kappa$  = microsetae on genu of leg I;  $\phi$  = solenidia on tibiae legs III; MTa = mastisetae on the tarsi legs III. Scales: A and D 20  $\mu\text{m}$ ; B 100  $\mu\text{m}$ ; C and E 50  $\mu\text{m}$ .

**Table 1.** Standard measurements of *Eutrombicula tinami* (n=30).

	AW	PW	SB	ASB	PSB	SD	P- PL	AP	<i>vi</i>	<i>ve</i>	<i>se</i>	<i>si</i>	1a	3a	DMIN	DMAX	VMIN	VMAX
Fuller (1952)	76- 77	92	29	35	56- 59	-		38	56- 59	48- 53	62- 63	53- 59	-	-	-	-	-	-
Minimum	78	93	21	44	30	74	23	33	43	46	58	60	57	42	46	54	32	39
Maximum	88	116	29	49	36	85	26	36	46	55	60	64	59	44	50	60	33	45
Mean	83	104	25	46	33	79	24	35	44	50	59	62	58	43	48	57	32	42

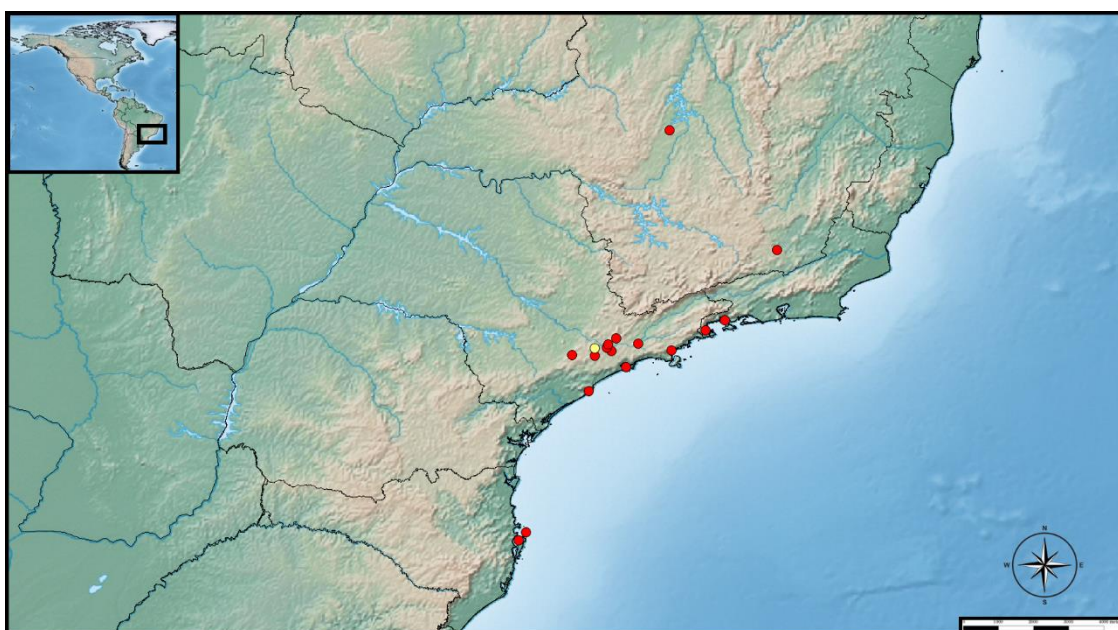
Legend: AW = distance between the bases of the *vi* setae; PW = distance between the bases of the *se* setae; SB = distance between the *si* bases; ASB = distance from the *si* bases to extreme anterior margin of the prodorsal sclerite; PSB = distance from the *si* bases to the extreme posterior margin of the prodorsal sclerite; SD = ASB + PSB; P-PL = distance from posterolateral to extreme posterior margin; AP = distance between the bases of *vi* and *se*; *vi* = anteromedial seta; *ve* = anterolateral setae; *se* = posterolateral setae; *si* = flagelliform trichobothridial setae; 1a = anterior sternal setae; 3a = posterior sternal setae; DMIN = minimum length of dorsal opisthosomal setae; DMAX = maximum length of dorsal opisthosomal setae; VMIN = minimum length of ventral opisthosomal setae and VMAX = maximum length of ventral opisthosomal setae.

**Table 2.** Standard measurements of *Eutrombicula tinami* (n=30).

	I	II	III	Ip	TaIII	TaW	$\sigma$ I	$\kappa$ I	$\varphi$ I	$\kappa$ I	$\omega$ I	$\varepsilon$ I	$\zeta'$ I	$\zeta''$ I	z	$\sigma$ II	$\varphi$ II	$\omega$ II	$\varepsilon$ II	$\zeta$ II	$\sigma$ III	$\varphi$ III
Minimum	289	280	285	865	89	13	17	2	18	3	14	4	23	15	13	18	16	12	4	15	16	18
Maximum	299	285	300	870	97	16	19	2	19	3	15	3	25	17	13	19	20	13	4	16	17	19
Mean	293	282	293	867	94	15	18	2	18	3	15	3	24	16	13	18	18	12	4	15	16	18

Legend: I = length of leg I; II = length of leg II; III = length of leg III; Ip = sum of leg lengths (trochanter to base of pretarsus); TaIII = length of tarsus leg III; TaW = width of tarsus leg III;  $\sigma$  I = average length of the three solenidia on genu of leg I;  $\kappa$  I = length of microseta on genu leg I;  $\varphi$  I = average length of both solenidia on tibia of leg I;  $\kappa$  I = length of microseta on tibia leg I;  $\omega$  I = length of solenidion on tarsus leg I;  $\varepsilon$  I = length of famulus on tarsus leg I;  $\zeta'$  I = length of dorsal eupathidium on tarsus leg I;  $\zeta''$  I = length of subterminal eupathidium on tarsus leg I; z = length of companion seta on tarsus leg I;  $\sigma$  II = length of solenidion on genu leg II;  $\varphi$  II = length of an average of both solenidia on tibia leg II;  $\omega$  II = length of solenidion on tarsus leg II;  $\varepsilon$  II = length of famulus on tarsus leg II;  $\zeta$  II = length of subterminal eupathidium on tarsus leg II;  $\sigma$  III = length of solenidion on genu leg III and  $\varphi$  III = length of solenidion on tarsus leg III.

**Distribution** (Figure 6) — *Minas Gerais (MG) state* - Abaeté (45°26'44" W, 19°09'36" S); Fazenda Continente, Coronel Pacheco (43°15'56" W, 21°35'17" S); *Rio de Janeiro state* - Angra dos Reis (44°19'04" W, 23°00'24" S); Paraty (44°42'46" W, 23°13'04" S); *Santa Catarina state* - Estação Ecológica de Carijós, Florianópolis (48°30'37" W, 27°27'54" S); Reserva Biológica Marinha do Arvoredo, Florianópolis (48°21'23" W, 27°17'57" S); *São Paulo state* - Caraguatatuba (45°19'28" W, 23°33'42" S); Reserva Florestal do Morro Grande, Cotia (46°57'48" W, 23°43'48" S); Vila Verde condominium, Itapevi (46°57'41" W, 23°34'47" S); Sabaúna district, Mogi das Cruzes (46°05'16" W, 23°29'02" S); Barra do Una, Peruíbe (47°04'59" W, 24°27'01" S); Água doce, Piedade (47°25'40" W, 23°42'43" S); Santos (46°20'00" W, 23°57'39" S); Água Funda neighborhood, São Paulo (46°37'24" W, 23°38'04" S); Instituto Butantan, São Paulo (46°43'21" W, 23°33'56" S); Serra da Cantareira, São Paulo (46°31'38" W, 23°22'44" S); Vila Albertina neighborhood, São Paulo (46°41'30" W, 23°30'04" S).



**Figure 6.** Geographical distribution of *Eutrombicula tinami* (Oudemans, 1910) in Brazil. The yellow dot represents a literature record, and red dots are new records.

**Type depository** — According to the original description and Jacinavicius et al. (2018a), the types for this species are deposited at the Naturalis Biodiversity Center, Leiden, Netherlands [formerly Rijksmuseum van Natuurlijke Historie], but Fuller (1952) reported the types were deposited in the Muséum National d'Histoire Naturelle, Paris, France, however they not available for this study.

**Material examined from Brazil** — **Mammals**: 5 larvae (IBSP 1648), Santos, São Paulo (SP), 26-II-1939, *Homo sapiens* L. (Primates: Hominidae), Dr. Tuffy and A. T. Leão coll.; 3 larvae (IBSP 12522), Caraguatatuba, SP, XI-2014, same host, G. F. S. R. Fournier and A. Pinter coll.; 1 larva (IBSP 4673), Instituto Butantan, São Paulo, SP, 1940, same host, A. T. Leão coll.; 1 larva (IBSP 1975), Serra da Cantareira, SP, 12-VIII-1940, *Nasua nasua* L. (Carnivora: Procyonidae), N. Bolognani coll.; 1 larva (IBSP 1680), Vila Albertina neighborhood, São Paulo, SP, 25-II-1938, *Didelphis aurita* Wied-Neuwied (Didelphimorphia: Didelphidae), L. F. Martins coll.; 4 larvae (IBSP 10541), Barra do Una, Peruíbe, SP, 05-XI-2010, same host, F. Nieri-Bastos coll.; 2 larvae (IBSP 352), Instituto Butantan, São Paulo, SP, 24-V-1933, same host; 1 larva (IBSP 11255), Vila Verde condominium, Itapevi, SP, 13-XII-2012, same host, F. C. Jacinavicius coll.; 6 larvae (IBSP 10551), same locality and host, 29-IV-2011, A. Marcili coll.; 4 larvae (IBSP 340), Instituto Butantan, São Paulo, SP, 22-X-1933, *Sylvilagus brasiliensis* (L.) (Lagomorpha: Leporidae); 3 larvae (IBSP 353), same locality and host, 21-V-1932; 1 larva (IBSP 581), same locality and host, VII-1931; 4 larvae (IBSP 1654), Água Funda neighborhood, São Paulo, SP, 07-III-1939, *Hydrochoerus hydrochaeris* L. (Rodentia: Caviidae), Dr. Vallejo coll.; 1 larva (IBSP 10535C), Serra da Cantareira, São Paulo, SP, 12-IV-2011, *Euryoryzomys russatus* (Wagner) (Rodentia: Cricetidae), F. Nieri-Bastos coll.; 1 larva (IBSP 358), Angra dos Reis, Rio de Janeiro (RJ), VI-1931, *Dasyprocta leporina* (L.) (Rodentia: Dasyproctidae), L. Travassos coll.; 1 larva (IBSP 1681), Abaeté, Minas Gerais (MG), 05-VII-1937, *Trinomys* sp. (Rodentia: Echimyidae), E. Chagas coll.; 2 larvae (IBSP 1684), same locality and host, 01-VI-1937, E. Chagas coll.;

**Birds**: 3 larvae (IBSP 370), Instituto Butantan, São Paulo, SP, no date, *Columbina talpacoti* (Temminck) (Columbiformes: Columbidae); 1 larva (IBSP 12732), Paraty, RJ, no date, *Geotrygon montana* (L.) (Columbiformes: Columbidae), L. Moreira-Lima coll.; 4 larvae (IBSP 468), Serra da Cantareira, São Paulo, SP, 16-I-1936, *Leptotila* sp. (Columbiformes: Columbidae); 6 larvae (IBSP 12165), Instituto Butantan, São Paulo, SP, 27-II-2015, *Leptotila verreauxi* (Bonaparte) (Columbiformes: Columbidae), L. Moreira-Lima coll.; 1 larva (IBSP 1689), same locality, 01-IV-1939, *Guira guira* (Gmelin) (Cuculiformes: Cuculidae), J. Navas and A. T. Leão coll.; 2 larvae (IBSP 10944), same data; 2 larvae (IBSP 1673), Sabaúna district, Mogi das Cruzes, SP, 29-I-1939, *Cyanoloxia brissonii* (Lichtenstein) (Passeriformes: Cardinalidae), N. Bolognani coll.; 14 larvae (IBSP 12213A), Paraty, SP, 19-III-2015, *Formicarius colma* Boddaert

(Passeriformes: Formicariidae), L. Moreira-Lima coll.; 1 larva (IBSP 1650A), Sabaúna district, Mogi das Cruzes, SP, 29-I-1939, “unidentified bird” (Passeriformes: Fringillidae), N. Bolognani coll.; 5 larvae (IBSP 372), Instituto Butantan, São Paulo, SP, 12-III-1933, *Mimus saturninus* (Lichtenstein) (Passeriformes: Mimidae), J. Cavalheiro coll.; 1 larva (IBSP 13119), Estação Ecológica de Carijós, Florianópolis, Santa Catarina (SC), 16-XI-2015, *Geothlypis aequinoctialis* (Gmelin) (Passeriformes: Parulidae), C. Lugarini coll.; 1 larva (IBSP 13121), same locality, 9-IV-2016, *Zonotrichia capensis* (Statius Muller) (Passeriformes: Passerellidae), C. Lugarini coll.; 1 larva (IBSP 371), Instituto Butantan, São Paulo, SP, 26-V-1932, same host, J. Cavalheiro coll.; 6 larvae (IBSP 361), Instituto Butantan, São Paulo municipality, São Paulo state, no date, *Chiroxiphia caudata* (Shaw and Nodder) (Passeriformes: Pipridae), J. Cavalheiro coll.; 3 larvae (IBSP 12378), Fazenda Continente, Coronel Pacheco, MG, 09-I-2006, same host, E. Daemon coll.; 1 larva (IBSP 12216B), Paraty, RJ, 20-III-2015, *Pyriglena leucoptera* (Vieillot) (Passeriformes: Thamnophilidae), L. Moreira-Lima coll.; 3 larvae (IBSP 12212), same locality, 16-IV-2015, *Tachyphonus coronatus* (Vieillot) (Passeriformes: Thraupidae), L. Moreira-Lima coll.; 1 larva (IBSP 13695), Estação Ecológica de Carijós, Florianópolis, SC, 17-IV-2017, same host, C. Lugarini coll.; 1 larva (IBSP 13700), same locality and host, 13-XII-2017; 1 larva (IBSP 13123), same locality and host, 1-XII-2015; 1 larva (IBSP 13699), same locality, 13-XII-2017, *Troglodytes musculus* Naumann (Passeriformes: Troglodytidae), C. Lugarini coll.; 2 larvae (IBSP 13706B), Reserva Biológica Marinha do Arvoredo, Florianópolis, SC, 24-I-2018, same host; 4 larvae (IBSP 12218), Paraty, RJ, 19-III-2015, *Turdus albicollis* Vieillot (Passeriformes: Turdidae), L. Moreira-Lima coll.; 1 larva (IBSP 13701), Reserva Biológica Marinha do Arvoredo Florianópolis, SC, 23-I-2018, same host; 1 larva (IBSP 13702), same data; 1 larva (IBSP 13703), same locality and host, 24-I-2018; 1 larva (IBSP 13704), same data; 5 larvae (IBSP 13705), same data; 1 larva (IBSP 363), Instituto Butantan, São Paulo, SP, no date, *Turdus amaurochalinus* Cabanis (Passeriformes: Turdidae); 7 larvae (IBSP 12017B), same locality, 29-I-2015, *Turdus rufiventris* Vieillot (Passeriformes: Turdidae), L. Moreira-Lima coll.; 6 larvae (IBSP 12018A), same data; 7 larvae (IBSP 12160A), same locality and host, 26-III-2015; 3 larvae (IBSP 12176), same data; 5 larvae (IBSP 12177), same data; 6 larvae (IBSP 12178), same data; 3 larvae (IBSP 12181A), same data; 2 larvae (IBSP 12162A), same locality and host, 26-II-2015; 3 larvae (IBSP 12166A), same locality and host, 27-II-2015; 2 larvae (IBSP 12167A), same data; 3 larvae (IBSP 12168), same data; 5 larvae

(IBSP 12169A), same data; 6 larvae (IBSP 12170), same data; 2 larvae (IBSP 12171), same data; 1 larva (IBSP 12172A), same data; 3 larvae (IBSP 12173), same data; 6 larvae (IBSP 12195A), same data; 2 larvae (IBSP 12196A), same data; 6 larvae (IBSP 12183A), same locality and host, 27-III-2015; 7 larvae (IBSP 12184), same data; 2 larvae (IBSP 376), same locality, 3-II-1933, *Tyrannus melancholicus* Vieillot (Passeriformes: Tyrannidae); 2 larvae (IBSP 13698), Estação Ecológica de Carijós, Florianópolis, SC, 13-XII-2017, *Elaenia obscura* (d'Orbigny and Lafresnaye) (Passeriformes: Tyrannidae); 3 larvae (IBSP 1641), Reserva Florestal do Morro Grande, Cotia, SP, 20-II-1939, *Crypturellus obsoletus* (Temminck) (Tinamiformes: Tinamidae), J. Navas coll.; 3 larvae (IBSP 876), Água doce, Piedade, SP, 12-VII-1936, *Tinamus solitarius* (Vieillot) (Tinamiformes: Tinamidae).

### 6.3.2 Notes about the trombiculiasis

The subjects came in contact with larval *E. tinami* in the forest, which were noticed several hours later, around 6:00pm, mainly because of the onset of intense pruritus; at this moment one of the subjects (Author Fournier, G.F.S.R.) had specimens collected by application of adhesive tape, few larvae were collected from the tape at the stereomicroscope and further identified (IBSP 12522).

The clinical signs consisted of areas of papular dermatitis located on the feet, legs, knees, hands, fingers, arms, face and scalp. The lesions were circular, focal and multifocal, with papular inflammatory reaction with a center papule and a hyperemic centrifuge halo of sizes ranging from 1 to 3 cm in diameter, probably caused by exuberant cellular inflammatory reaction with manifests severe pruritus and lasts for over 72 hours as described in other *Eutrombicula* species. No infection symptoms, such as fever, were present. The pruritus ceased after about five days without any medication. Neither subject consulted a physician or used medicine to kill the parasites or control inflammation. Both subjects used physical removal with a hard bath sponge during a shower about 10 hours after exposure, but it was not evaluated whether this action was efficient or not. Both subjects experienced the same symptoms and skin manifestations. Figure 7 shows the inflammatory papules on the female subject 24 hours after exposure.





**Figure 7.** Lower leg of female bitten by *Eutrombicula tinami* (Oudemans, 1910). The arrows show the areas of papular dermatitis.

#### 6.4 DISCUSSION

Host records suggest some *Eutrombicula* species are not host specific. This applies to *E. tinami*, which has been reported from multiple species of birds, rodents and marsupials (Oudemans 1910; Brennan and Lukoschus 1971; Brennan and Reed 1974, 1975; Jacinavicius et al. 2018a).

Prior to this study *E. tinami* had been reported from only five hosts, *Didelphis marsupialis* from Surinam (Brennan and Lukoschus 1971) *Proechimys semispinosus* from Panama (Brennan and Lukoschus 1971), *Marmosa robinsoni* from Venezuela (Brennan and Reed 1974), *Didelphis aurita* from Brazil (Jacinavicius et al. 2018a) and the original host, *Crypturus noctivagus*, also from Brazil (Oudemans 1910). In this



study, we recorded 207 *E. tinami* from 70 individual hosts representing 17 mammals and 53 birds sampled in Brazil. Mammals, including humans accounted for only 20% of the *E. tinami* recovered from hosts. All were new mammalian host records for this species, except for the host species *D. aurita*. Birds are important hosts for Brazilian *E. tinami* accounting for 80% of all the specimens recovered with 20 new host records in 15 families. The bird genus *Turdus* spp. appears to be a common host for *E. tinami* accounting for about half of all birds with *E. tinami* and nearly 60% of all specimens recovered.

This species was also found biting humans and joins *E. alfreddugesi* and *E. batatas*, in causing human trombiculiasis in Brazil.

*Eutrombicula tinami* was described for Brazil without specific locality information (Oudemans 1910). The only other published Brazilian record for this species was from a marsupial collected in the São Paulo, SP (Jacinavicius et al. 2018a). Here, we provide new records from the states of Minas Gerais, Rio de Janeiro, Santa Catarina and São Paulo. This species had Previously published records of this species from Panama (Brennan and Lukoschus 1971), Surinam (Brennan and Lukoschus 1971) and Venezuela (Brennan and Reed 1974) indicating perhaps its distribution includes the neighboring countries.

Although *E. tinami* has been reported from several countries, the two limited redescriptions (Oudemans 1912; Fuller 1952), more than 50 years ago, did not provide enough morphological detail to identify this species. In this study, we provide new figures, SEM images and additional metric data to help identify this species.

The human bite symptoms reported here are similar to those reported by Chaccour (2005) and Faccini *et al.* (2017). The under reporting of trombiculiasis in Brazil is probably due to the difficulty of finding chiggers on a human host or identifying them when they are found. Fonseca (1932) suggested chiggers may vector pathogens in Brazil. Surveys of Brazilian and South America chiggers their hosts and host symptoms are needed to help understand the potential health risks chiggers may present to humans and domestic animals.

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## 7. CHAPTER 6 – THE GENUS *Eutrombicula* EWING, 1938 (TROMBIDIFORMES: TROMBICULIDAE) IN BRAZIL

### 7.1 INTRODUCTION

The genus *Eutrombicula* Ewing, 1938 is currently represented with more than 80 species worldwide parasitizing amphibians, reptiles, birds and mammals. Thirty-eight species have been previously recorded from South America. Of these, nine species were recorded from Brazil, *Eutrombicula alfreddugesi* (Oudemans, 1910); *Eutrombicula batatas* (Linnaeus, 1758); *Eutrombicula bruyanti* (Oudemans, 1910); *Eutrombicula daemonei* Bassini-Silva and Jacinavicius, 2018; *Eutrombicula goeldii* (Oudemans, 1910); *Eutrombicula ophidica* (Fonseca, 1932); *Eutrombicula spipi* Brennan and Reed, 1974; *Eutrombicula tinami* (Oudemans, 1910); and *Eutrombicula tropica* (Ewing, 1925) (Bassini-Silva et al. 2018; 2019; Jacinavicius et al. 2018a,b; 2019; 2020; Mendoza-Roldan et al. 2020; Sampaio et al. 2020). The distribution of these species in Brazil has been discussed by Bassini-Silva et al. (2018; 2019) and Sampaio et al. (2020).

A very important factor of this genus is that several species have already been registered biting humans (Jenkins 1949; Faccini et al. 2017; Bassini-Silva et al. 2019), of the Brazilian species listed above; *E. alfreddugesi* and *E. batatas* was registered in Maranhão State by Faccini et al. 2017. Whereas, *E. tinami* was assigned to the coastal region of São Paulo State by Bassini-Silva et al. (2019), this species was collected directly from the leg of the collector. So far, no species of this genus has been recorded as a possible pathogen vector, but possibly, due to the worldwide presence of these mites, and they can accidentally bite humans, they may become a potential pathogen vector.

In the present study, we redescribe the species *E. alfreddugesi*, *E. goeldii*, and *E. spipi* based on material and types. Additional images of scanning electron microscopy (SEM) for the species *E. batatas* and *E. goeldii* were provided. *Eutrombicula butantanensis* (Fonseca, 1932) which was previously synonymized with *E. alfreddugesi* is now resuscitated, and after examining the type, we are synonymizing *Eutrombicula ophidica* (Fonseca, 1932) with *E. butantanensis*. Also, we are increasing the knowledge about these species on national territory, recording new locality and host records for *E. alfreddugesi*, *E. batatas*, *E. butantanensis* and *E. goeldii*. Finally, four new species of this genus are described and a key for all Brazilian *Eutrombicula* species are provided.

## 7.2 MATERIAL AND METHODS

Slide-mounted and alcohol-preserved specimens housed at the Acari Collection of the Instituto Butantan (IBSP) were examined. The chiggers were identified using existing keys and compared with the original description of the species. Besides that, part of the material in alcohol was prepared for Scanning Electron Microscopy (SEM). The SEM micrographs were obtained with a Digital Scanning Microscope FEI, Quanta 250, located at the Laboratório de Biologia Celular, Instituto Butantan. Also, slide-mounted material deposited in the Smithsonian National Chigger Collection at the National Museum of Natural History, Washington, DC, USA (USNM), located in the Systematic Entomology Laboratory (BARC-USDA-ARS), Beltsville, MD, USA, was examined. And here, represents some of the new records for the species listed below.

Illustrations of the mites were made using Leica DFC 500 digital camera coupled to an optical microscope Leica DM4000B. Extended focal range images were composed using Leica Application Suite version 2.5.0. Drawings were prepared using Inkscape v.1.0.1 software.

The terminology of the dorsal opisthosoma setae and setae on the prodorsal sclerite follows Grandjean (1939) with adaptations by Kethley (1990), and Grandjean (1935; 1947) for the specialized setae on the legs and palps.

In this list, we have four categories of material examined, they are: (1) Type material examined - type specimens (holotype or paratypes) examined from species previously described; (2) Material reexamined - specimens already published, and here, were reexamined, in some cases, their identifications were changed, as explained in the discussion; (3) New records - identified specimens of species already described, these specimens represent new records for locality or host, also they can be from the USNM or IBSP collection; (4) Additional records - identified specimens belonging to the new species described in the present study, as of new species, it would be redundant to say that they are new records, in this way we are placing them in a different category to those said as new records.

## 7.3 RESULTS

### **Family Trombiculidae Ewing, 1944**

#### ***Eutrombicula* Ewing, 1938**

*Eutrombicula* Ewing, 1938: 293; Loomis & Wrenn, 1984: 152; Domrow & Lester, 1985: 8; Hoffmann, 1990: 42; Stekolnikov & González-Acuña, 2015: 3.

Type species: *Microthrombidium alfreddugesi* Oudemans, 1910

**Diagnosis.** Larva. Palptarsus with seven branched setae and  $\omega$ ; odontus bifurcate; cheliceral blade with tricuspid cap; eyes 2/2, separate from prodorsal sclerite; pentagonal prodorsal sclerite; pair of flagelliform trichobothria (*si*), *se* setae on prodorsal sclerite; Fe I–III each divided into basifemur and telofemur; Cx I–III each unisetose; pretarsus with empodium and without onychotriches; Ge I with three solenidia ( $\sigma$ ); Ge II and III each with one solenidion ( $\sigma$ ); Ta I and II with subterminal eupathidium ( $\zeta$ ); Ta I with dorsal eupathidium ( $\zeta$ ), and companion seta (*z*).

### *Eutrombicula alfreddugesi* (Oudemans, 1910)

#### (Figures 1-4)

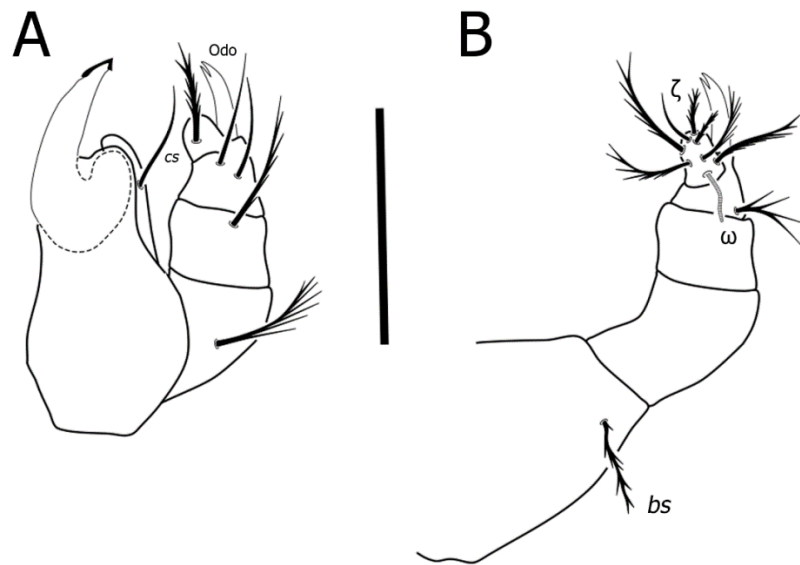
*Microthrombidium alfreddugesi* Oudemans, 1910: 84

To see the full synonymic list of this species, see Fuller, 1952: 101; Jenkins, 1949: 305; Hoffmann, 1990: 44

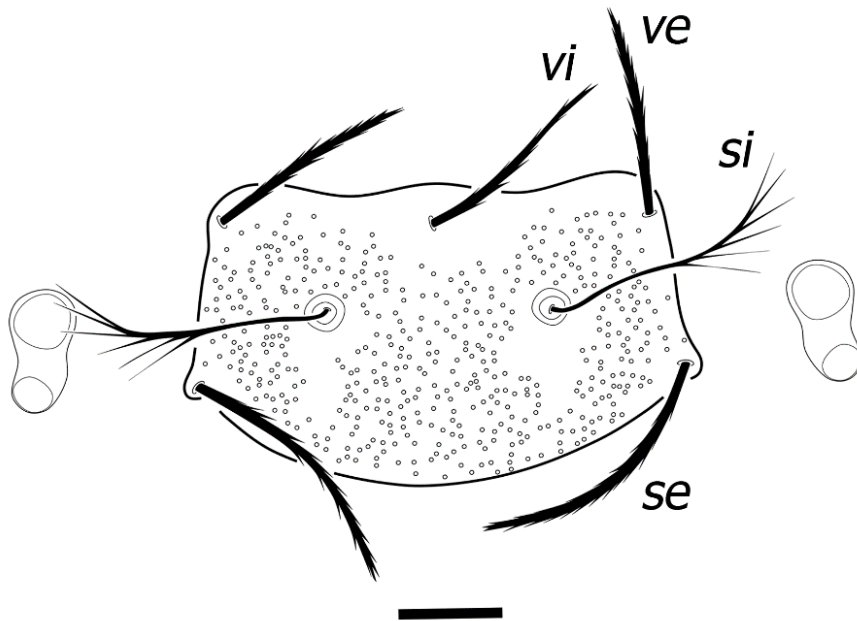
**Diagnosis.** Larva. Palpfemur and palpgenu each with single branched seta; dorsal and lateral setae nude and ventral setae branched on the palptibia; adoral (*cs*) setae nude; odontus bifurcate, outer and inner prongs are almost the same size, divided at the tip of the odontus; flagelliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed; C row with 8 setae; D row with 6 setae; E row with 4 setae each; F row with two setae; with 32 opisthosomal setae including 12 ventral setae; base of famulus ( $\epsilon$ ) on Ta I and II distal and proximal to solenidion ( $\omega$ ), respectively; one mastiseta on Ta III.

**Redescription.** Larvae (material). *Gnathosoma* – fPp = B/B/NNB/7B $\omega$  $\zeta$ ; odontus bifurcate, outer and inner prongs are almost the same size, divided at the tip of the odontus; cheliceral blade with tricuspid cap; gnathobase with few punctuations, subcapitular (*bs*) setae branched and adoral (*cs*) setae nude (Figs. 1A and B). *Idiosoma* - eyes 2/2, anterior lens larger, with ocular plate; subrectangular prodorsal sclerite heavily punctuated, anterior margin slightly sinuous, lateral margin convex and posterior margin of prodorsal sclerite markedly concave (Fig. 2), with flagelliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed, and 5 branched normal setae [pair of *ve* (= AL) seta, single *vi* (= AM) seta and pair of *se* (= PL) seta], *si* > *se*  $\geq$  *ve* > *vi*; Opisthosoma (Figs. 3A and B) with 32 setae; dorsal

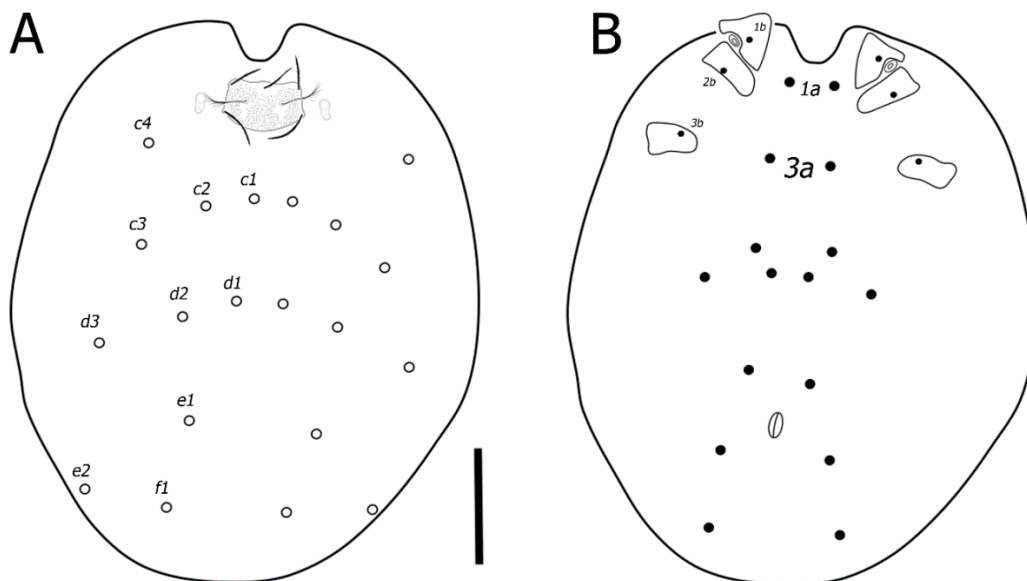
opisthosoma with 20 setae, C row with 4 pairs of setae, D row with 3 pairs of setae, E row with 2 pairs of setae, F row with one pair of setae, and 12 ventral opisthosomal setae with 8 setae anterior to anus and 4 setae posterior to the anus. Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs* – femur of legs I-III each divided into basifemur and telofemur, each leg terminated with paired claws, and claw like empodium without onychotriches, coxal fields with punctuations that form lines; *Leg I* - coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3  $\sigma$  and  $\kappa$ ; tibia 8B, 2  $\phi$  and  $\kappa$ ; tarsus 21 to 22B with  $\omega$ ,  $\epsilon$ , dorsal eupathidium ( $\zeta'$ ) with companion seta (*z*) and subterminal eupathidium ( $\zeta''$ ), base of famulus ( $\epsilon$ ) distal to solenidion ( $\omega$ ) (Fig. 4A). *Leg II* - coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B,  $\sigma$ ; tibia 6B, 2  $\phi$ ; tarsus 16B with  $\omega$ ,  $\epsilon$  and subterminal eupathidium ( $\zeta$ ), base of  $\epsilon$  proximal to  $\omega$  (Fig. 4B). *Leg III* - coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B,  $\sigma$ , tibia 6B,  $\phi$ ; tarsus 14B and one mastisetae (MTa) (Fig. 4C).



**Figure 1.** *Eutrombicula alfreddugesi* (Oudemans, 1910); A – dorsal view of gnathosoma; B – ventral view of palp. Symbols:  $\omega$  = solenidion on palptarsus;  $\zeta$  = subterminal eupathidium of palptarsus; Odo = odontus; *cs* = adoral setae; *bs* = subcapitular setae. Scales: A and B 50  $\mu$ m.

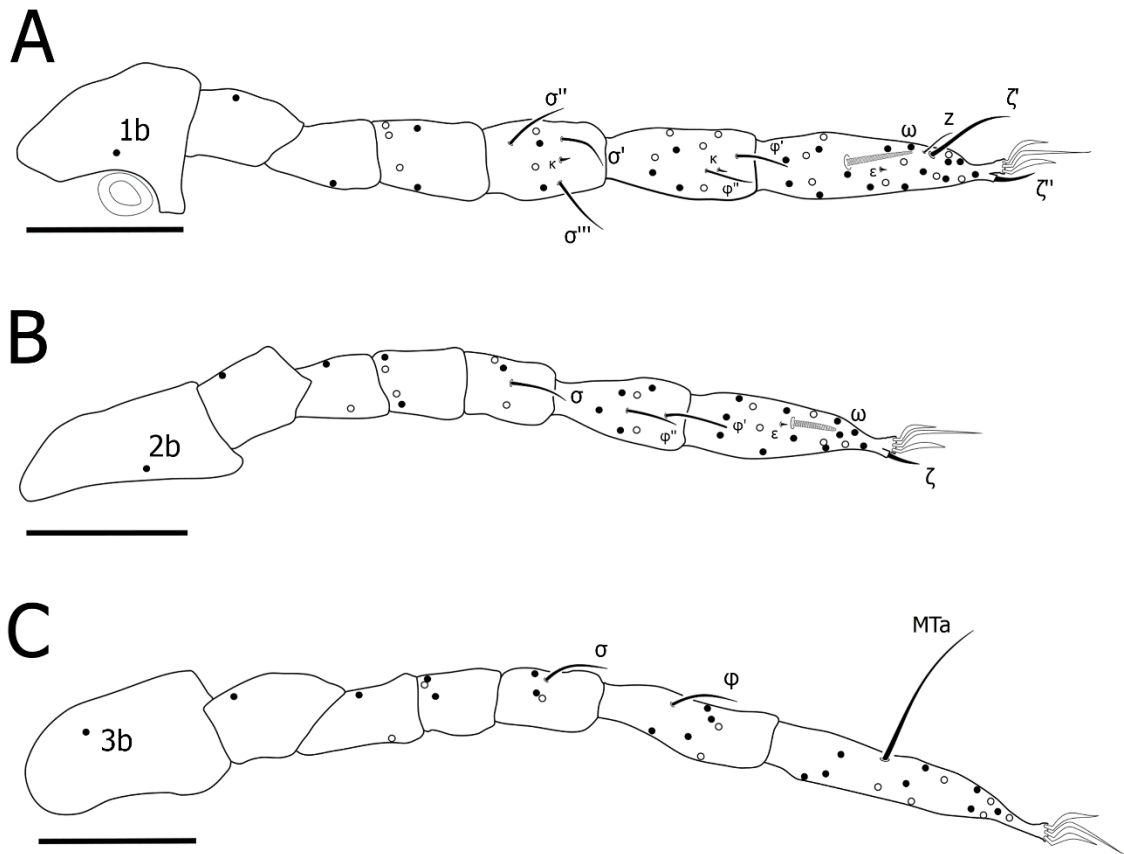


**Figure 2.** *Eutrombicula alfreddugesi* (Oudemans, 1910); prodorsal sclerite. Symbols: *ve* = external vertical setae; *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular setae (trichobothria). Scales: 20  $\mu$ m.



**Figure 3.** *Eutrombicula alfreddugesi* (Oudemans, 1910); A – dorsal view of idiosoma; B – ventral view of idiosoma. Solid circles = ventral setae; open circles = dorsal setae; Symbols: *c*<sub>1</sub>-*c*<sub>4</sub> = C row setae; *d*<sub>1</sub>-*d*<sub>3</sub> = D row setae; *e*<sub>1</sub>-*e*<sub>2</sub> = E row setae; *f*<sub>1</sub> = F row setae; *1a* = anterior sternal setae; *3a* = posterior sternal setae; *1b* = coxal field I seta; *2b* = coxal field II seta; *3b* = coxal field III seta. Scales: A and B 100  $\mu$ m.





**Figure 4.** *Eutrombicula alfreddugesi* (Oudemans, 1910); A – Leg I; B – Leg II; C – Leg III; Solid circles = ventral leg setae; open circles = dorsal leg setae; Symbols:  $\zeta'$  = dorsal eupathidium on Ta I;  $\zeta''$  and  $\zeta$  = subterminal eupathidium on Ta I and II, respectively;  $\omega$  = solenidion on Ta I and II;  $\sigma$ ,  $\sigma'$ ,  $\sigma''$ ,  $\sigma'''$  = solenidia on Ge I-III;  $\kappa$  = microsetae on Ge I and Ti I;  $\phi'$ ,  $\phi''$ ,  $\phi$  = solenidia on Ti I-III;  $\epsilon$  = famulus on Ta I and II;  $1b$  = coxal field I seta;  $2b$  = coxal field II seta;  $3b$  = coxal field III seta; MTa = mastisetae on Ta III. Scales: A-C 50  $\mu$ m.

**New records.** 5 larvae (IBSP 14884), Iracema Municipality, Acre State, 10 Oct. 2018, ex *Oxyrhopus melanogenys* (Tschudi, 1845) (Squamata: Colubridae), J. A. Mendoza-Roldan coll.

**Hosts and distribution in Brazil.** *E. alfreddugesi* has been described in Mexico, collected on the skin of a man. In Brazil, this species has been described in several localities, but after reviewing the material already published, none of them belong to *E. alfreddugesi*. These records are listed and explained which species belong in the discussion of the present study. So far, this species has been found only in Acre State, parasitizing the Tschudi's false coral snake, *Oxyrhopus melanogenys* (Tschudi, 1845) (Squamata: Colubridae).

***Eutrombicula batatas* (Linnaeus, 1758)****(Figure 5)**

*Acarus batatas* Linnaeus, 1758: 617

To see the full synonymic list of this species, see Fuller, 1952: 141; Jenkins, 1949: 298; Hoffmann, 1990: 55; Jacinavicius et al. 2019: 229

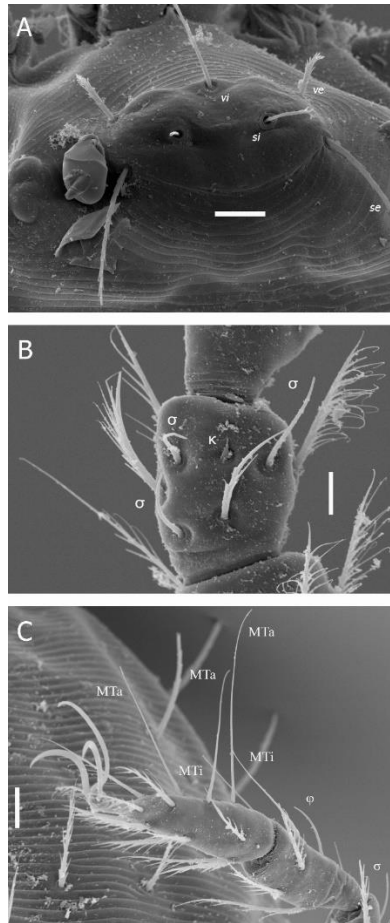
**Diagnosis.** Larva. Palpfemur and palpgenu each with single branched seta; dorsal and lateral setae nude and ventral setae branched on the palptibia; adoral (*cs*) setae nude; odontus bifurcate with inner prong smaller than the outer prong; inner prong coming a little over the middle of odontus; flageliform trichobothria (*si*), two-thirds with setules thin and long, sparsely distributed; C row with 10 setae; D and E rows with 8 setae each; F and H rows with two setae each; with 54 opisthosomal setae including 24 ventral setae; base of famulus ( $\epsilon$ ) on Ta I and II distal and proximal to solenidion ( $\omega$ ), respectively; two mastisetae on Ti III; three mastisetae on Ta III.

**New records from USNM collection.** 2 larvae (RML 51724), Barcarena Municipality, Pará State, 26 Mar. 1969, ex. *Choloepus didactylus* (L., 1758) (Pilosa: Megalonychidae), T. H. G. Aitken coll.; 9 larvae, Fazenda Água Limpa, Brasilia University (UnB), Brasília, Federal District, 25 Apr. 1984, *Calomys* sp. (Rodentia: Cricetidae), D. Gettinger coll. 7 larvae, same locality, 27 Apr. 1984, *Necromys* sp. (Rodentia: Cricetidae).

**New records from IBSP collection.** 3 larvae (IBSP 11666), Mato Grosso State, 24 Mar. 2013, ex unidentified host, C. Strussmann coll.

**Hosts and distribution in Brazil.** This species was described from Suriname, with no additional information on the specific locality or host. However, it has been found throughout America over the years. The first record of this species in Brazil was made by Ewing (1925), who found this species in the Amazonas State parasitizing a chicken, *Gallus gallus domesticus* (L., 1758) (Galliformes: Phasianidae), and in the Pará State, parasitizing a wild turkey, *Meleagris gallopavo* (L., 1758) (Galliformes: Phasianidae). A year later, Bequaert (1926) recorded *E. batatas* parasitizing *Dasyprocta aguti* L., 1766 (Rodentia: Dasyproctidae) and an unidentified Cervidae also in Pará State. This species has some relationship with farm animals, due to the fact this species was recorded again parasitizing chickens in the Rio de Janeiro State (Confalonieri and Carvalho 1973), in Mato Grosso State, parasitizing horses,

*Equus ferus caballus* L., 1758 (Perissodactyla: Equidae) (Confalonieri and Benez 1976), and in the Maranhão State, parasitizing goats, *Capra aegagrus hircus* (L., 1758) (Artiodactyla: Bovidae) (Faccini et al. 2017). Only recently has this species been frequently recorded parasitizing wild animals in national territory. Bassini-Silva et al. (2018) found this species parasitizing unidentified rodents (Rodentia: Cricetidae) and owls (Strigiformes; Strigidae), the brown rat, *Rattus norvegicus* (Berkenhout, 1769) (Rodentia: Muridae), the Brazilian common opossum, *Didelphis aurita* (Wied-Neuwied, 1826) (Didelphimorphia: Didelphidae), and the smooth-billed ani, *Crotophaga ani* L., 1758 (Cuculiformes: Cuculidae), in the São Paulo State. This species was also recorded parasitizing two species of caviids, the Brazilian guinea pig, *Cavia aperea* Erxleben, 1777 (Rodentia: Caviidae), and the capybara, *Hydrochoerus hydrochaeris* (L., 1766) (Rodentia: Caviidae) in the state of Paraná and Rio Grande do Sul, respectively (Bassini-Silva et al. 2018). Moreover, these same authors registered this species in the Pará State, parasitizing the common potoo, *Nyctibius griseus* (Gmelin, 1789) (Nyctibiiformes: Nyctibiidae). The last record for this species in the country was made by Jacinavicius et al. (2019), in Pernambuco state, parasitizing the white-eared opossum, *Didelphis albiventris* Lund, 1840 (Didelphimorphia: Didelphidae). And yet, in the present study we are recording this species again in the states of Pará and Mato Grosso, parasitizing Linné's two-toed sloth, *Choloepus didactylus* (L., 1758) (Pilosa: Megalonychidae), and an unidentified host, respectively. For the first time, this species is being recorded in Brasília, Federal District, parasitizing rodents, *Calomys* sp. (Rodentia: Cricetidae) and *Necromys* sp. (Rodentia: Cricetidae).



**Figure 5.** Scanning electron micrographs of *Eutrombicula batatas* (Linnaeus, 1758); A – prodorsal sclerite; B – genu of the leg I; C – genu, tibia and tarsus of the leg III. Symbols: *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular setae (trichobothria);  $\sigma$  = solenidia on Ge I and III;  $\kappa$  = microseta on Ge I;  $\phi$  = solenidion on Ti III; MTi = mastisetae on Ti III; MTa = mastisetae on Ta III. Scales: A and C 30  $\mu\text{m}$ , B 40  $\mu\text{m}$ .

**Note.** This species has been redescribed (Faccini et al., 2017) and recorded (Bassini-Silva et al., 2018; Jacinavicius et al. 2019) in recent Brazilian studies. Because of this, we are not redescribing the species here. However, in the present study, SEM images have been provided (Fig. 5) in order to add more details to those previously redescrptions.

### ***Eutrombicula daemoni* Bassini-Silva & Jacinavicius, 2018**

*Eutrombicula daemoni* Bassini-Silva & Jacinavicius, 2018: 978; Sampaio et al. 2020: 117.

**Diagnosis.** Larva. Palpfemur and palpgenu each with single branched seta; dorsal and lateral setae nude and ventral setae branched on the palptibia; adoral (*cs*) setae nude; odontus bifurcate with inner prong smaller than the outer prong; inner prong coming a little over the middle of odontus; flageliform trichobothria (*si*), two-thirds with setules thin and long,

sparsely distributed; C row with 10 setae; D and E rows with 8 setae each; F row with four setae; H row with two setae; with 62 to 66 opisthosomal setae including 26 to 30 ventral setae; base of famulus ( $\epsilon$ ) on Ta I and II distal and proximal to solenidion ( $\omega$ ), respectively; two mastisetae on Ti III; four mastisetae on Ta III.

**Hosts and distribution in Brazil.** This species was described parasitizing a social flycatcher, *Myiozetetes similis* (Spix, 1825) (Passeriformes: Tyrannidae), in the Minas Gerais State (Bassini-Silva et al. 2018). In addition, a recent record for this species was made by Sampaio et al. (2020). These authors found this species parasitizing a dog, *Canis lupus familiaris* L., 1758 (Carnivora: Canidae), in the same state (Minas Gerais) as its original description.

**Note.** This species has been described recently by Bassini-Silva et al. (2018). However, the types have been reexamined, and no observation has been necessary for this species.

### ***Eutrombicula goeldii* (Oudemans, 1910)**

#### **(Figures 6-10)**

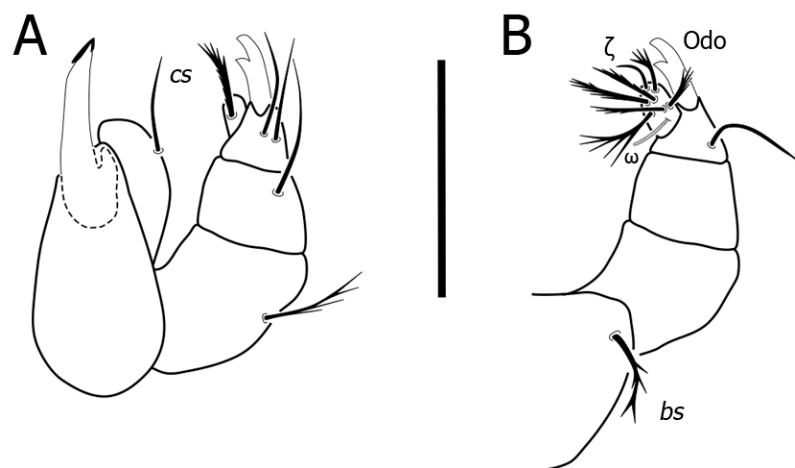
*Microthrombidium goeldii* Oudemans, 1910: 84

To see the full synonymic list of this species, see Fuller, 1952: 136; Jenkins, 1949: 312

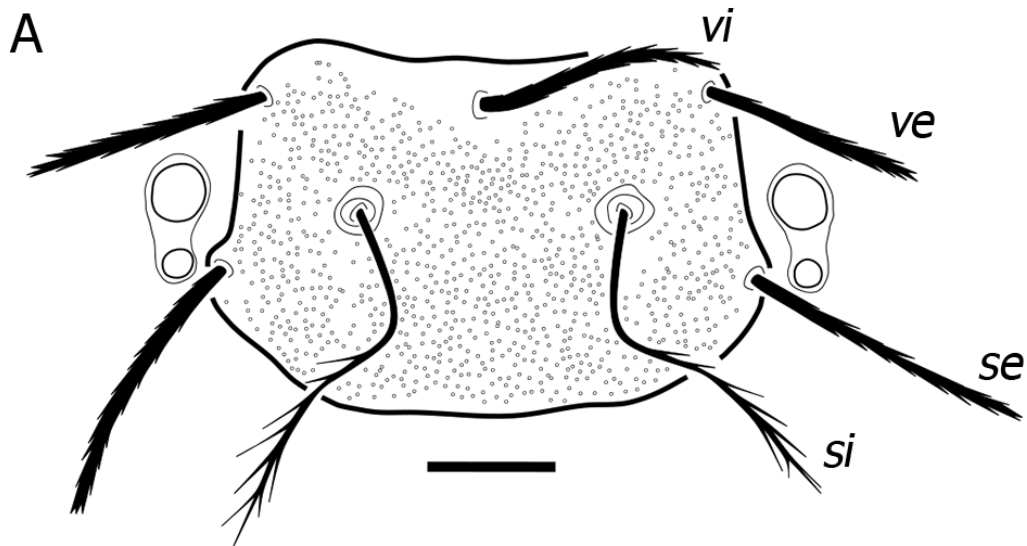
**Diagnosis.** Larva. Palpfemur with single branched seta; palpgenu with single nude seta (whip-like); dorsal, lateral and ventral setae nude on the palptibia; adoral (*cs*) setae nude; outer prong much bigger than inner prong, which the inner prong coming out of the middle of odontus; prodorsal sclerite heavily punctuated; flageliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed; C row with 8 setae; D row with 6 setae; E row with 4 setae; F and H rows with two setae each; 34 opisthosomal setae including 12 ventral setae; base of famulus ( $\epsilon$ ) on Ta I and II distal and proximal to solenidion ( $\omega$ ), respectively; one mastiseta on Ta III.

**Redescription.** Larvae. *Gnathosoma* – fPp = B/N/NNB/7B $\omega$  $\zeta$ ; palpgenu seta whip-like; odontus bifurcate, outer prong much bigger than inner prong, which the inner prong coming out of the middle of odontus; cheliceral blade with tricuspid cap; gnathobase few punctuations, subcapitular (*bs*) setae branched and adoral (*cs*) setae nude (Figs. 6A-B, and 10A). *Idiosoma* - eyes 2/2, anterior lens larger, with ocular plate; subrectangular prodorsal sclerite heavily punctuated, anterior margin slightly sinuous, lateral margin convex and

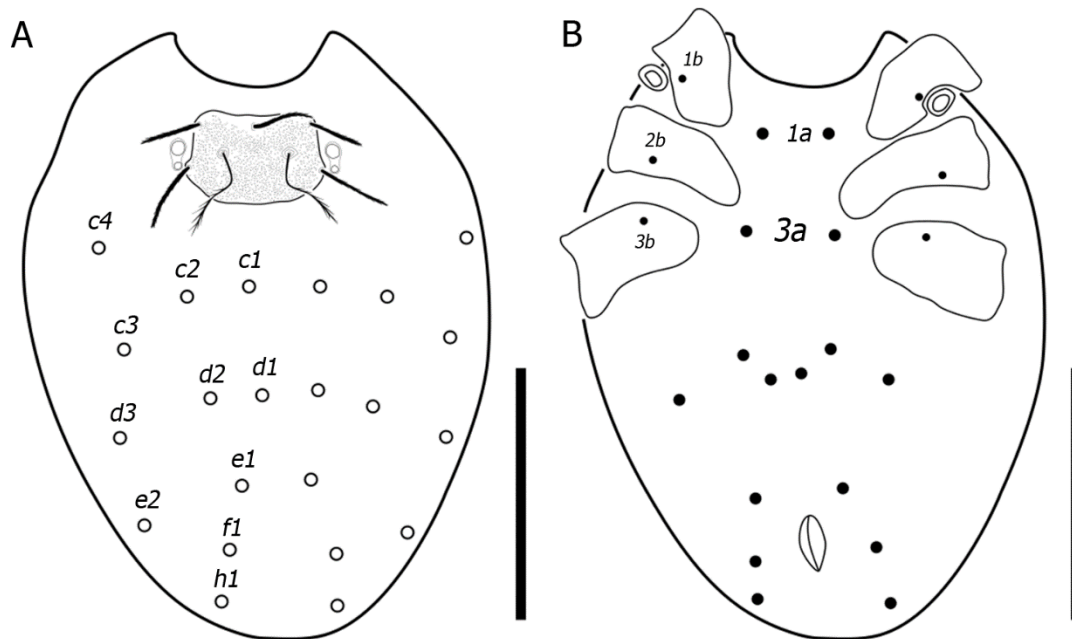
posterior margin of prodorsal sclerite markedly concave (Fig. 7 and 10B), with pair of flagelliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed, and 5 branched normal setae [pair of *ve* (= AL) seta, single *vi* (= AM) seta and pair of *se* (= PL) seta];  $si > se > vi > ve$ . Opisthosoma (Figs. 8A and B) with 34 setae; dorsal opisthosoma with 22 setae, C row with 4 pairs of setae, D row with 3 pairs of setae, E row with 2 pairs, F and H rows with one pair of setae each, and 12 ventral opisthosomal setae with 8 setae anterior to anus and 4 setae posterior to anus). Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs* – femur of legs I-III each divided into basifemur and telofemur, each leg terminated with paired claws, and claw like empodium without onychotriches, coxal fields with punctuations that form lines; *Leg I* - coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3  $\sigma$  and  $\kappa$  (Fig. 10C); tibia 8B, 2  $\phi$  and  $\kappa$ ; tarsus 22B with  $\omega$ ,  $\varepsilon$ , dorsal eupathidium ( $\zeta'$ ) with companion seta (*z*) and subterminal eupathidium ( $\zeta''$ ), base of famulus ( $\varepsilon$ ) distal to solenidion ( $\omega$ ) (Fig. 9A). *Leg II* - coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B,  $\sigma$ ; tibia 6B, 2  $\phi$ ; tarsus 16B with  $\omega$ ,  $\varepsilon$  and subterminal eupathidium ( $\zeta$ ), base of  $\varepsilon$  proximal to  $\omega$  (Fig. 9B). *Leg III* - coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B,  $\sigma$ , tibia 6B; tarsus 14B, one mastisetae (MTa) (Fig. 9C and 10D).



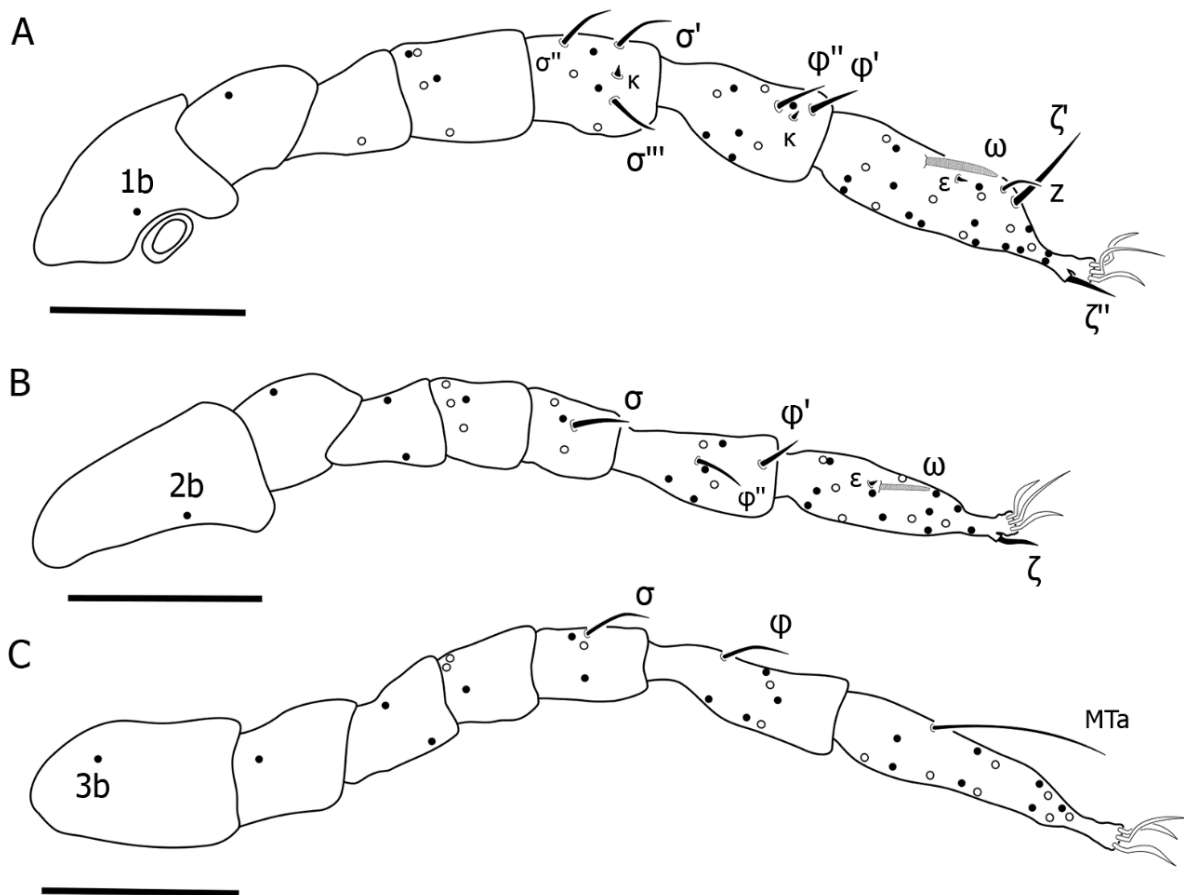
**Figure 6.** *Eutrombicula goeldii* (Oudemans, 1910); A – dorsal view of gnathosoma; B – ventral view of palp. Symbols:  $\omega$  = solenidion on palptarsus;  $\zeta$  = subterminal eupathidium of palptarsus; Odo = odontus; *cs* = adoral setae; *bs* = subcapitular setae. Scales: A and B 50  $\mu\text{m}$ .



**Figure 7.** *Eutrombicula goeldii* (Oudemans, 1910); prodorsal sclerite. Symbols: *ve* = external vertical setae; *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular setae (trichobothria). Scales: 20  $\mu$ m.



**Figure 8.** *Eutrombicula goeldii* (Oudemans, 1910); A – dorsal view of idiosoma; B – ventral view of idiosoma. Solid circles = ventral setae; open circles = dorsal setae; Symbols: *c*<sub>1</sub>-*c*<sub>4</sub> = C row setae; *d*<sub>1</sub>-*d*<sub>3</sub> = D row setae; *e*<sub>1</sub>-*e*<sub>2</sub> = E row setae; *f*<sub>1</sub> = F row setae; *h*<sub>1</sub> = H row setae; *1a* = anterior sternal setae; *3a* = posterior sternal setae; *1b* = coxal field I seta; *2b* = coxal field II seta; *3b* = coxal field III seta. Scales: A and B 100  $\mu$ m.

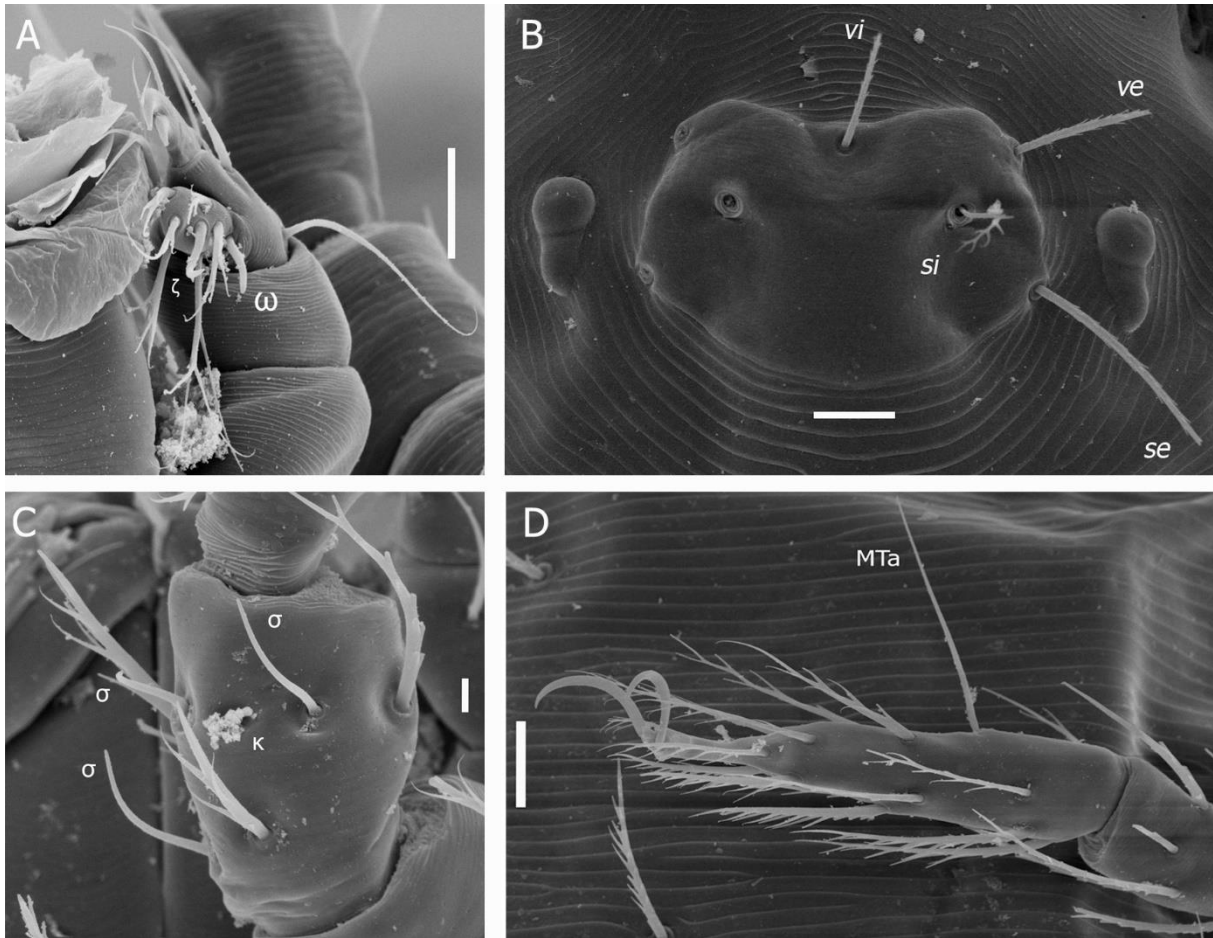


**Figure 9.** *Eutrombicula goeldii* (Oudemans, 1910); A – Leg I; B – Leg II; C – Leg III; Solid circles = ventral leg setae; open circles = dorsal leg setae; Symbols:  $\zeta'$  = dorsal eupathidium on Ta I;  $\zeta''$  and  $\zeta$  = subterminal eupathidium on Ta I and II, respectively;  $\omega$  = solenidion on Ta I and II;  $\sigma$ ,  $\sigma'$ ,  $\sigma''$ ,  $\sigma'''$  = solenidia on Ge I-III;  $\kappa$  = microsetae on Ge I and Ti I;  $\phi'$ ,  $\phi''$ ,  $\phi$  = solenidia on Ti I-III;  $\epsilon$  = famulus on Ta I and II; *1b* = coxal field I seta; *2b* = coxal field II seta; *3b* = coxal field III seta; MTa = masetae on Ta III. Scales: A-C 50  $\mu$ m.

**Material reexamined.** 4 larvae (IBSP 10547), Baixada Maranhense, Maranhão State, Brazil, 2005, ex *Capra aegagrus hircus* (L., 1758) (Artiodactyla: Bovidae), J. L. H. Faccini coll.

**New records from USNM collection.** 2 larvae (RML 56197), Ananindeua Municipality, Pará State, 25 Aug. 1970, ex *Turdus albicollis* Vieillot, 1818 (Passeriformes: Turdidae), T. H. G. Aitken coll.; 2 larvae (RML 56189), Catu Forest, Belém Municipality, Pará State, 5 Aug. 1970, ex *Hylaeamys megacephalus* (Fischer, 1814) (Rodentia: Cricetidae).





**Figure 10.** Scanning electron micrographs of *Eutrombicula goeldii* (Oudemans, 1910); A – ventral view of the palp; B – prodorsal sclerite; C – genu of the leg I; D – tarsus of the leg III. Symbols:  $\omega$  = solenidion on palptarsus;  $\zeta$  = subterminal eupathidium of palptarsus; *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular setae (trichobothria);  $\sigma$  = solenidia on Ge I;  $\kappa$  = microseta on Ge I; MTa = mastisetae on Ta III. Scales: A 20  $\mu$ m, B 40  $\mu$ m, C 10  $\mu$ m, D 30  $\mu$ m.

**New records from IBSP collection.** 1 larva (IBSP 6083B), Palmeiras de São Paulo District, Suzano Municipality, São Paulo State, 4 Apr. 1977, ex *Chironius bicarinatus* (Wied-Neuwied, 1820) (Squamata: Colubridae), A. Salmon coll.; 1 larva (IBSP 12917A), Cananéia Municipality, São Paulo State, 16 Jan. 2016, ex *Spilotes pullatus* (L., 1758) (Squamata: Colubridae); 1 larva (IBSP 14834), Santa Bárbara d'Oeste municipality, São Paulo State, 24 Oct. 2017, ex *Anolis meridionalis* Boettger, 1885 (Squamata: Dactyloidae); 3 larvae (IBSP 12914A), Diamantina Municipality, Minas Gerais State, 12 Jul. 2015; *Tropidurus montanus* Rodrigues, 1987 (Squamata: Tropiduridae); 9 larvae (IBSP 12733), Tapajós-Arapiuns Extractive Reserve, Santarém Municipality, Pará State, 2014, ex unidentified “bird”, A. Marcili coll.; 1 larva (IBSP 13782), Jardim Municipality, Mato Grosso do Sul State, 25 Jan. 2018, ex *Casiornis rufus* (Vieillot, 1816) (Passeriformes: Tyrannidae); 2 larvae (IBSP

12202), Paraty Municipality, Rio de Janeiro State, 2 Mar. 2015, ex *Zonotrichia* sp. (Passeriformes: Passerellidae), L. Moreira-Lima coll.; 1 larva (IBSP 12871), Brasília National Park, Federal District, Brazil, 23 Nov. 2015, ex *Coryphospingus cucullatus* (Müller, 1776) (Passeriformes: Thraupidae), G. V. Tolesano-Pascoli coll.; 1 larva (IBSP 12875), same locality and date, ex *Elaenia chiriquensis* Lawrence, 1865 (Passeriformes: Tyrannidae), G. V. Tolesano-Pascoli coll.; 1 larva (IBSP 12876), same locality and host, 21 Nov. 2015; 1 larva (IBSP 12877), same locality and host, 29 Nov. 2015; 1 larva (IBSP 12878), same data; 1 larva (IBSP 12881), same locality and date, ex *Hemithraupis guira* (L., 1766) (Passeriformes: Thraupidae), G. V. Tolesano-Pascoli coll.; 1 larva (IBSP12892), same locality and date, ex *Troglodytes musculus* Naumann, 1823 (Passeriformes: Troglodytidae), G. V. Tolesano-Pascoli coll.; 1 larva (IBSP 12882), same locality, 23 Nov. 2015, ex *Hemitriccus margaritaceiventer* (d'Orbigny & Lafresnaye, 1837) (Passeriformes: Rhynchocyclidae), G. V. Tolesano-Pascoli coll.; 1 larva (IBSP 12898), same locality and date, ex *Volatinia jacarina* (L., 1766) (Passeriformes: Thraupidae), G. V. Tolesano-Pascoli coll.; 1 larva (IBSP 12899), same data; 1 larva (IBSP 12900), same data; 1 larva (12901), same locality and host, 29 Nov. 2015; 1 larva (IBSP 12903), same locality and date, ex *Zonotrichia capensis* (Müller, 1776) (Passeriformes: Passerellidae), G. V. Tolesano-Pascoli coll.; 1 larva (IBSP 12884), same locality, 20 Nov. 2015, ex *Myiarchus swainsoni* Cabanis & Heine, 1859 (Passeriformes: Tyrannidae), G. V. Tolesano-Pascoli coll.; 1 larva (IBSP 12880), Permanent Life Area Busca Vida, Camaçari Municipality, Bahia State, 12 Dec. 2015, ex *Formicivora grisea* (Boddaert, 1783) (Passeriformes: Thamnophilidae), G. V. Tolesano-Pascoli coll.; 1 larva (IBSP 13125), Biological Reserve of Mamanguape and Rio Tinto, Paraíba State, 12 Jul. 2012, ex *Dysithamnus mentalis* (Temminck, 1823) (Passeriformes: Thamnophilidae), C. Lugarini coll.; 1 larva (IBSP 13126), same locality, 27 Jul. 2013, ex *Chiroxiphia pareola* (L., 1766) (Passeriformes: Tyrannidae), C. Lugarini coll.; 1 larva (IBSP 13134), same locality and host, 29 Nov. 2012; 1 larva (IBSP 13127), same locality, 8 Jul. 2013, ex *Hemitriccus margaritaceiventer* (d'Orbigny & Lafresnaye, 1837) (Passeriformes: Rhynchocyclidae), C. Lugarini coll.; 1 larva (IBSP 13128), same locality, 26 Aug. 2012, ex *Formicivora grisea* (Boddaert, 1783) (Passeriformes: Thamnophilidae), C. Lugarini coll.; 1 larva (IBSP 13131), same locality and host, 16 Apr. 2012; 1 larva (IBSP 13130), same locality, 30 Aug. 2011, ex *Herpsilochmus atricapillus* Pelzeln, 1868 (Passeriformes: Thamnophilidae), C. Lugarini coll.; 1 larva (IBSP 13135), same locality, 19 Mar. 2013, ex *Thamnophilus torquatus* Swainson, 1825 (Passeriformes: Thamnophilidae), C. Lugarini coll.; 1 larva (IBSP 13137), same locality, 23 Dec. 2011, ex *Neopelma pallescens* (Lafresnaye, 1853) (Passeriformes: Pipridae),

C. Lugarini coll.; 1 larva (IBSP 13140), same locality, 6 Jul. 2013, ex *Tachyphonus rufus* (Boddaert, 1783) (Passeriformes: Thraupidae); C. Lugarini coll.; 1 larva (IBSP 13143), same data; 1 larva (IBSP 13141), same locality and host, 8 Jul. 2013; 1 larva (IBSP 13145), same data; 1 larva (IBSP 13146), same data; 1 larva (IBSP 13144), same locality and host, 27 Jul. 2013; 2 larvae (IBSP 11053A), Inhamum Municipal Environmental Protection Area, Caxias Municipality, Maranhão State, 30 Jul. 2011, ex *Marmosa demerarae* (Thomas, 1905) (Didelphimorphia: Didelphidae), F. S. Reis coll.; 2 larvae (IBSP 11054), same locality, 1 Jul. 2011, ex *Marmosa murina* (L., 1758), F. S. Reis coll.; 2 larvae (IBSP 11056B), same locality and date, ex *Didelphis aurita* Wied-Neuwied, 1826 (Didelphimorphia: Didelphidae), F. S. Reis coll.; 1 larva (IBSP 908), Anápolis Municipality, Goiás State, Jul. to Oct. 1936, ex unidentified rodent, R. M. Gilmore coll.

**Hosts and distribution in Brazil.** Oudemans (1910) described this species parasitizing the *Dasyprocta aguti* L., 1766 (Rodentia: Dasyproctidae), somewhere in Brazil. There was no information about the specific locality. Only, many years later, this species was found again in the national territory (Jacinavicius et al. 2018b). These authors recorded *E. goeldii* in the Rio de Janeiro State parasitizing the South American water rat, *Nectomys squamipes* (Brants, 1827) (Rodentia: Cricetidae). In this study, *E. goeldii* was collected in reptiles, birds and mammals, following what had already been reported in other countries in South America. In this study, we are recording again in the Rio de Janeiro State, however, this time, *E. goeldii* was collected parasitizing a bird, *Zonotrichia* sp. (Passeriformes: Passerellidae). The localities and hosts association cited below are also new to this species: São Paulo State, parasitizing two-headed Sipo, *Chironius bicarinatus* (Wied-Neuwied, 1820) (Squamata: Colubridae), the chicken snake, *Spilotes pullatus* (L., 1758) (Squamata: Colubridae), and the *Anolis meridionalis* Boettger, 1885 (Squamata: Dactyloidae); Minas Gerais State, parasitizing the montane collared lizard, *Tropidurus montanus* Rodrigues, 1987 (Squamata: Tropiduridae); Mato Grosso do Sul State, parasitizing the rufous casiornis, *Casiornis rufus* (Vieillot, 1816) (Passeriformes: Tyrannidae); Brasília/Federal District, parasitizing the rufous-collared sparrow, *Zonotrichia capensis* (Müller, 1776) (Passeriformes: Passerellidae), the pearly-vented tody-tyrant, *Hemitriccus margaritaceiventer* (d'Orbigny & Lafresnaye, 1837) (Passeriformes: Rhynchocyclidae), the red-crested finch, *Coryphospingus cucullatus* (Müller, 1776) (Passeriformes: Thraupidae), the guira tanager, *Hemithraupis guira* (L., 1766) (Passeriformes: Thraupidae), the blue-black grassquit, *Volatinia jacarina* (L., 1766) (Passeriformes: Thraupidae), the Southern house wren, *Troglodytes musculus* Naumann,

1823 (Passeriformes: Troglodytidae), the lesser elaenia, *Elaenia chiriquensis* Lawrence, 1865 (Passeriformes: Tyrannidae), the Swainson's flycatcher, *Myiarchus swainsoni* Cabanis & Heine, 1859 (Passeriformes: Tyrannidae); Bahia State, parasitizing the Southern white-fringed antwren, *Formicivora grisea* (Boddaert, 1783) (Passeriformes: Thamnophilidae); Paraíba State, parasitizing the pale-bellied tyrant-manakin, *Neopelma pallescens* (Lafresnaye, 1853) (Passeriformes: Pipridae), the *H. margaritaceiventris*, the plain antvireo, *Dysithamnus mentalis* (Temminck, 1823) (Passeriformes: Thamnophilidae), the *F. grisea*, the black-capped antwren, *Herpsilochmus atricapillus* Pelzeln, 1868 (Passeriformes: Thamnophilidae), the rufous-winged antshrike, *Thamnophilus torquatus* Swainson, 1825 (Passeriformes: Thamnophilidae), the white-lined tanager, *Tachyphonus rufus* (Boddaert, 1783) (Passeriformes: Thraupidae), and the blue-backed manakin, *Chiroxiphia pareola* (L., 1766) (Passeriformes: Tyrannidae); Pará State, parasitizing an unidentified bird, the white-necked thrush, *Turdus albicollis* Vieillot, 1818 (Passeriformes: Turdidae), and the Azara's broad-headed oryzomys, *Hylaeamys megacephalus* (Fischer, 1814) (Rodentia: Cricetidae); Goiás State, parasitizing an unidentified rodent; and Maranhão State, parasitizing the Brazilian common opossum, *Didelphis aurita* Wied-Neuwied, 1826 (Didelphimorphia: Didelphidae), the woolly mouse opossum, *Marmosa demerarae* (Thomas, 1905) (Didelphimorphia: Didelphidae), and the Linnaeus's mouse opossum, *Marmosa murina* (L., 1758) (Didelphimorphia: Didelphidae).

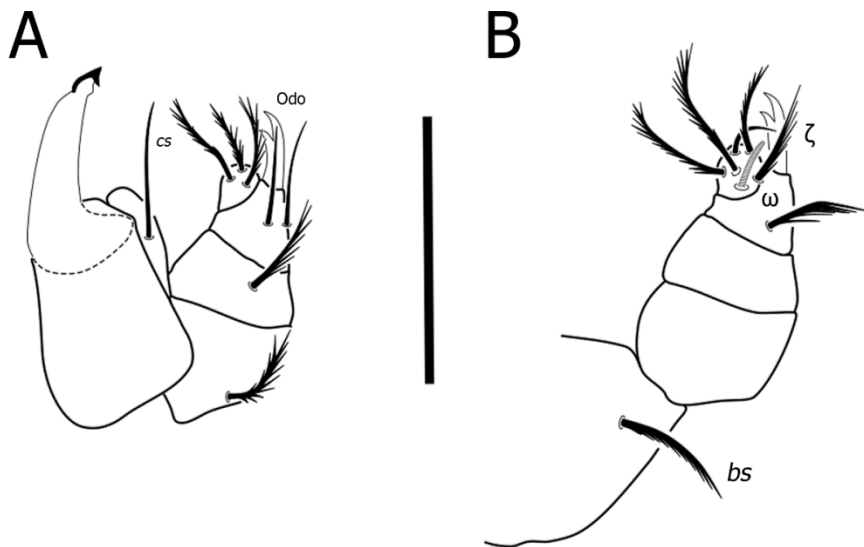
### ***Eutrombicula spipi* Brennan and Reed, 1974**

#### **(Figures 11-14)**

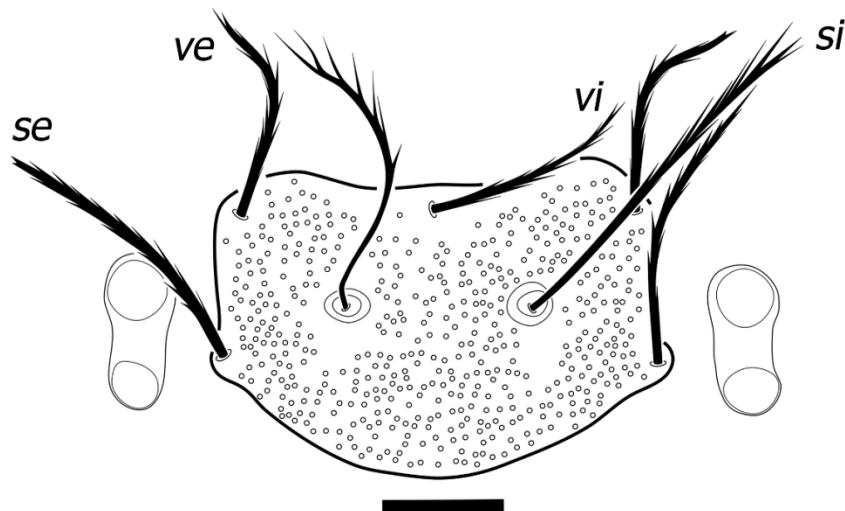
*Eutrombicula spipi* Brennan and Reed, 1974: 705; 1975: 52; Loomis and Wrenn, 1984: 157; Bassini-Silva et al. 2018: 984; Jacinavicius et al. 2019: 229.

**Diagnosis.** Larva. Palpfemur and palpgenu each with single branched seta; dorsal and lateral setae nude and ventral setae branched on the palptibia; adoral (*cs*) setae nude; odontus bifurcate with inner prong smaller than the outer prong; inner prong coming a little over the middle of odontus; flageliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed; C row with 10 setae; D and E rows with 8 setae each; with 35 to 36 opisthosomal setae including 27 to 28 ventral setae; base of famulus ( $\epsilon$ ) on Ta I and II distal and in the same line to solenidion ( $\omega$ ), respectively; two mastisetae on Ti III; two mastisetae on Ta III.

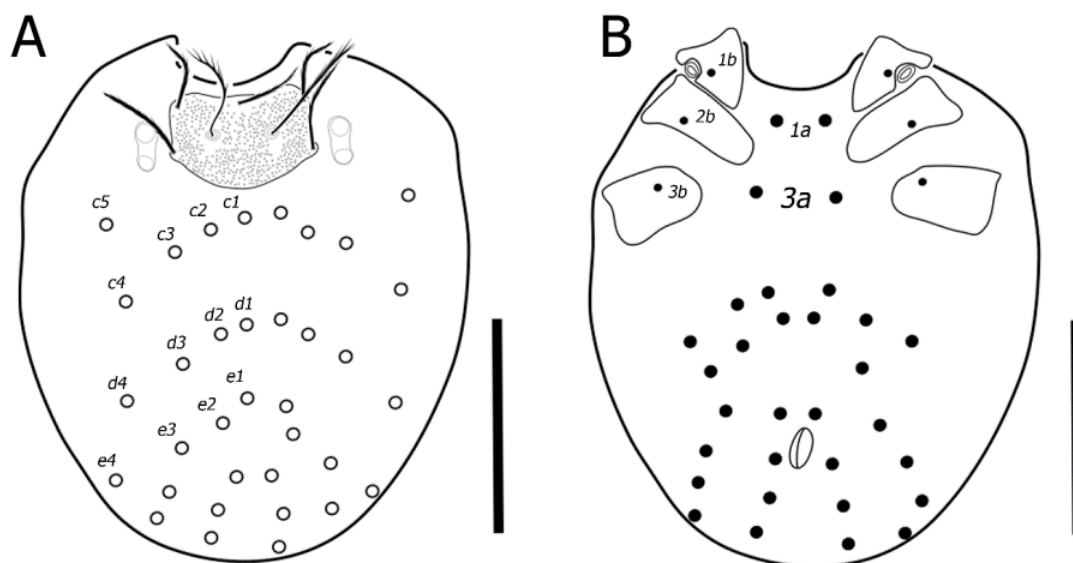
**Redescription.** Larvae (holotype and paratypes). *Gnathosoma* – fPp = B/B/NNB/7B $\omega$  $\zeta$ ; odontus bifurcate, with inner prong smaller than the outer prong; inner prong coming a little over the middle of odontus; cheliceral blade with tricuspid cap; gnathobase with few punctations, subcapitular (*bs*) setae branched and adoral (*cs*) setae nude (Figs. 11A and B). *Idiosoma* - eyes 2/2, subequal, with ocular plate; subrectangular prodorsal sclerite heavily punctuated, anterior margin slightly sinuous, lateral margin convex and posterior margin of prodorsal sclerite markedly concave (Fig. 12), with flagelliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed, and 5 branched normal setae [pair of *ve* (= AL) seta, single *vi* (= AM) seta and pair of *se* (= PL) seta];  $si > se > ve \geq vi$ . Opisthosoma (Figs. 13A and B) with 62 to 64 setae; dorsal opisthosoma with 35 to 36 setae, C row with 5 pairs of setae, D and E rows with 4 pairs of setae each, F and H rows merged with 9 to 10 irregularly placed setae; and 27 to 28 ventral opisthosomal setae with 15 setae anterior to anus and 12 to 13 setae posterior to the anus. Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs* – femur of legs I-III each divided into basifemur and telofemur, each leg terminated with paired claws, and claw like empodium without onychotriches, coxal fields with punctations that form lines; *Leg I* - coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3  $\sigma$  and  $\kappa$ ; tibia 8B, 2  $\phi$  and  $\kappa$ ; tarsus 21B with  $\omega$ ,  $\varepsilon$ , dorsal eupathidium ( $\zeta'$ ) with companion seta (*z*) and subterminal eupathidium ( $\zeta''$ ), base of famulus ( $\varepsilon$ ) distal to solenidion ( $\omega$ ) (Fig. 14A). *Leg II* - coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B,  $\sigma$ ; tibia 6B, 2  $\phi$ ; tarsus 16B with  $\omega$ ,  $\varepsilon$  and subterminal eupathidium ( $\zeta$ ), base of  $\varepsilon$  in the same line of  $\omega$  (Fig. 14B). *Leg III* - coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B,  $\sigma$ , tibia 4B,  $\phi$  and 2 mastisetæ (MTi); tarsus 14B and 2 mastisetæ (MTa) (Fig. 14C).



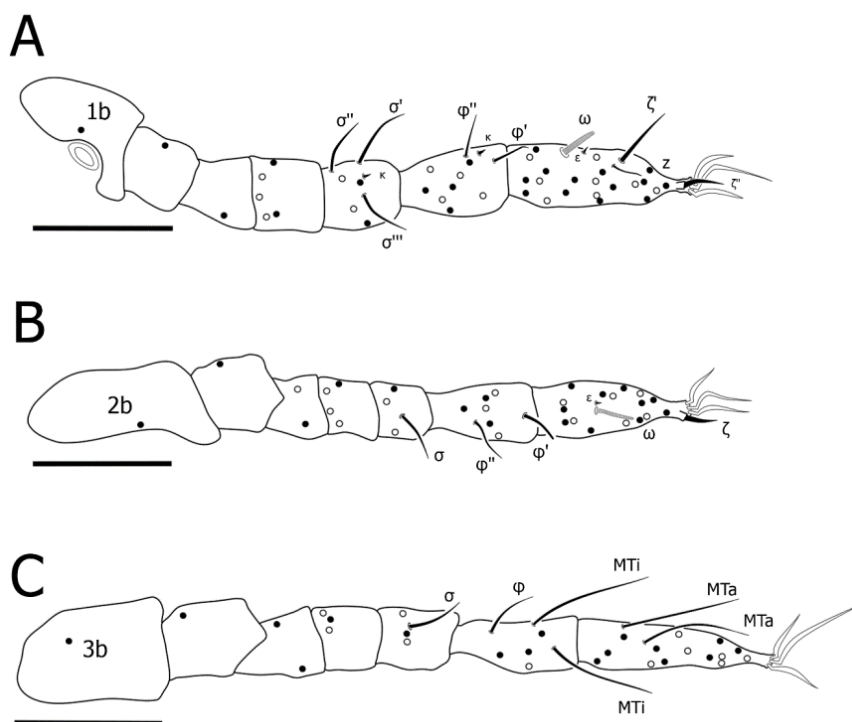
**Figure 11.** *Eutrombicula spipi* Brennan and Reed, 1974; A – dorsal view of gnathosoma; B – ventral view of palp. Symbols:  $\omega$  = solenidion on palptarsus;  $\zeta$  = subterminal eupathidium of palptarsus; Odo = odontus; cs = adoral setae; bs = subcapitular setae. Scales: A and B 50  $\mu\text{m}$ .



**Figure 12.** *Eutrombicula spipi* Brennan and Reed, 1974; prodorsal sclerite. Symbols: ve = external vertical setae; se = external scapular setae; vi = internal vertical setae; si = internal scapular setae (trichobothria). Scales: 20  $\mu\text{m}$ .



**Figure 13.** *Eutrombicula spipi* Brennan and Reed, 1974; A – dorsal view of idiosoma; B – ventral view of idiosoma. Symbols:  $c_1$ - $c_5$  = C row setae;  $d_1$ - $d_4$  = D row setae;  $e_1$ - $e_4$  = E row setae;  $1a$  = anterior sternal setae;  $3a$  = posterior sternal setae;  $1b$  = coxal field I seta;  $2b$  = coxal field II seta;  $3b$  = coxal field III seta. Scales: A and B 100  $\mu$ m.



**Figure 14.** *Eutrombicula spipi* Brennan and Reed, 1974; A – Leg I; B – Leg II; C – Leg III; Solid circles = ventral leg setae; open circles = dorsal leg setae Symbols:  $\zeta'$  = dorsal eupathidium on Ta I;  $\zeta''$  and  $\zeta$  = subterminal eupathidium on Ta I and II, respectively;  $\omega$  = solenidion on Ta I and II;  $\sigma$ ,  $\sigma'$ ,  $\sigma''$ ,  $\sigma'''$  = solenidia on Ge I-III;  $\kappa$  = microsetae on Ge I and Ti I;  $\phi'$ ,  $\phi''$ ,  $\phi$  = solenidia on Ti I-III;  $\epsilon$  = famulus on Ta I and II;  $1b$  = coxal field I seta;  $2b$  = coxal field II seta;  $3b$  = coxal field III seta; MTi = masetiae on Ti III; MTa = masetiae on Ta III. Scales: A-C 50  $\mu$ m.

**Type material examined. HOLOTYPE:** 1 larva (USNMENT01759885), La Esmeralda Amazonas State, Venezuela, 6 Mar. 1967; ex *Echimys armatus* (I. Geoffroy) (= *Makalata didelphoides* [Desmarest]) (Rodentia: Echimyidae); Smithsonian Army coll. **PARATYPES:** 9 larvae (USNMENT01759886, USNMENT01759887, USNMENT01759888, USNMENT01759889, USNMENT01759890, USNMENT01759891, USNMENT01759892, USNMENT01759893, USNMENT01759894), same data as holotype; 9 larvae (USNMENT01759895, USNMENT01759896, USNMENT01759897, USNMENT01759898, USNMENT01759899, USNMENT01759900, USNMENT01759901, USNMENT01759902, USNMENT01759903), same locality and host, 1 Mar. 1967; 9 larvae (USNMENT01759904, USNMENT01759905, USNMENT01759906, USNMENT01759907, USNMENT01759908, USNMENT01759909, USNMENT01759910, USNMENT01759911, USNMENT01759912), same locality and host, 2 Mar. 1967; 10 larvae (USNMENT01759913, USNMENT01759914, USNMENT01759915, USNMENT01759916, USNMENT01759917, USNMENT01759918, USNMENT01759919, USNMENT01759920, USNMENT01759921, USNMENT01759922), same data; 8 larvae (USNMENT01759923, USNMENT01759924, USNMENT01759925, USNMENT01759926, USNMENT01759927, USNMENT01759928, USNMENT01759929, USNMENT01759930), same locality and host, 3 Mar. 1967; 14 larvae (USNMENT01759931, USNMENT01759932, USNMENT01759933, USNMENT01759934, USNMENT01759935, USNMENT01759936, USNMENT01759937, USNMENT01759938, USNMENT01759939, USNMENT01759940, USNMENT01759941, USNMENT01759942, USNMENT01759943, USNMENT01759944), same locality and host, 5 Mar. 1967; 2 larvae (USNMENT01759945, USNMENT01759946), same data; 1 larva (USNMENT01759947), same locality and host, 17 Mar. 1967; 4 larvae (USNMENT01759948, USNMENT01759949, USNMENT01759950, USNMENT01759951), same data; 11 larvae (USNMENT01759952, USNMENT01759953, USNMENT01759954, USNMENT01759955, USNMENT01759956, USNMENT01759957, USNMENT01759958, USNMENT01759959, USNMENT01759960, USNMENT01759961, USNMENT01759962), same data; 6 larvae (USNMENT01759963, USNMENT01759964, USNMENT01759965, USNMENT01759966, USNMENT01759967, USNMENT01759968), Bolivar, Bolivar State, Venezuela, 7 Apr. 1967, ex *Lutreolina crassicaudata* (Desmarest) (Didelphimorphia: Didelphidae).



**Material reexamined.** 5 larvae (IBSP 13046B), Carneiros, Petrolina municipality, Pernambuco state, 01 May 2015, ex *Didelphis albiventris* Lund, 1840 (Didelphimorphia: Didelphidae), M. C. Horta coll.

**Hosts and distribution in Brazil.** Originally described from Venezuela parasitizing echymids and didelphids (Brennan and Reed, 1974), this species has only been registered for Brazil once by Jacinavicius et al. (2019). The authors found this species in Pernambuco state parasitizing the white-eared opossum, *Didelphis albiventris* Lund, 1840 (Didelphimorphia: Didelphidae).

### ***Eutrombicula tinami* (Oudemans, 1910)**

*Microthrombidium tinami* Oudemans 1910: 84; 1912: 24.

*Trombicula tinami*: Methlagl 1928: 216, 223 and 224; Ewing 1931: 10.

*Eutrombicula tinami*: Ewing 1938: 294; Radford, 1942: 67; Fuller, 1952: 133; Brennan and Lukoschus 1971: 44; Brennan and Reed 1974: 710; Brennan and Reed 1975: 52; Loomis and Wrenn, 1984: 158; Jacinavicius et al. 2018a: 9; Bassini-Silva et al., 2019: 413.

*Otonyssus tinami*: Buitendijk 1945: 338.

*Eutrombicula (Eutrombicula) tinami*: Vercammen-Grandjean 1965: 32.

**Diagnosis.** Larva. Palpfemur and palpgenu each with single branched seta; dorsal and lateral setae nude and ventral setae branched on the palptibia; adoral (*cs*) setae nude; outer prong much bigger than inner prong, which the inner prong coming out of the middle of odontus; flageliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed; C row with 8 setae; D row with 6 setae; E and F rows with two setae each; 34 opisthosomal setae including 16 ventral setae; base of famulus ( $\varepsilon$ ) on Ta I and II distal and proximal to solenidion ( $\omega$ ), respectively; one mastiseta on Ta III.

**Hosts and distribution in Brazil.** This species was described from Brazil by Oudemans (1910), without specifying the locality. There was only information that it was collected parasitizing the yellow-legged tinamou, *Crypturellus noctivagus* (Struthioniformes: Tinamidae). Recently, the knowledge of this species has increased in the country with the studies made by Jacinavicius et al. (2018) who recorded *E. tinami* in São Paulo State, parasitizing the Brazilian common opossum, *Didelphis aurita* Wied-Neuwied, 1826 (Didelphimorphia: Didelphidae); and by Bassini-Silva et al. (2019), which recorded this species parasitizing birds and mammals, including three occasions of this species biting

humans in the São Paulo State. These authors recorded *E. tinami* in the Santa Catarina State parasitizing the following bird species, the masked yellowthroat, *Geothlypis aequinoctialis* (Gmelin, 1789) (Passeriformes: Parulidae), the rufous-collared sparrow, *Zonotrichia capensis* (Müller, 1776) (Passeriformes: Passerellidae), the Southern house wren, *Troglodytes musculus* Naumann, 1823 (Passeriformes: Troglodytidae), and the highland elaenia, *Elaenia obscura* (d'Orbigny and Lafresnaye, 1837) (Passeriformes: Tyrannidae). Other records are in the São Paulo State parasitizing the following bird and mammal species, an unidentified bird (Passeriformes: Fringillidae), the ruddy ground-dove, *Columbina talpacoti* (Temminck, 1809) (Columbiformes: Columbidae), the *Leptotila* sp. (Columbiformes: Columbidae), the white-tipped dove, *Leptotila verreauxi* (Bonaparte, 1855) (Columbiformes: Columbidae), the guira cuckoo, *Guira guira* (Gmelin, 1788) (Cuculiformes: Cuculidae), the ultramarine grosbeak, *Cyanoloxia brissonii* (Lichtenstein, 1823) (Passeriformes: Cardinalidae), the chalk-browed mockingbird, *Mimus saturninus* (Lichtenstein, 1823) (Passeriformes: Mimidae), the blue manakin, *Chiroxiphia caudata* (Shaw and Nodder, 1793) (Passeriformes: Pipridae), the brown tinamou, *Crypturellus obsoletus* (Temminck, 1815) (Tinamiformes: Tinamidae), the solitary tinamou, *Tinamus solitarius* (Vieillot, 1819) (Tinamiformes: Tinamidae), the creamy-bellied thrush, *Turdus amaurochalinus* Cabanis, 1850 (Passeriformes: Turdidae), the rufous-bellied thrush, *Turdus rufiventris* Vieillot, 1818 (Passeriformes: Turdidae), the tropical kingbird, *Tyrannus melancholicus* Vieillot, 1819 (Passeriformes: Tyrannidae), the South American coati, *Nasua nasua* (L., 1766) (Carnivora: Procyonidae), the Brazilian common opossum, *Didelphis aurita* (Wied-Neuwied, 1826) (Didelphimorphia: Didelphidae), the tapeti, *Sylvilagus brasiliensis* (L., 1758) (Lagomorpha: Leporidae), the capybara, *Hydrochoerus hydrochaeris* (L., 1766) (Rodentia: Caviidae) and the russet rice rat, *Euryoryzomys russatus* (Wagner, 1848) (Rodentia: Cricetidae); in the Rio de Janeiro State parasitizing the following bird and mammal species, the ruddy quail-dove, *Geotrygon montana* (L., 1758) (Columbiformes: Columbidae), the rufous-capped antthrush, *Formicarius colma* Boddaert, 1783 (Passeriformes: Formicariidae), the white-shouldered fire-eye, *Pyriglena leucoptera* (Vieillot, 1818) (Passeriformes: Thamnophilidae), the ruby-crowned tanager, *Tachyphonus coronatus* (Vieillot, 1822) (Passeriformes: Thraupidae), the white-necked thrush, *Turdus albicollis* Vieillot, 1818 (Passeriformes: Turdidae), the red-rumped agouti, *Dasyprocta leporina* (L., 1758) (Rodentia: Dasyproctidae); while in the Minas Gerais State parasitizing a bird and a mammal species, *C. caudata* (Passeriformes: Pipridae) and *Trinomys* sp. (Rodentia: Echimyidae), respectively.

**Note.** This species was recently redescribed by Bassini Silva et al. (2019), with no need for another redescription in the present study.

***Eutrombicula butantanensis* (Fonseca, 1932)**

**(Figures 15-18)**

*Trombicula butantanensis* Fonseca, 1932: 147; Torres and Braga, 1939: 38; Jenkins, 1949: 308.

*Trombicula ophidica* Fonseca, 1932: 151; Jenkins, 1949 **n. syn.**

*Eutrombicula butantanensis*: Ewing, 1938: 294; Radford, 1942: 66; Radford, 1954: 261;

*Eutrombicula ophidica*: Ewing, 1938: 294; Radford, 1942: 66; Jenkins, 1949: 315; Radford, 1954: 261; Mendoza-Roldan et al. 2020 **n. syn.**

*Acariscus butantanensis*: Ewing, 1943: 63;

*Trombicula (Eutrombicula) butantanensis*: Thor and Willmann, 1947: 290;

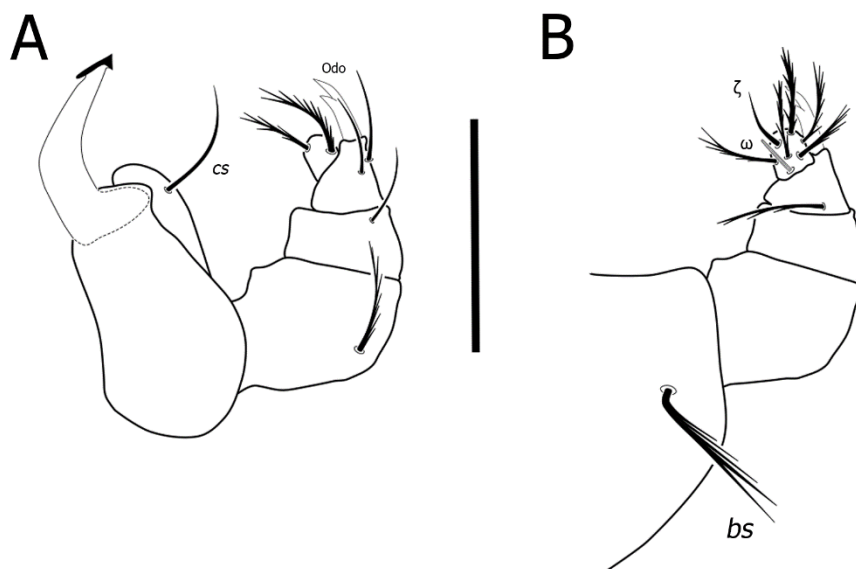
*Trombicula (Eutrombicula) ophidica*: Thor and Willmann, 1947: 290 **n. syn.**

*Fonsecia (Subfonsecia) ophidica*: Vercammen-Grandjean, 1965: 75; 1967: 133 **n. syn.**

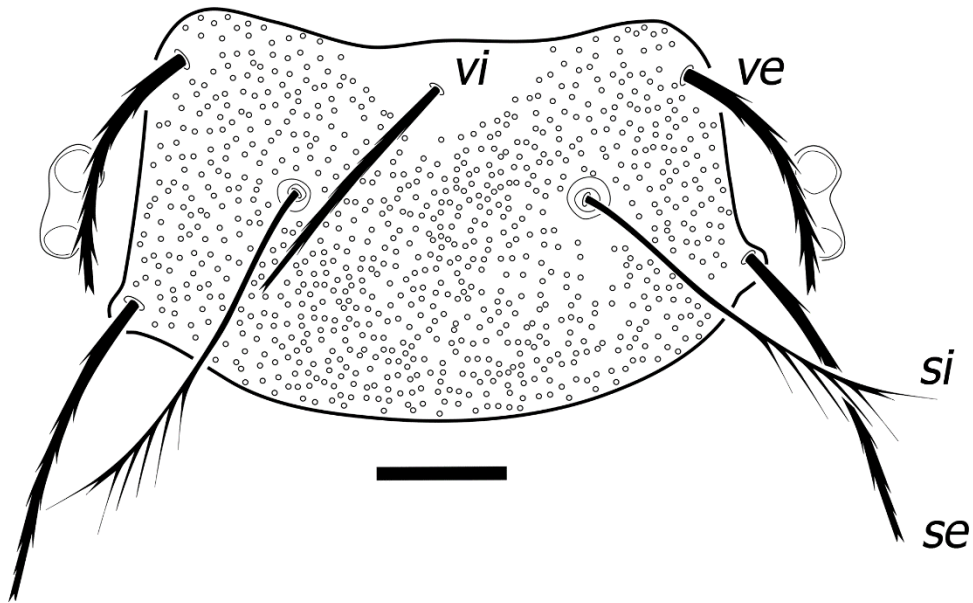
**Diagnosis.** Larva. Palpfemur with single branched seta; palpgenu with single nude seta; dorsal and lateral setae nude and ventral setae branched on the palptibia; adoral (*cs*) setae nude; odontus bifurcate, outer prong slightly larger than the inner prong, this one comes out a little bit above the middle of the odontus; with flagelliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed; C row with 8 setae; D row with 6 setae; E row with 4 setae; F row with two setae; with 32 opisthosomal setae including 12 ventral setae; base of famulus ( $\epsilon$ ) on Ta I and II distal and proximal to solenidion ( $\omega$ ), respectively; one mastiseta on Ta III.

**Redescription.** Larvae (holotype and paratypes). *Gnathosoma* – fPp = B/N/NNB/7B $\omega$  $\zeta$ ; odontus bifurcate, outer prong slightly larger than the inner prong, this one comes out a little bit above the middle of the odontus; cheliceral blade with tricuspid cap; gnathobase with few punctuations, subcapitular (*bs*) setae branched and adoral (*cs*) setae nude (Figs. 15A and B). *Idiosoma* - eyes 2/2, anterior lens larger, with ocular plate; subrectangular prodorsal sclerite heavily punctuated, anterior margin slightly sinuous, lateral margin convex and posterior margin of prodorsal sclerite markedly concave (Fig. 16), with flagelliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed, and 5 branched normal setae [pair of *ve* (= AL) seta, single *vi* (= AM) seta and pair of *se* (= PL) seta]; *si* > *se* > *ve* > *vi*. Opisthosoma (Figs. 17A and B) with 32 setae; dorsal opisthosoma with 20 setae, C row with 4 pairs of setae, D row with 3 pairs of setae, E row with 2 pairs of setae, F row with one pair

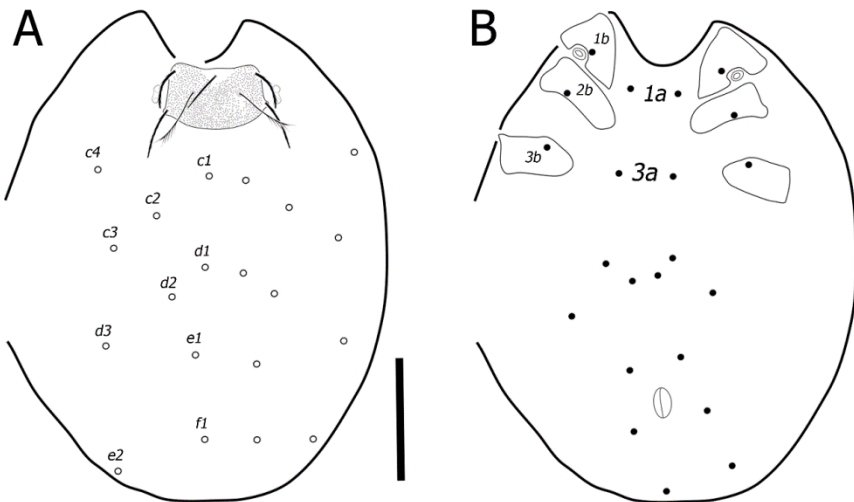
of setae, and 12 ventral opisthosomal setae with 8 setae anterior to anus and 4 setae posterior to the anus. Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs* – femur of legs I-III each divided into basifemur and telofemur, each leg terminated with paired claws, and claw like empodium without onychotriches, coxal fields with punctuations that form lines; *Leg I* - coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3  $\sigma$  and  $\kappa$ ; tibia 8B, 2  $\phi$  and  $\kappa$ ; tarsus 21B with  $\omega$ ,  $\epsilon$ , dorsal eupathidium ( $\zeta'$ ) with companion seta (*z*) and subterminal eupathidium ( $\zeta''$ ), base of famulus ( $\epsilon$ ) distal to solenidion ( $\omega$ ) (Fig. 18A). *Leg II* - coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B,  $\sigma$ ; tibia 6B, 2  $\phi$ ; tarsus 16B with  $\omega$ ,  $\epsilon$  and subterminal eupathidium ( $\zeta$ ), base of  $\epsilon$  proximal to  $\omega$  (Fig. 18B). *Leg III* - coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B,  $\sigma$ , tibia 6B,  $\phi$ ; tarsus 13B and one mastiseta (MTa) (Fig. 18C).



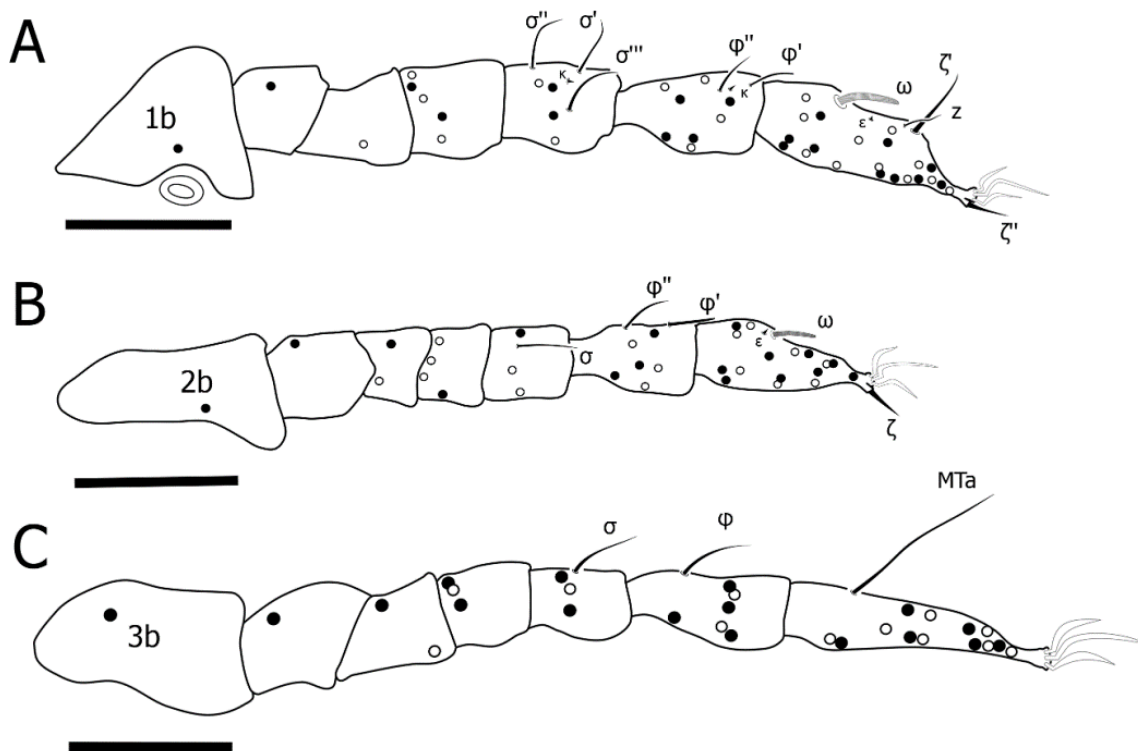
**Figure 15.** *Eutrombicula butantanensis* (Fonseca, 1932); A – dorsal view of gnathosoma; B – ventral view of palp. Symbols:  $\omega$  = solenidion on palptarsus;  $\zeta$  = subterminal eupathidium of palptarsus; Odo = odontus; *cs* = adoral setae; *bs* = subcapitular setae. Scales: A and B 50  $\mu$ m.



**Figure 16.** *Eutrombicula butantanensis* (Fonseca, 1932); prodorsal sclerite. Symbols: *ve* = external vertical setae; *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular setae (trichobothria). Scales: 20  $\mu\text{m}$ .



**Figure 17.** *Eutrombicula butantanensis* (Fonseca, 1932); A – dorsal view of idiosoma; B – ventral view of idiosoma. Symbols: *c*<sub>1</sub>-*c*<sub>4</sub> = C row setae; *d*<sub>1</sub>-*d*<sub>3</sub> = D row setae; *e*<sub>1</sub>-*e*<sub>2</sub> = E row setae; *f*<sub>1</sub> = F row setae; *1a* = anterior sternal setae; *3a* = posterior sternal setae; *1b* = coxal field I seta; *2b* = coxal field II seta; *3b* = coxal field III seta. Scales: A and B 100  $\mu\text{m}$ .



**Figure 18.** *Eutrombicula butantanensis* (Fonseca, 1932); A – Leg I; B – Leg II; C – Leg III; Symbols:  $\zeta'$  = dorsal eupathidium on Ta I;  $\zeta''$  and  $\zeta$  = subterminal eupathidium on Ta I and II, respectively;  $\omega$  = solenidion on Ta I and II;  $\sigma$ ,  $\sigma'$ ,  $\sigma''$ ,  $\sigma'''$  = solenidia on Ge I-III;  $\kappa$  = microsetae on Ge I and Ti I;  $\phi'$ ,  $\phi''$ ,  $\phi$  = solenidia on Ti I-III;  $\epsilon$  = famulus on Ta I and II; *1b* = coxal field I seta; *2b* = coxal field II seta; *3b* = coxal field III seta; MTa = masetae on Ta III. Scales: A-C 50  $\mu$ m.

**Type material examined of the *E. butantanensis*.** **HOLOTYPE:** larva (IBSP 28), Butantan District, São Paulo State, 17 Feb. 1932, ex *Homo sapiens* (L., 1758) (Primates: Hominidae), J. B. Arantes coll.; **PARATYPES:** 1 larva (IBSP 83), São Paulo State, 3 Mar. 1932, ex *Xenodon merremii* (Wagler, 1824) (Squamata: Colubridae), F. Fonseca coll.; 1 larva (IBSP 84), same data.

**Type material examined of the *E. ophidica*.** **HOLOTYPE:** larva (IBSP 29), Promissão Municipality, São Paulo State, 18 May 1932, ex *Xenodon merremii* (Wagler, 1824) (Squamata: Colubridae), F. Fonseca coll.; **PARATYPE:** 2 larvae (IBSP 29), same data as holotype.

**New records.** 1 larva (IBSP 88B), Promissão Municipality, São Paulo State, 19 May 1932, ex *Xenodon merremii* (Wagler, 1824) (Squamata: Colubridae), F. Fonseca coll.; 8 larvae (IBSP 84), without specific locality, 15 Apr. 1932 same host; 3 larvae (IBSP 6186A), Dracena Municipality, São Paulo State, 19 Dec. 1977, same host; 1 larva (IBSP 6033),

Oriente Municipality, São Paulo State, 17 Nov. 1976, same host, J. Tardini coll.; 2 larvae (IBSP 12067), Sete Barras Municipality, São Paulo State, Dec. 2013, *Placosoma glabellum* (Peters, 1870) (Squamata: Gymnophthalmidae), J. A. Mendoza-Roldan coll.

**Hosts and distribution in Brazil.** This species was described from the skin of a man who was taking care of a serpentarium, in addition to these records this species was also recorded parasitizing the Wagler's snake, *Xenodon merremii* (Wagler, 1824) (Squamata: Colubridae) twice (Fonseca, 1932). In the present study we are recording for the first time this species parasitizing the rainforest gecko, *Placosoma glabellum* (Peters, 1870) (Squamata: Gymnophthalmidae). So far, all records for this species are restricted to the São Paulo State.

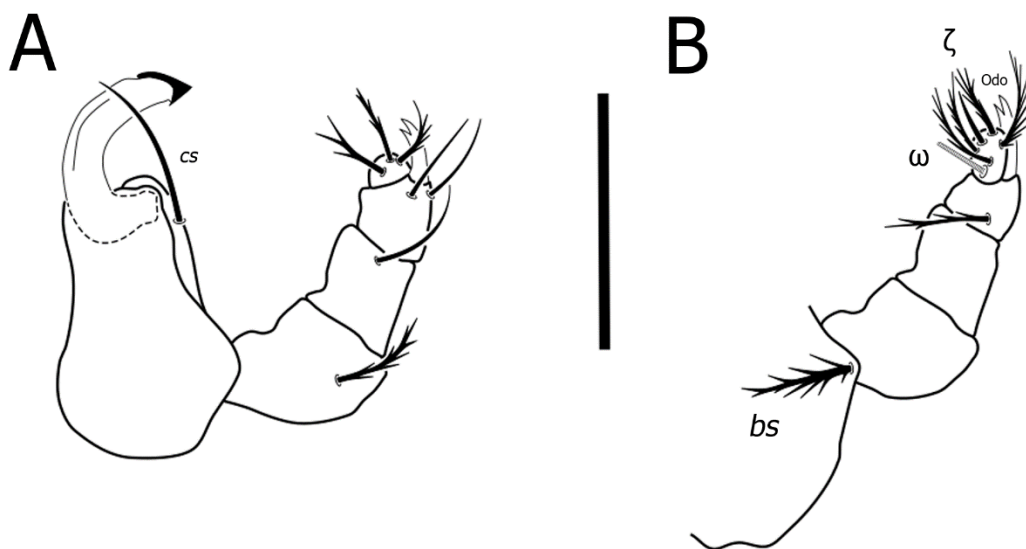
### ***Eutrombicula* sp. n. 1**

**(Figures 19-22, Tables 1-4)**

**Diagnosis.** Larva. Palpfemur with single branched seta; palpgenu with single nude seta; dorsal and lateral setae nude and ventral setae branched on the palptibia; adoral (*cs*) setae nude; outer and inner prong are almost the same size, divided at the tip of the odontus; prodorsal sclerite heavily punctuated; flageliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed; C row with 8 setae; D row with 6 setae; E row with 4 setae; F row with two setae; with 32 opisthosomal setae including 12 ventral setae; coxal field I with distal margin elongated covering the margin of coxal field II; base of famulus ( $\epsilon$ ) on Ta I and II distal and proximal to solenidion ( $\omega$ ), respectively.

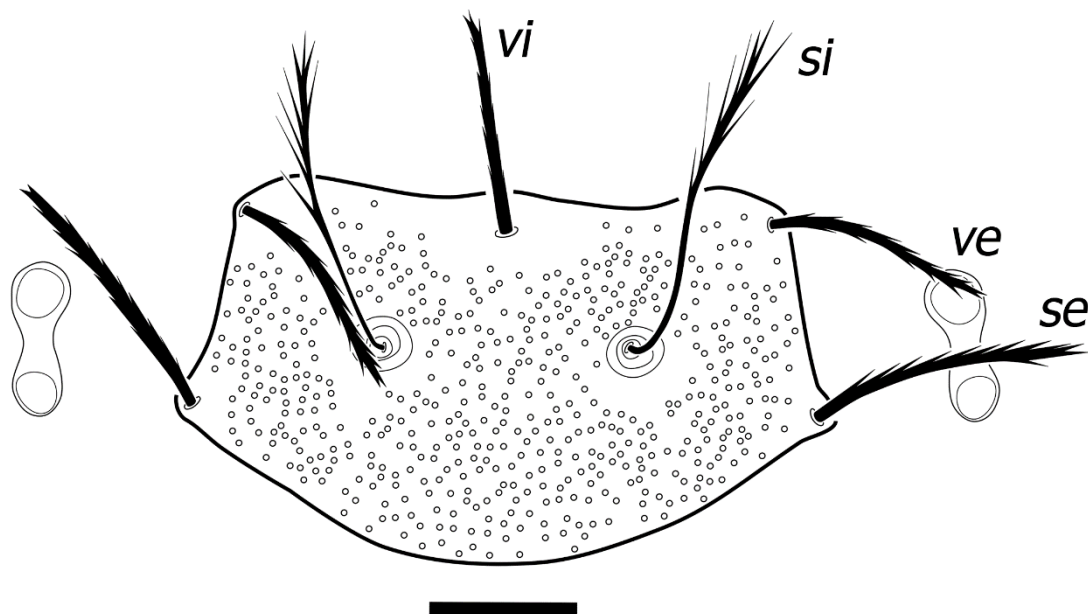
**Description.** Larvae (holotype, paratypes and additional material). *Gnathosoma* – fPp = B/N/NNB/7B $\omega$  $\zeta$ ; odontus bifurcate, outer and inner prong are almost the same size, divided at the tip of the odontus; curved cheliceral blade with tricuspoid cap; gnathobase with few punctuations, subcapitular (*bs*) setae branched and adoral (*cs*) setae nude (Figs. 19A and B). *Idiosoma* - eyes 2/2, subequal, with ocular plate; subrectangular prodorsal sclerite heavily punctuated, anterior margin slightly sinuous, lateral margin convex and posterior margin of prodorsal sclerite markedly concave (Fig. 20), with flagelliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed, and 5 branched normal setae [pair of *ve* (= AL) seta, single *vi* (= AM) seta and pair of *se* (= PL) seta];  $si > se \geq vi > ve$ . Opisthosoma (Figs. 21A and B) with 32 setae; dorsal opisthosoma with 20 setae, C row with 4 pairs of setae, D row with 3 pairs of setae, E row with 2 pairs of setae, F row with one pair of setae,

and 12 ventral opisthosomal setae with 10 setae anterior to anus and 2 setae posterior to the anus. Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs* – femur of legs I-III each divided into basifemur and telofemur, each leg terminated with paired claws, and claw like empodium without onychotriches, coxal fields with punctuations that form lines; coxal field I with distal margin elongated covering the margin of coxal field II; *Leg I* - coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3  $\sigma$  and  $\kappa$ ; tibia 8B, 2  $\phi$  and  $\kappa$ ; tarsus 21B with  $\omega$ ,  $\varepsilon$ , dorsal eupathidium ( $\zeta'$ ) with companion seta (*z*) and subterminal eupathidium ( $\zeta''$ ), base of famulus ( $\varepsilon$ ) distal to solenidion ( $\omega$ ) (Fig. 22A). *Leg II* - coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B,  $\sigma$ ; tibia 6B, 2  $\phi$ ; tarsus 16B with  $\omega$ ,  $\varepsilon$  and subterminal eupathidium ( $\zeta$ ), base of  $\varepsilon$  proximal to  $\omega$  (Fig. 22B). *Leg III* - coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B,  $\sigma$ , tibia 6B,  $\phi$ ; tarsus 15B (Fig. 22C).

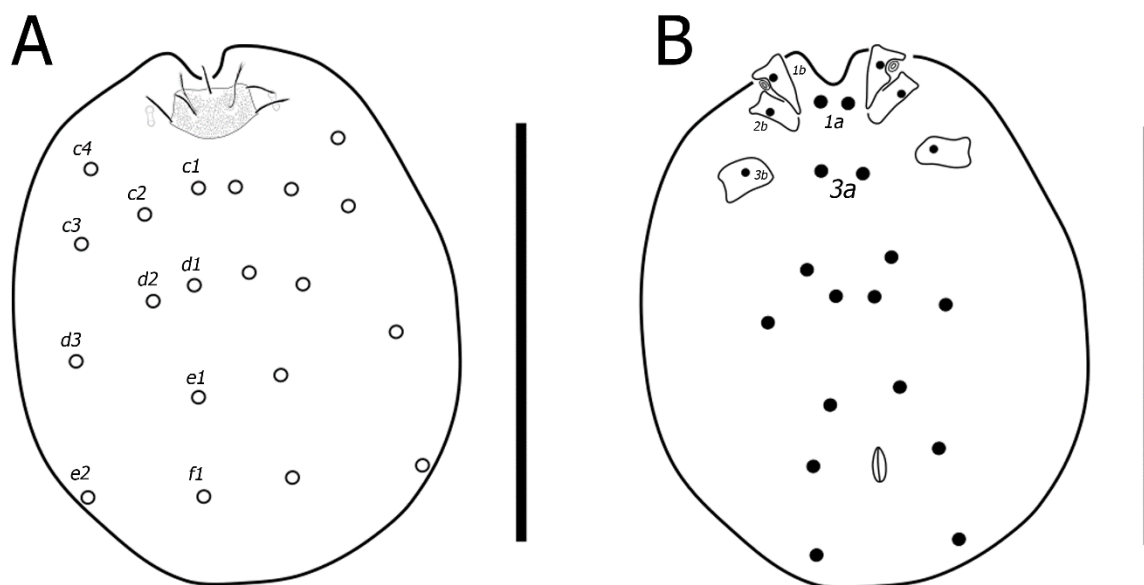


**Figure 19.** *Eutrombicula* sp. n. 1; A – dorsal view of gnathosoma; B – ventral view of palp. Symbols:  $\omega$  = solenidion on palptarsus;  $\zeta$  = subterminal eupathidium of palptarsus; Odo = odontus; *cs* = adoral setae; *bs* = subcapitular setae. Scales: A and B 50  $\mu$ m.

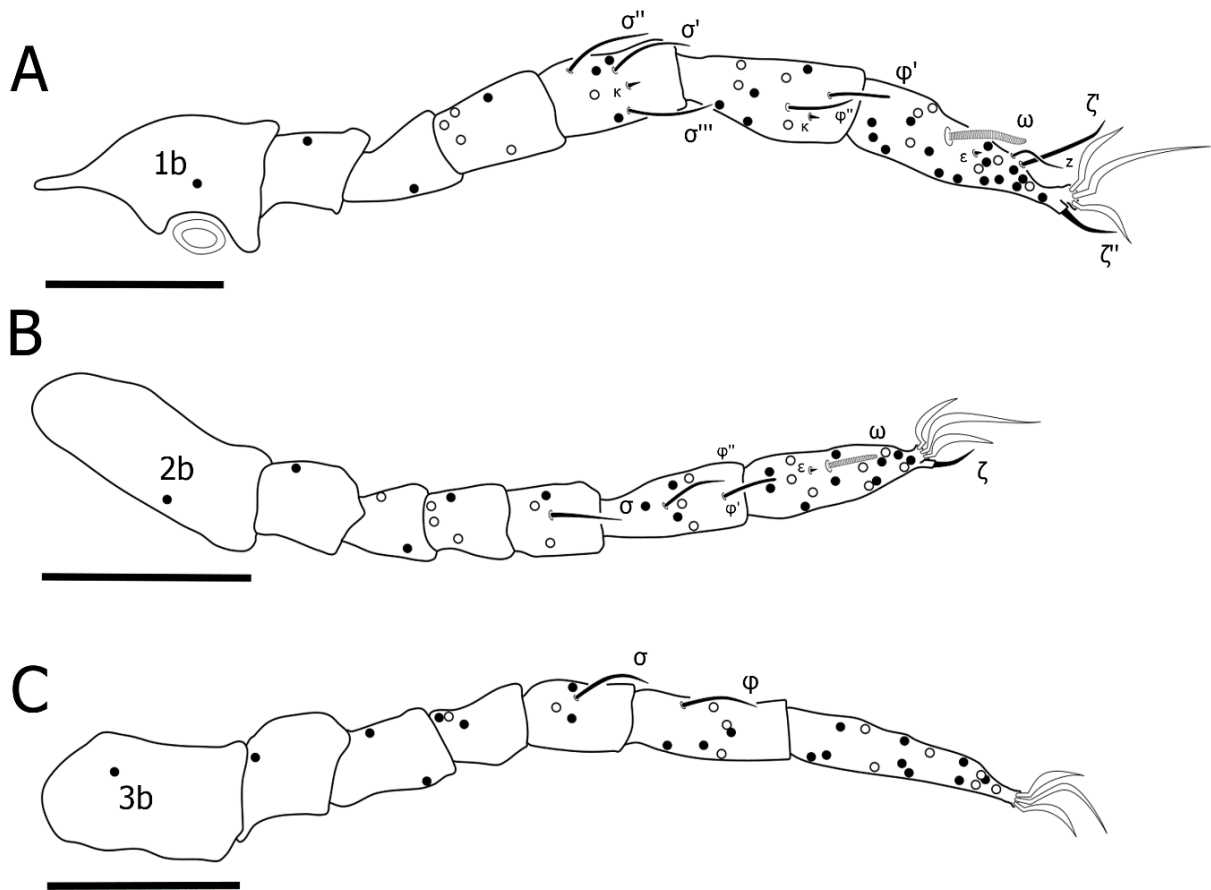




**Figure 20.** *Eutrombicula* sp. n. 1; prodorsal sclerite. Symbols: *ve* = external vertical setae; *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular setae (trichobothria). Scales: 20  $\mu$ m.



**Figure 21.** *Eutrombicula* sp. n. 1; A – dorsal view of idiosoma; B – ventral view of idiosoma. Symbols: *c*<sub>1</sub>-*c*<sub>4</sub> = C row setae; *d*<sub>1</sub>-*d*<sub>3</sub> = D row setae; *e*<sub>1</sub>-*e*<sub>2</sub> = E row setae; *f*<sub>1</sub> = F row setae; *1a* = anterior sternal setae; *3a* = posterior sternal setae; *1b* = coxal field I seta; *2b* = coxal field II seta; *3b* = coxal field III seta. Scales: A and B 500  $\mu$ m.



**Figure 22.** *Eutrombicula* sp. n. 1; A – Leg I; B – Leg II; C – Leg III; Solid circles = ventral leg setae; open circles = dorsal leg setae; Symbols:  $\zeta'$  = dorsal eupathidium on Ta I;  $\zeta''$  and  $\zeta$  = subterminal eupathidium on Ta I and II, respectively;  $\omega$  = solenidion on Ta I and II;  $\sigma$ ,  $\sigma'$ ,  $\sigma''$ ,  $\sigma'''$  = solenidia on Ge I-III;  $\kappa$  = microsetae on Ge I and Ti I;  $\phi'$ ,  $\phi''$ ,  $\phi$  = solenidia on Ti I-III;  $\varepsilon$  = famulus on Ta I and II; *1b* = coxal field I seta; *2b* = coxal field II seta; *3b* = coxal field III seta.. Scales: A-C 50  $\mu$ m.

**Table 1.** Standard measurements of *Eutrombicula* sp. n. 1.

	AW	PW	SB	ASB	PSB	SD	AP	<i>vi</i>	<i>ve</i>	<i>se</i>	<i>si</i>	<i>1a</i>	<i>3a</i>	DMIN	DMAX	VMIN	VMAX
<b>Holotype</b>	71	84	33	21	29	50	26	29	25	29	44	40	33	29	37	30	35
<b>Minimum</b>	68	84	32	20	28	48	25	29	25	30	43	38	30	28	39	29	35
<b>Maximum</b>	72	88	33	23	30	53	26	31	29	36	44	42	34	31	37	32	36
<b>Mean</b>	70	86	32	21	29	50	25	30	27	33	43	40	32	29	38	30	35

Legend: AW = distance between the bases of the *ve* setae; PW = distance between the bases of the *se* setae; SB = distance between the trichobothria (*si*) bases; ASB = distance from trichobothria (*si*) bases to extreme anterior margin of the prodorsal sclerite; PSB = distance from trichobothria (*si*) bases to extreme posterior margin of the prodorsal sclerite; SD = ASB + PSB; AP = distance between the bases of *ve* and *se*; *ve* = external vertical setae; *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular setae (trichobothria); *1a* = anterior sternal setae; *3a* = posterior sternal setae; DMIN = minimum length of dorsal opisthosomal setae; DMAX = maximum length of dorsal opisthosomal setae; VMIN = minimum length of ventral idiosomal setae; VMAX = maximum length of ventral idiosomal setae.

**Table 2.** Standard measurements of *Eutrombicula* sp. n. 1.

	<b>Cx</b>	<b>Tr</b>	<b>BFe</b>	<b>TFe</b>	<b>Ge</b>	<b>Ti</b>	<b>Ta</b>	<b>I</b>	<b>Ta</b>	<b>I</b>	<b>Cx</b>	<b>Tr</b>	<b>BFe</b>	<b>TFe</b>	<b>Ge</b>	<b>Ti</b>	<b>Ta</b>	<b>II</b>	<b>Ta</b>	<b>II</b>	
	<b>I</b>	<b>I</b>	<b>I</b>	<b>I</b>	<b>I</b>	<b>I</b>	<b>(L)</b>		<b>(W)</b>		<b>II</b>	<b>II</b>	<b>II</b>	<b>II</b>	<b>II</b>	<b>II</b>	<b>(L)</b>		<b>(W)</b>		
<b>Holotype</b>	64	27	28	33	37	52	61		17		61	30	23	24	27	40	50			15	
<b>Minimum</b>	62	27	28	32	36	50	60		17		60	30	22	24	27	38	49			15	
<b>Maximum</b>	65	30	30	34	39	55	62		18		62	32	23	26	30	41	52			16	
<b>Mean</b>	63	28	29	33	37	52	61		17		61	31	22	25	28	39	50			15	

Legend: Cx I - length of coxal field I; Tr I - length of trochanter on leg I; BFe I - length of basifemur on leg I; TFe I - length of telofemur on leg I; Ge I - length of genu on leg I; Ti I - length of tibia on leg I; Ta I (L) - length of tarsus on leg I; Ta I (W) - width of tarsus on leg I; Cx II - length of coxal field II; Tr II - length of trochanter on leg II; BFe II - length of basifemur on leg II; TFe II - length of telofemur on leg II; Ge II - length of genu on leg II; Ti II - length of tibia on leg II; Ta II (L) - length of tarsus on leg II; Ta II (W) – width of tarsus on leg II.

**Table 3.** Standard measurements of *Eutrombicula* sp. n. 1.

	<b>Cx III</b>	<b>Tr III</b>	<b>BFe III</b>	<b>TFe III</b>	<b>Ge III</b>	<b>Ti III</b>	<b>TaIII (L)</b>	<b>Ta III (W)</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IP</b>
<b>Holotype</b>	58	25	33	26	30	44	65	15	238	194	233	838
<b>Minimum</b>	58	24	30	25	29	42	65	14	233	190	215	818
<b>Maximum</b>	60	25	33	27	30	44	66	15	250	204	225	866
<b>Mean</b>	59	24	31	26	29	43	65	14	241	197	220	842

Legend: Cx III - length of coxal field III; Tr III - length of trochanter on leg III; BFe III - length of basifemur on leg III; TFe III - length of telofemur on leg III; Ge III - length of genu on leg III; Ti III - length of tibia on leg III; Ta III (L) - length of tarsus on leg III; Ta III (W) - width of tarsus on leg III; I = length of leg I (trochanter to tarsus); II = length of leg II (trochanter to tarsus); III = length of leg III (trochanter to tarsus); IP - sum of leg lengths (proximal end of coxal field to the pretarsus).

**Table 4.** Standard measurements of *Eutrombicula* sp. n. 1.

	$\sigma$ I	$\kappa$ I	$\varphi'$ I	$\varphi''$ I	$\kappa$ I	$\omega$ I	$\varepsilon$ I	$\zeta'$ I	z	$\zeta''$ I	$\sigma$ II	$\varphi'$ II	$\varphi''$ II	$\omega$ II	$\varepsilon$ II	$\zeta$ II	$\sigma$ III	$\varphi$ III
<b>Holotype</b>	21	4	17	18	3	21	2	23	14	15	20	15	16	14	2	12	20	21
<b>Minimum</b>	21	3	17	18	3	21	2	22	14	15	20	14	16	13	2	11	20	21
<b>Maximum</b>	23	4	19	20	3	24	2	23	16	16	24	15	18	14	2	12	22	22
<b>Mean</b>	22	3	18	19	3	22	2	22	15	15	22	15	17	13	2	11	21	21

Legend: I =  $\sigma$  I,  $\sigma$  II,  $\sigma$  III = length of the solenidia on Ge I-III;  $\kappa$  I = length of microseta on Ge and Ti I;  $\varphi'$  I,  $\varphi''$  I = length of the solenidia on Ti I;  $\kappa$  I = length of microseta on Ti I;  $\omega$  I = length of solenidion on Ta I;  $\varepsilon$  I = length of famulus on Ta I;  $\zeta'$  I = length of dorsal eupathidium on Ta I; z = length of companion seta on Ta I;  $\zeta''$  I = length of subterminal eupathidium on Ta I;  $\varphi'$  II,  $\varphi''$  II = length of the solenidia on Ti II;  $\omega$  II = length of solenidion on Ta II;  $\varepsilon$  II = length of famulus on Ta II;  $\zeta$  II = length of subterminal eupathidium on Ta II;  $\varphi$  III = length of the solenidia on Ti III;

**Type material examined. HOLOTYPE:** larva (IBSP 11687), Mato Grosso State, 31 Mar. 2013, ex *Micrablepharus atticolus* Rodrigues, 1996 (Squamata: Gymnophthalmidae), C. Strussmann coll.; **PARATYPES:** 4 larvae (IBSP 11687), same data as holotype.

**Additional records.** 2 larvae (IBSP 11668), Mato Grosso State, 24 Feb. 2013, *Micrablepharus atticolus* Rodrigues, 1996 (Squamata: Gymnophthalmidae), C. Strussmann coll.; 2 larvae (IBSP 11671), same locality and host, 28 Mar. 2013; 1 larva (IBSP 11677), same data; 12 larvae (IBSP 11672), same locality and host, 26 Mar. 2013; 7 larvae (IBSP 11674), same data; 5 larvae (IBSP 11682), same locality and host, 2 Apr. 2013; 7 larvae (IBSP 11685A), same data; 2 larvae (IBSP 11684), same locality and host, 1 Apr. 2013; 2 larvae (IBSP 11689), same data; 3 larvae (IBSP 11688), same locality and host, 31 Mar. 2013; 1 larva (IBSP 11680), same locality, 2 Apr. 2013, *Ameiva* sp. (Squamata: Teiidae); 1 larva (IBSP 11670), same locality, no date, *Ameivula* sp. (Squamata: Teiidae); 1 larva (IBSP 11686), same data; 5 larvae (IBSP 11673A), same locality and host, 27 Mar. 2013; 1 larva (IBSP 11676), same locality and host, 28 Mar. 2013; 4 larvae (IBSP 11679), same locality and host, 2 Apr. 2013; 4 larvae (IBSP 11683), same locality and host, 1 Apr. 2013; 11 larvae (IBSP 11667), same locality, 24 Feb. 2013, ex *Tropidurus oreadicus* Rodrigues, 1987 (Squamata: Tropiduridae); 3 larvae (IBSP 11675A), same locality and host, 27 Mar. 2013; 2 larvae (IBSP 13063), Pedrinhas, Petrolina Municipality, Pernambuco State, 04 May, 2015, ex *Tropidurus* sp. (Squamata: Tropiduridae), M. C. Horta coll.

**Hosts and distribution in Brazil.** So far, this new species is collected in the Mato Grosso State parasitizing the species of lizards, *Micrablepharus atticolus* Rodrigues, 1996 (Squamata: Gymnophthalmidae), *Ameiva* sp. (Squamata: Teiidae), *Ameivula* sp. (Squamata: Teiidae) and *Tropidurus oreadicus* Rodrigues, 1987 (Squamata: Tropiduridae), and there is another record for the Pernambuco State, which this new species was collected parasitizing an unidentified *Tropidurus*.

### *Eutrombicula* sp. n. 2

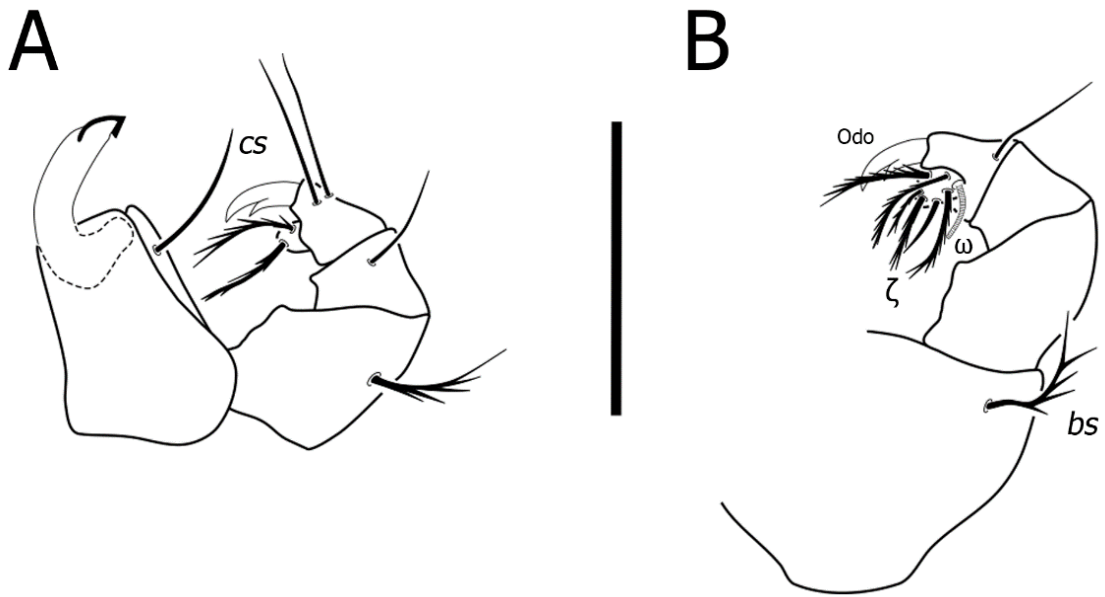
(Figures 23-26, Tables 5-8)

**Diagnosis.** Larva. Palpfemur with single branched seta; palpgenu with single nude seta; dorsal, lateral and ventral setae nude on the palptibia; adoral (*cs*) setae nude; outer prong much bigger than inner prong, and inner prong in the medium region of odontus; prodorsal

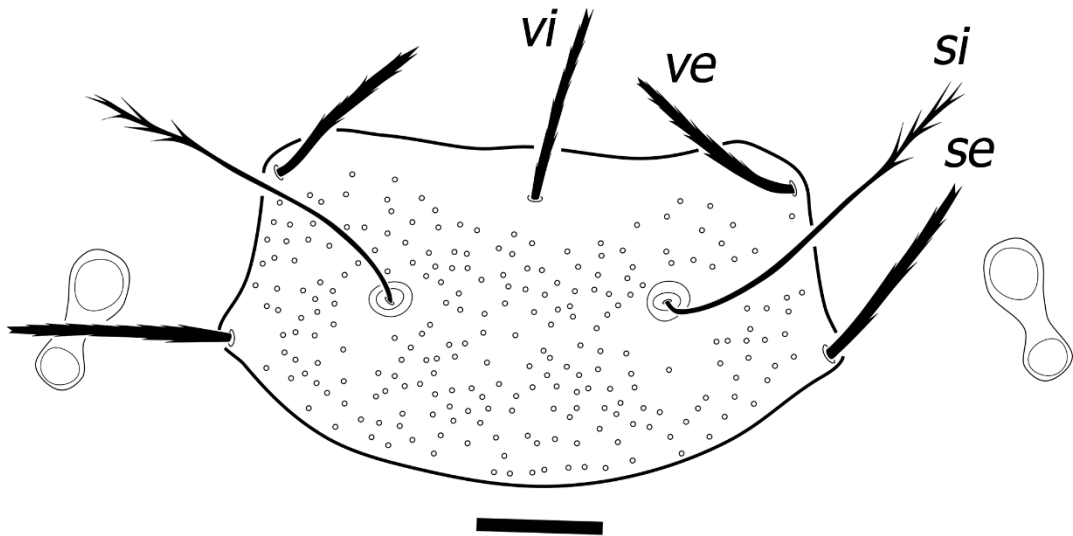
sclerite sparsely punctuated; flageliform trichobothria (*si*), distal tip with setules thin and long, sparsely distributed; C row with 8 setae; D row with 6 setae; E row with 4 setae; F and H rows with two setae each; with 32 opisthosomal setae including 10 ventral setae; base of famulus ( $\varepsilon$ ) on Ta I and II distal and proximal to solenidion ( $\omega$ ), respectively; without mastiseta on Ta III.

**Description.** Larvae (holotype, paratype and additional material). *Gnathosoma* – fPp = B/N/NNN/7B $\omega$  $\zeta$ ; odontus bifurcate, outer prong much bigger than inner prong, and inner prong in the medium region of odontus; cheliceral blade with tricuspid cap; gnathobase with few punctuations, subcapitular (*bs*) setae branched and adoral (*cs*) setae nude (Figs. 23A and B). *Idiosoma* - eyes 2/2, anterior lens larger, with ocular plate; subrectangular prodorsal sclerite sparsely punctuated, anterior margin slightly sinuous, lateral margin convex and posterior margin of prodorsal sclerite markedly concave (Fig. 24), with flagelliform trichobothria (*si*), distal tip with setules thin and long, sparsely distributed, and 5 branched normal setae [pair of *ve* (= AL) seta, single *vi* (= AM) seta and pair of *se* (= PL) seta];  $si > se \geq vi > ve$ . Opisthosoma (Figs. 25A and B) with 32 setae; dorsal opisthosoma with 22 setae, C row with 4 pairs of setae, D row with 3 pairs of setae, E row with 2 pairs of setae, F and H rows with one pair of setae each, and 10 ventral opisthosomal setae with 8 setae anterior to anus and 2 setae posterior to the anus. Two pairs of sternal setae (*Ia*, *3a*) between coxal fields I and III. *Legs* – femur of legs I-III each divided into basifemur and telofemur, each leg terminated with paired claws, and claw like empodium without onychotriches, coxal fields with punctuations that form lines; *Leg I* - coxal field seta *Ib* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3  $\sigma$  and  $\kappa$ ; tibia 8B, 2  $\phi$  and  $\kappa$ ; tarsus 21B with  $\omega$ ,  $\varepsilon$ , dorsal eupathidium ( $\zeta'$ ) with companion seta (*z*) and subterminal eupathidium ( $\zeta''$ ), base of famulus ( $\varepsilon$ ) distal to solenidion ( $\omega$ ) (Fig. 26A). *Leg II* - coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B,  $\sigma$ ; tibia 6B, 2  $\phi$ ; tarsus 16B with  $\omega$ ,  $\varepsilon$  and subterminal eupathidium ( $\zeta$ ), base of  $\varepsilon$  proximal to  $\omega$  (Fig. 26B). *Leg III* - coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B,  $\sigma$ , tibia 6B,  $\phi$ ; tarsus 15B (Fig. 26C).

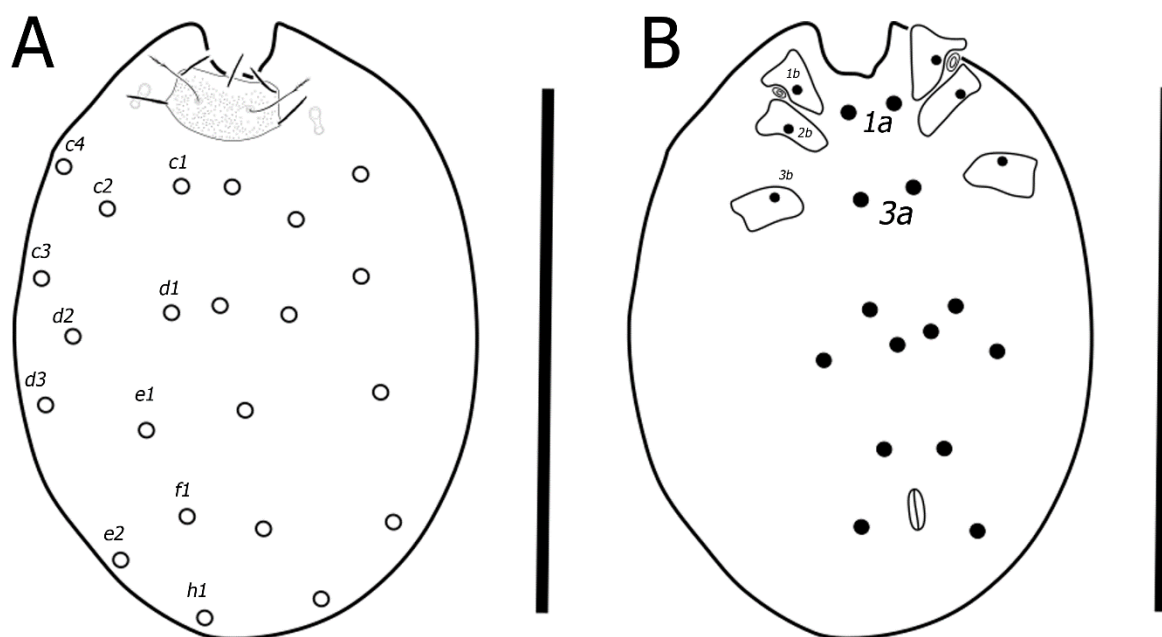




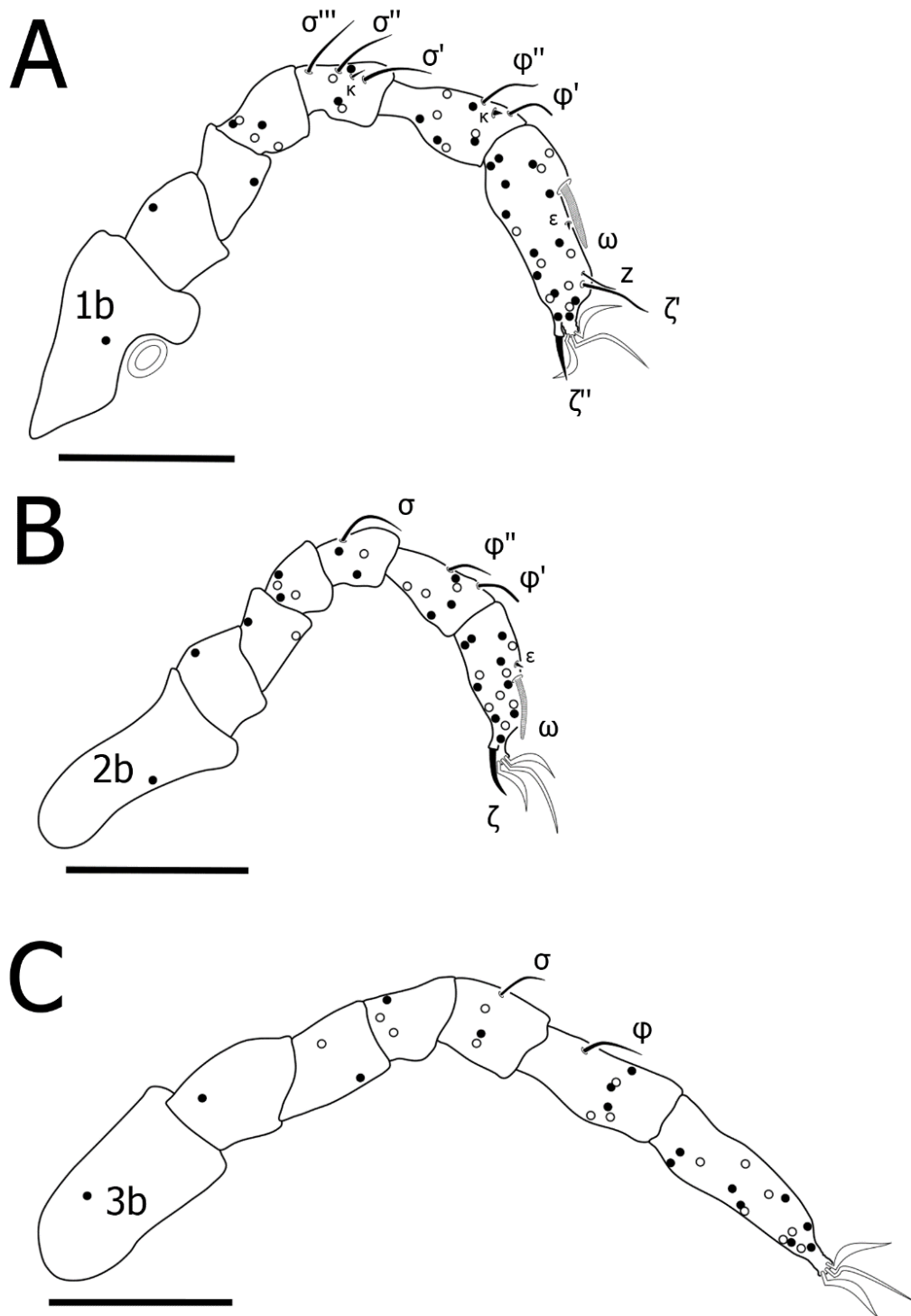
**Figure 23.** *Eutrombicula* sp. n. 2; A – dorsal view of gnathosoma; B – ventral view of palp. Symbols:  $\omega$  = solenidion on palptarsus;  $\zeta$  = subterminal eupathidium of palptarsus; Odo = odontus; cs = adoral setae; bs = subcapitular setae. Scales: A and B 50  $\mu$ m.



**Figure 24.** *Eutrombicula* sp. n. 2; prodorsal sclerite. Symbols: ve = external vertical setae; se = external scapular setae; vi = internal vertical setae; si = internal scapular setae (trichobothria). Scales: 20  $\mu$ m.



**Figure 25.** *Eutrombicula* sp. n. 2; A – dorsal view of idiosoma; B – ventral view of idiosoma. Symbols:  $c_1$ - $c_4$  = C row setae;  $d_1$ - $d_3$  = D row setae;  $e_1$ - $e_2$  = E row setae;  $f_1$  = F row setae;  $h_1$  = H row setae;  $1a$  = anterior sternal setae;  $3a$  = posterior sternal setae;  $1b$  = coxal field I seta;  $2b$  = coxal field II seta;  $3b$  = coxal field III seta. Scales: A and B 500  $\mu$ m.



**Figure 26.** *Eutrombicula* sp. n. 2; A – Leg I; B – Leg II; C – Leg III; Solid circles = ventral leg setae; open circles = dorsal leg setae; Symbols:  $\zeta'$  = dorsal eupathidium on Ta I;  $\zeta''$  and  $\zeta$  = subterminal eupathidium on Ta I and II, respectively;  $\omega$  = solenidion on Ta I and II;  $\sigma$ ,  $\sigma'$ ,  $\sigma''$ ,  $\sigma'''$  = solenidia on Ge I-III;  $\kappa$  = microsetae on Ge I and Ti I;  $\phi'$ ,  $\phi''$ ,  $\phi$  = solenidia on Ti I-III;  $\epsilon$  = famulus on Ta I and II; *1b* = coxal field I seta; *2b* = coxal field II seta; *3b* = coxal field III seta. Scales: A-C 50  $\mu$ m.

**Table 5.** Standard measurements of *Eutrombicula* sp. n. 2.

	AW	PW	SB	ASB	PSB	SD	AP	<i>vi</i>	<i>ve</i>	<i>se</i>	<i>si</i>	<i>1a</i>	<i>3a</i>	DMIN	DMAX	VMIN	VMAX
<b>Holotype</b>	82	94	44	25	29	54	26	30	22	28	46	34	30	26	34	27	30
<b>Minimum</b>	80	94	40	23	29	52	25	29	22	28	45	34	29	26	33	25	30
<b>Maximum</b>	84	96	46	26	32	58	26	31	25	35	48	36	31	28	37	27	33
<b>Mean</b>	82	95	43	24	30	55	25	30	23	31	46	35	30	27	35	26	31

Legend: AW = distance between the bases of the *ve* setae; PW = distance between the bases of the *se* setae; SB = distance between the trichobothria (*si*) bases; ASB = distance from trichobothria (*si*) bases to extreme anterior margin of the prodorsal sclerite; PSB = distance from trichobothria (*si*) bases to extreme posterior margin of the prodorsal sclerite; SD = ASB + PSB; AP = distance between the bases of *ve* and *se*; *ve* = external vertical setae; *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular setae (trichobothria); *1a* = anterior sternal setae; *3a* = posterior sternal setae; DMIN = minimum length of dorsal opisthosomal setae; DMAX = maximum length of dorsal opisthosomal setae; VMIN = minimum length of ventral idiosomal setae; VMAX = maximum length of ventral idiosomal setae.

**Table 6.** Standard measurements of *Eutrombicula* sp. n. 2.

	<b>Cx</b>	<b>Tr</b>	<b>BFe</b>	<b>TFe</b>	<b>Ge</b>	<b>Ti</b>	<b>Ta</b>	<b>I</b>	<b>Ta</b>	<b>I</b>	<b>Cx</b>	<b>Tr</b>	<b>BFe</b>	<b>TFe</b>	<b>Ge</b>	<b>Ti</b>	<b>Ta</b>	<b>II</b>	<b>Ta</b>	<b>II</b>
	<b>I</b>	<b>I</b>	<b>I</b>	<b>I</b>	<b>I</b>	<b>I</b>	<b>(L)</b>		<b>(W)</b>		<b>II</b>	<b>II</b>	<b>II</b>	<b>II</b>	<b>II</b>	<b>II</b>	<b>(L)</b>		<b>(W)</b>	
<b>Holotype</b>	48	20	29	24	28	33	56		23		44	17	23	14	22	24	44		16	
<b>Minimum</b>	47	19	29	22	28	30	52		22		43	17	21	14	20	22	42		16	
<b>Maximum</b>	50	22	32	24	29	34	57		24		45	18	24	15	23	24	46		18	
<b>Mean</b>	48	20	30	23	28	32	54		23		44	17	22	14	21	23	44		17	

Legend: Cx I - length of coxal field I; Tr I - length of trochanter on leg I; BFe I - length of basifemur on leg I; TFe I - length of telofemur on leg I; Ge I - length of genu on leg I; Ti I - length of tibia on leg I; Ta I (L) - length of tarsus on leg I; Ta I (W) - width of tarsus on leg I; Cx II - length of coxal field II; Tr II - length of trochanter on leg II; BFe II - length of basifemur on leg II; TFe II - length of telofemur on leg II; Ge II - length of genu on leg II; Ti II - length of tibia on leg II; Ta II (L) - length of tarsus on leg II; Ta II (W) – width of tarsus on leg II.

**Table 7.** Standard measurements of *Eutrombicula* sp. n. 2.

	<b>Cx III</b>	<b>Tr III</b>	<b>BFe III</b>	<b>TFe III</b>	<b>Ge III</b>	<b>Ti III</b>	<b>TaIII (L)</b>	<b>Ta III (W)</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IP</b>
<b>Holotype</b>	41	34	30	25	25	39	48	14	190	144	201	668
<b>Minimum</b>	40	34	29	23	24	38	47	13	180	136	195	641
<b>Maximum</b>	44	35	32	27	26	40	50	14	198	150	210	697
<b>Mean</b>	42	34	30	25	25	39	48	13	189	143	202	669

Legend: Cx III - length of coxal field III; Tr III - length of trochanter on leg III; BFe III - length of basifemur on leg III; TFe III - length of telofemur on leg III; Ge III - length of genu on leg III; Ti III - length of tibia on leg III; Ta III (L) - length of tarsus on leg III; Ta III (W) - width of tarsus on leg III; I = length of leg I (trochanter to tarsus); II = length of leg II (trochanter to tarsus); III = length of leg III (trochanter to tarsus); IP - sum of leg lengths (proximal end of coxal field to the pretarsus).

**Table 8.** Standard measurements of *Eutrombicula* sp. n. 2.

	$\sigma$ I	$\kappa$ I	$\varphi'$ I	$\varphi''$ I	$\kappa$ I	$\omega$ I	$\varepsilon$ I	$\zeta'$ I	z	$\zeta''$ I	$\sigma$ II	$\varphi'$ II	$\varphi''$ II	$\omega$ II	$\varepsilon$ II	$\zeta$ II	$\sigma$ III	$\varphi$ III
<b>Holotype</b>	19	4	12	16	2	18	2	19	9	13	17	12	12	17	2	14	12	17
<b>Minimum</b>	15	3	12	16	2	18	2	19	9	11	15	12	11	17	2	14	11	16
<b>Maximum</b>	19	4	14	18	3	20	2	22	11	13	17	12	13	20	2	15	12	18
<b>Mean</b>	17	3	13	17	2	19	2	20	10	12	16	12	12	18	2	14	11	17

Legend: I =  $\sigma$  I,  $\sigma$  II,  $\sigma$  III = length of the solenidia on Ge I-III;  $\kappa$  I = length of microseta on Ge and Ti I;  $\varphi'$  I,  $\varphi''$  I = length of the solenidia on Ti I;  $\kappa$  I = length of microseta on Ti I;  $\omega$  I = length of solenidion on Ta I;  $\varepsilon$  I = length of famulus on Ta I;  $\zeta'$  I = length of dorsal eupathidium on Ta I; z = length of companion seta on Ta I;  $\zeta''$  I = length of subterminal eupathidium on Ta I;  $\varphi'$  II,  $\varphi''$  II = length of the solenidia on Ti II;  $\omega$  II = length of solenidion on Ta II;  $\varepsilon$  II = length of famulus on Ta II;  $\zeta$  II = length of subterminal eupathidium on Ta II;  $\varphi$  III = length of the solenidia on Ti III.

**Type material examined. HOLOTYPE:** larva (IBSP 16567), Morro do Chapéu Municipality, Bahia State, Dec. 2000, ex *Tropidurus erythrocephalus* Rodrigues, 1987 (Squamata: Tropiduridae), V. Menezes coll.; **PARATYPE:** 1 larva (IBSP 16567), same data as holotype.

**Material reexamined.** 5 larvae (IBSP 10836), Morro do Chapéu Municipality, Bahia State, Dec. 2000, ex *Tropidurus erythrocephalus* Rodrigues, 1987 (Squamata: Tropiduridae), V. Menezes coll.; 5 larvae (IBSP 16566), same data; 11 larvae (IBSP 16568), same data; 1 larva (IBSP 10837), same locality and date, ex *Tropidurus semitaeniatus* (Spix, 1825) (Squamata: Tropiduridae); 3 larvae (IBSP 16558A), same data; 1 larva (IBSP 16559), same data; 1 larva (IBSP 16560A), same data; 3 larvae (IBSP 16561A), same data; 5 larvae (IBSP 16562), same data; 1 larva (IBSP 16564), same data; 1 larva (IBSP 10838A), same locality and date, ex *Tropidurus hispidus* (Spix, 1825) (Squamata: Tropiduridae); 2 larvae (IBSP 16552), same data; 2 larvae (IBSP 16554A), same data; 1 larva (IBSP 16555A), same data; 1 larva (IBSP 16556), same data; 2 larvae (IBSP 16557), same data; 5 larvae (IBSP 10839), same locality and date, ex *Tropidurus cocorobensis* Rodrigues, 1987 (Squamata: Tropiduridae); 1 larva (IBSP 16548A), same data; 1 larva (IBSP 16551), same data.

**Hosts and distribution in Brazil.** The new species described in the present study was only collected in the Bahia State, parasitizing four tropidurids species, *Tropidurus cocorobensis* Rodrigues, 1987 (Squamata: Tropiduridae), *Tropidurus erythrocephalus* Rodrigues, 1987 (Squamata: Tropiduridae), *Tropidurus hispidus* (Spix, 1825) (Squamata: Tropiduridae) and *Tropidurus semitaeniatus* (Spix, 1825) (Squamata: Tropiduridae).

### ***Eutrombicula* sp. n. 3**

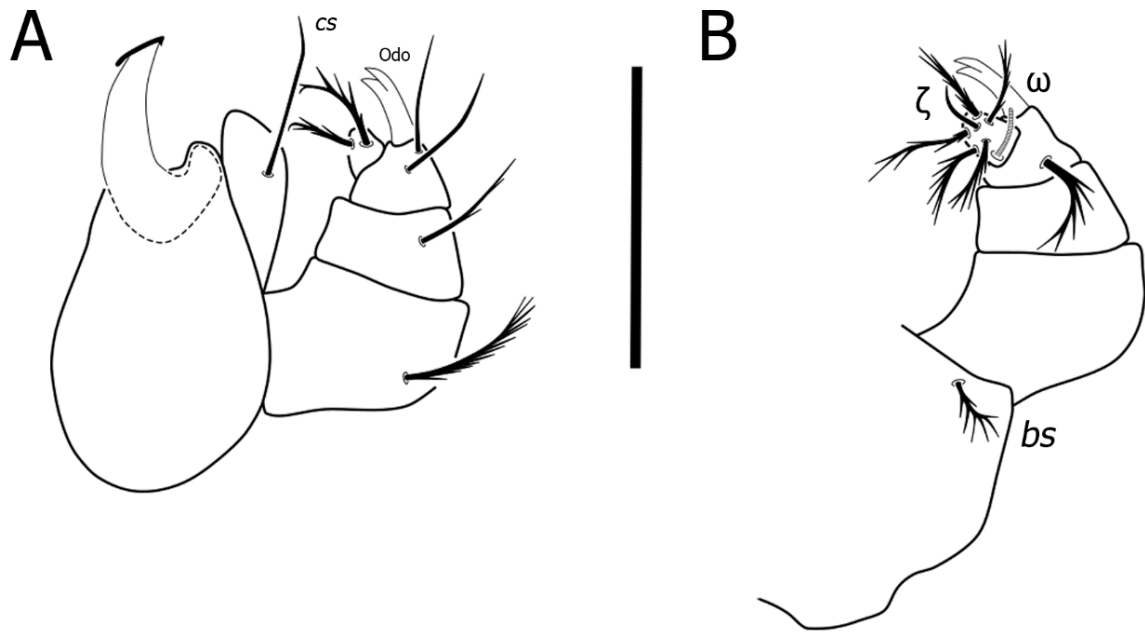
**(Figures 27-30, Tables 9-12)**

**Diagnosis.** Palpfemur and palpgenus with single branched seta each; dorsal, lateral setae nude and ventral setae branched on the palptibia; adoral (*cs*) setae nude; outer and inner prong are the same size, divided at the tip of the odontus; prodorsal sclerite heavily punctuated with horizontal striations; flageliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed; C row with 8 setae; D row with 6 setae; E row with 4 setae; F and H rows with two setae each; with 32 opisthosomal setae including 10 ventral setae; base of

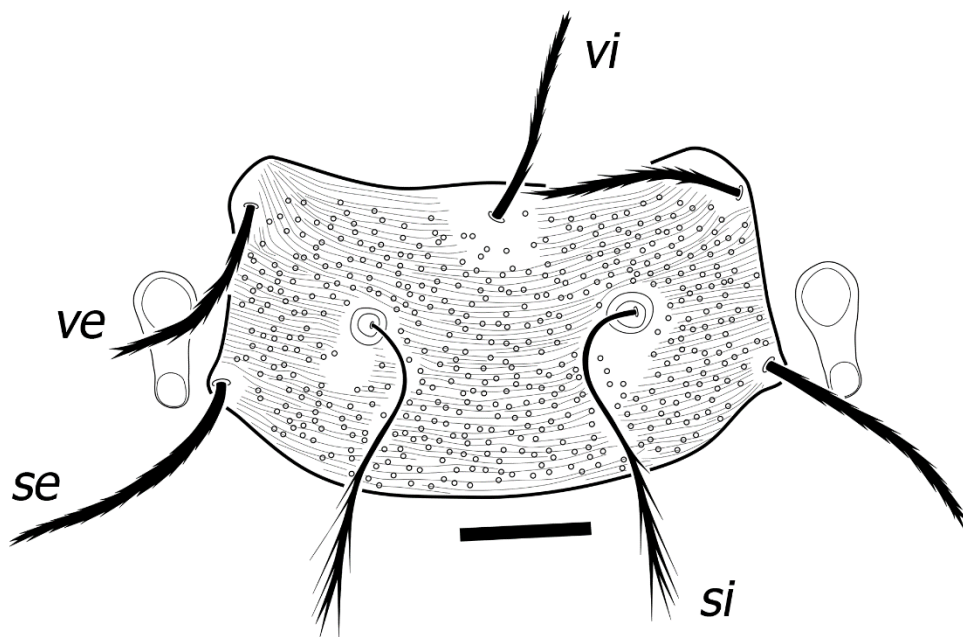


famulus ( $\epsilon$ ) on Ta I and II distal and proximal to solenidion ( $\omega$ ), respectively; one mastiseta on Ta III.

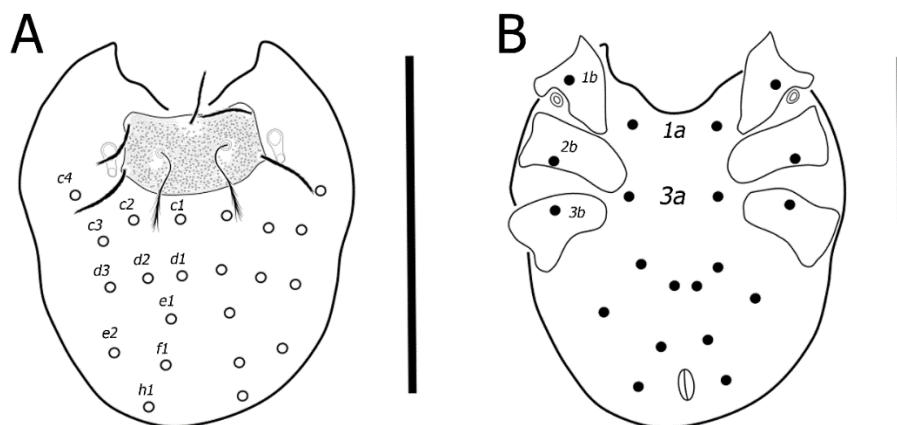
**Description.** Larvae (holotype, paratypes and additional material). *Gnathosoma* – fPp = B/B/NNB/7B $\omega$  $\zeta$ ; odontus bifurcate, outer and inner prong are the same size, divided at the tip of the odontus; cheliceral blade with tricuspid cap; gnathobase with few punctuations and horizontal striations, subcapitular (*bs*) setae branched and adoral (*cs*) setae nude (Figs. 27A and B). *Idiosoma* - eyes 2/2, anterior lens larger, with ocular plate; subrectangular prodorsal sclerite heavily punctuated with horizontal striations, anterior margin slightly sinuous, lateral margin convex and posterior margin of prodorsal sclerite slightly concave (Fig. 28), with flagelliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed, and 5 branched normal setae [pair of *ve* (= AL) seta, single *vi* (= AM) seta and pair of *se* (= PL) seta];  $si > ve > se \geq vi$ . Opisthosoma (Figs. 29A and B) with 32 setae; dorsal opisthosoma with 22 setae, C row with 4 pairs of setae, D row with 3 pairs of setae, E row with 2 pairs of setae, F and H rows with one pair of setae each, and 10 ventral opisthosomal setae with 8 setae anterior to anus and 2 setae parallel with the anus. Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs* – femur of legs I-III each divided into basifemur and telofemur, each leg terminated with paired claws, and claw like empodium without onychotriches, coxal fields with punctuations and strong horizontal striations; *Leg I* - coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3  $\sigma$  and  $\kappa$ ; tibia 8B, 2  $\phi$  and  $\kappa$ ; tarsus 21B with  $\omega$ ,  $\epsilon$ , dorsal eupathidium ( $\zeta'$ ) with companion seta (*z*) and subterminal eupathidium ( $\zeta''$ ), base of famulus ( $\epsilon$ ) distal to solenidion ( $\omega$ ) (Fig. 30A). *Leg II* - coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B,  $\sigma$ ; tibia 6B, 2  $\phi$ ; tarsus 16B with  $\omega$ ,  $\epsilon$  and subterminal eupathidium ( $\zeta$ ), base of  $\epsilon$  proximal to  $\omega$  (Fig. 30B). *Leg III* - coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B,  $\sigma$ , tibia 6B,  $\phi$ ; tarsus 14B and one mastiseta (MTa) (Fig. 30C).



**Figure 27.** *Eutrombicula* sp. n. 3; A – dorsal view of gnathosoma; B – ventral view of palp. Symbols:  $\omega$  = solenidion on palptarsus;  $\zeta$  = subterminal eupathidium of palptarsus; Odo = odontus; cs = adoral setae; bs = subcapitular setae. Scales: A and B 50  $\mu$ m.

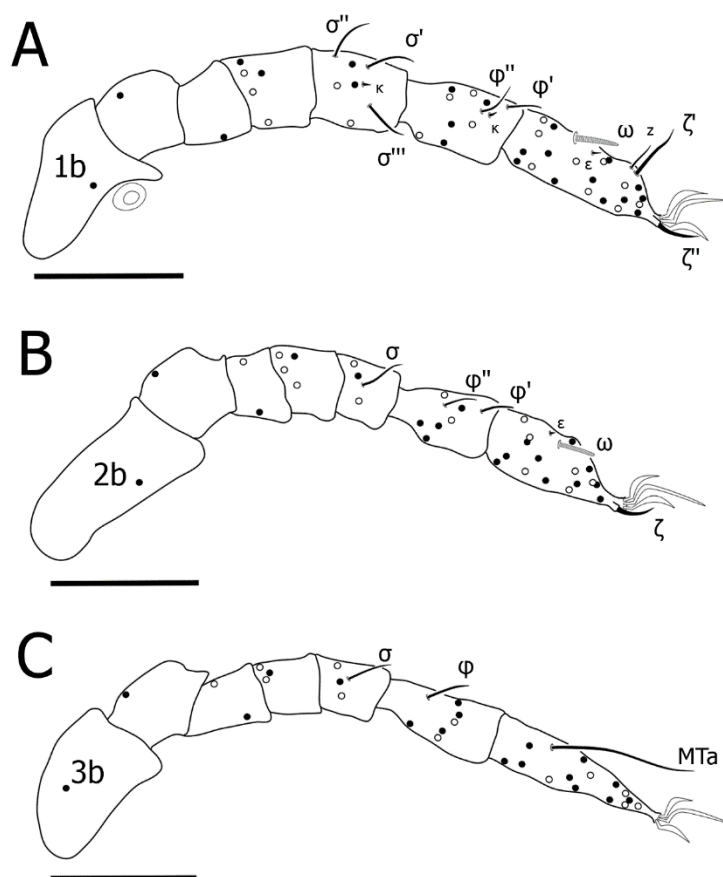


**Figure 28.** *Eutrombicula* sp. n. 3; prodorsal sclerite. Symbols: ve = external vertical setae; se = external scapular setae; vi = internal vertical setae; si = internal scapular setae (trichobothria). Scales: 20  $\mu$ m.



**Figure 29.** *Eutrombicula* sp. n. 3; A – dorsal view of idiosoma; B – ventral view of idiosoma. Symbols:  $c_1$ - $c_4$  = C row setae;  $d_1$ - $d_3$  = D row setae;  $e_1$ - $e_2$  = E row setae;  $f_1$  = F row setae;  $h_1$  = H row setae;  $1a$  = anterior sternal setae;  $3a$  = posterior sternal setae;  $1b$  = coxal field I seta;  $2b$  = coxal field II seta;  $3b$  = coxal field III seta. Scales: A and B 200  $\mu$ m.

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**Figure 30.** *Eutrombicula* sp. n. 3; A – Leg I; B – Leg II; C – Leg III; Solid circles = ventral leg setae; open circles = dorsal leg setae; Symbols:  $\zeta'$  = dorsal eupathidium on Ta I;  $\zeta''$  and  $\zeta$  = subterminal eupathidium on Ta I and II, respectively;  $\omega$  = solenidion on Ta I and II;  $\sigma$ ,  $\sigma'$ ,  $\sigma''$ ,  $\sigma'''$  = solenidia on Ge I-III;  $\kappa$  = microsetae on Ge I and Ti I;  $\phi'$ ,  $\phi''$ ,  $\phi$  = solenidia on Ti I-III;  $\epsilon$  = famulus on Ta I and II;  $1b$  = coxal field I seta;  $2b$  = coxal field II seta;  $3b$  = coxal field III seta; MTa = mastisetae on Ta III. Scales: A-C 50  $\mu$ m.

**Table 9.** Standard measurements of *Eutrombicula* sp. n. 3.

	AW	PW	SB	ASB	PSB	SD	AP	<i>vi</i>	<i>ve</i>	<i>se</i>	<i>si</i>	<i>Ia</i>	<i>3a</i>	DMIN	DMAX	VMIN	VMAX
<b>Holotype</b>	72	81	39	20	26	46	26	31	32	31	46	38	33	31	40	29	34
<b>Minimum</b>	70	80	38	20	24	44	25	30	32	29	44	37	32	31	39	30	34
<b>Maximum</b>	75	83	40	22	28	50	26	31	34	31	47	40	34	33	42	32	36
<b>Mean</b>	72	81	39	21	26	47	25	30	33	30	45	38	33	32	40	31	35

Legend: AW = distance between the bases of the *ve* setae; PW = distance between the bases of the *se* setae; SB = distance between the trichobothria (*si*) bases; ASB = distance from trichobothria (*si*) bases to extreme anterior margin of the prodorsal sclerite; PSB = distance from trichobothria (*si*) bases to extreme posterior margin of the prodorsal sclerite; SD = ASB + PSB; AP = distance between the bases of *ve* and *se*; *ve* = external vertical setae; *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular setae (trichobothria); *Ia* = anterior sternal setae; *3a* = posterior sternal setae; DMIN = minimum length of dorsal opisthosomal setae; DMAX = maximum length of dorsal opisthosomal setae; VMIN = minimum length of ventral idiosomal setae; VMAX = maximum length of ventral idiosomal setae.

**Table 10.** Standard measurements of *Eutrombicula* sp. n. 3.

	Cx I	Tr I	BFe I	TFe I	Ge I	Ti I	Ta I (L)	I Ta I (W)	Cx II	Tr II	BFe II	TFe II	Ge II	Ti II	Ta II (L)	Ta II (W)	II
<b>Holotype</b>	39	27	18	28	30	36	53	11	42	28	19	24	18	31	46	17	
<b>Minimum</b>	38	26	18	27	29	35	50	10	40	28	19	23	18	31	44	17	
<b>Maximum</b>	43	30	20	29	32	36	55	11	43	30	20	25	20	33	48	18	
<b>Mean</b>	40	28	19	28	30	35	52	10	41	29	19	24	19	32	46	17	

Legend: Cx I - length of coxal field I; Tr I - length of trochanter on leg I; BFe I - length of basifemur on leg I; TFe I - length of telofemur on leg I; Ge I - length of genu on leg I; Ti I - length of tibia on leg I; Ta I (L) - length of tarsus on leg I; Ta I (W) - width of tarsus on leg I; Cx II - length of coxal field II; Tr II - length of trochanter on leg II; BFe II - length of basifemur on leg II; TFe II - length of telofemur on leg II; Ge II - length of genu on leg II; Ti II - length of tibia on leg II; Ta II (L) - length of tarsus on leg II; Ta II (W) – width of tarsus on leg II.

**Table 11.** Standard measurements of *Eutrombicula* sp. n. 3.

	<b>Cx III</b>	<b>Tr III</b>	<b>BFe III</b>	<b>TFe III</b>	<b>Ge III</b>	<b>Ti III</b>	<b>TaIII (L)</b>	<b>Ta III (W)</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IP</b>
<b>Holotype</b>	45	29	26	22	21	37	54	14	192	166	189	673
<b>Minimum</b>	44	29	26	22	20	37	52	14	185	163	186	656
<b>Maximum</b>	46	30	28	24	21	39	55	16	202	176	197	707
<b>Mean</b>	45	29	27	23	20	38	53	15	193	169	191	681

Legend: Cx III - length of coxal field III; Tr III - length of trochanter on leg III; BFe III - length of basifemur on leg III; TFe III - length of telofemur on leg III; Ge III - length of genu on leg III; Ti III - length of tibia on leg III; Ta III (L) - length of tarsus on leg III; Ta III (W) - width of tarsus on leg III; I = length of leg I (trochanter to tarsus); II = length of leg II (trochanter to tarsus); III = length of leg III (trochanter to tarsus); IP - sum of leg lengths (proximal end of coxal field to the pretarsus).

**Table 12.** Standard measurements of *Eutrombicula* sp. n. 3.

	$\sigma$ I	$\kappa$ I	$\varphi'$ I	$\varphi''$ I	$\kappa$ I	$\omega$ I	$\varepsilon$ I	$\zeta'$ I	z	$\zeta''$ I	$\sigma$ II	$\varphi'$ II	$\varphi''$ II	$\omega$ II	$\varepsilon$ II	$\zeta$ II	$\sigma$ III	$\varphi$ III	MTa
<b>Holotype</b>	11	3	12	9	3	14	3	15	8	13	13	11	11	12	2	12	14	14	47
<b>Minimum</b>	11	3	11	9	3	14	3	15	8	13	13	10	11	12	2	12	12	13	46
<b>Maximum</b>	14	3	12	10	3	16	3	17	9	15	13	11	12	13	2	14	14	14	50
<b>Mean</b>	12	3	11	9	3	15	3	16	8	14	13	10	11	12	2	13	13	13	48

Legend: I =  $\sigma$  I,  $\sigma$  II,  $\sigma$  III = length of the solenidia on Ge I-III;  $\kappa$  I = length of microseta on Ge and Ti I;  $\varphi'$  I,  $\varphi''$  I = length of the solenidia on Ti I;  $\kappa$  I = length of microseta on Ti I;  $\omega$  I = length of solenidion on Ta I;  $\varepsilon$  I = length of famulus on Ta I;  $\zeta'$  I = length of dorsal eupathidium on Ta I; z = length of companion seta on Ta I;  $\zeta''$  I = length of subterminal eupathidium on Ta I;  $\varphi'$  II,  $\varphi''$  II = length of the solenidia on Ti II;  $\omega$  II = length of solenidion on Ta II;  $\varepsilon$  II = length of famulus on Ta II;  $\zeta$  II = length of subterminal eupathidium on Ta II;  $\varphi$  III = length of the solenidia on Ti III; MTa = length of mastiseta on Ta III.

**Type material examined. HOLOTYPE:** larva (IBSP 11285), National Park Grande Sertão Veredas, Minas Gerais State, no date, ex *Ameiva* sp. (Squamata: Teiidae), M. B. Labruna coll.  
**PARATYPES:** 5 larvae (IBSP 11285), same data as holotype.

**Material reexamined.** 1 larva (IBSP 10838B), Morro do Chapéu Municipality, Bahia State, Dec. 2000, ex *Tropidurus hispidus* (Spix, 1825) (Squamata: Tropiduridae); 2 larvae (IBSP 16553), same data; 1 larva (IBSP 16554B), same data; 1 larva (IBSP 16555B), same data; 3 larvae (IBSP 10840), same locality and date, ex *Tropidurus cocorobensis* Rodrigues, 1987 (Squamata: Tropiduridae); 10 larvae (IBSP 16548B), same date; 2 larvae (IBSP 16549), same data; 1 larva (IBSP 16550), same data; 1 larva (IBSP 16558B), same locality and date, ex *Tropidurus semitaeniatus* (Spix, 1825) (Squamata: Tropiduridae); 1 larva (IBSP 16560B), same data; 1 larva (IBSP 16561B), same data; 2 larvae (IBSP 16563), same data; 1 larva (IBSP 16565), same data; 5 larvae (IBSP 12090C), Muquém, Guaribas municipality, Piauí State, 24-V-2013, ex *Thrichomys laurentius* Thomas, 1904 (Rodentia: Echimyidae), M. C. Horta coll.

**Additional material.** 3 larvae (IBSP 12906), Ilha da Queimada Grande, Itanhaém Municipality, São Paulo State, 28 May 2015, ex *Psychosaura macrorhyncha* (Hoge, 1946) (Squamata: Scincidae), R. A. Dias coll.; 2 larvae (IBSP 10552), Serra do Cipó National Park, Minas Gerais State, 30 Jul. 2011, ex *Micrablepharus maximiliani* (Reinhardt & Lütken, 1862) (Squamata: Gymnophthalmidae), C. Jared and M. Trefault coll.; 1 larva (IBSP 11685B), Mato Grosso State, 02 Apr. 2013, ex *Micrablepharus atticolus* Rodrigues, 1996 (Squamata: Gymnophthalmidae), C. Strussmann coll.; 2 larvae (IBSP 12971), Vale de São Domingos Municipality, Mato Grosso State, 18 Mar. 2017, ex *Cercosaura eigenmanni* (Griffin, 1917) (Squamata: Gymnophthalmidae), D. H. Morais coll.; 1 larva (IBSP 12972), Hydroelectric of Guarapé, Mato Grosso State, 18 Mar. 2017, ex *Copeoglossum nigropunctatum* (Spix, 1825) (Squamata: Scincidae); 2 larvae (IBSP 12974), same locality, 12 Apr. 2012, ex *Thecadactylus rapicauda* (Houttuyn, 1782) (Squamata: Phyllodactylidae); 1 larvae (IBSP 12951A), Tucuruí Municipality, Pará State, 27 Aug. 2016, ex *Kentropyx calcarata* Spix, 1825 (Squamata: Teiidae); 4 larvae (IBSP 12955A), same locality and host, 01 Dec. 2016; 2 larvae (IBSP 14829), Pacajá Municipality, Pará State, 9 Oct. 2017, ex *Copeoglossum nigropunctatum* (Spix, 1825) (Squamata: Scincidae), J. A. Mendoza-Roldan coll.; 2 larvae (IBSP 13060), Pedrinhas, Petrolina Municipality, Pernambuco State, 02 May 2015, ex *Tupinambis* sp. (Squamata: Teiidae), M. C. Horta coll.; 2 larvae (IBSP 13061), same data; 2 larvae (IBSP



13062 B), same locality, 03 May 2015, ex unidentified lizard (Squamata); 1 larva (IBSP 12487C), no specific locality, 04 Mar. 2015, ex *Thrichomys pachyurus* (Wagner, 1845) (Rodentia: Echimyidae).

**Hosts and distribution in Brazil.** This new species described in the present study was collected in the state of Minas Gerais and Bahia, parasitizing three tropidurids species, *Tropidurus cocorobensis* Rodrigues, 1987 (Squamata: Tropiduridae), *Tropidurus hispidus* (Spix, 1825) (Squamata: Tropiduridae), *Tropidurus semitaeniatus* (Spix, 1825) (Squamata: Tropiduridae), an unidentified *Ameiva* sp. (Squamata: Teiidae) and the blue-tailed lizard, *Micrablepharus maximiliani* (Reinhardt & Lütken, 1862) (Squamata: Gymnophthalmidae). Also, this new species is recorded in five other Brazilian states parasitizing different species of lizards from the ones listed above. In the São Paulo State, this species was collected parasitizing the Hoge's mabuya, *Psychosaura macrorhyncha* (Hoge, 1946) (Squamata: Scincidae); In the Mato Grosso State, parasitizing the *Micrablepharus atticolus* Rodrigues, 1996 (Squamata: Gymnophthalmidae), the Eigenmann's prionodactylus, *Cercosaura eigenmanni* (Griffin, 1917) (Squamata: Gymnophthalmidae), the black-spotted skink, *Copeoglossum nigropunctatum* (Spix, 1825) (Squamata: Scincidae) and the turniptail gecko, *Thecadactylus rapicauda* (Houttuyn, 1782) (Squamata: Phyllodactylidae); In the Pará State, parasitizing the striped forest whiptail, *Kentropyx calcarata* Spix, 1825 (Squamata: Teiidae) and the black-spotted skink, *Copeoglossum nigropunctatum* (Spix, 1825) (Squamata: Scincidae); and in the Pernambuco State, parasitizing an unidentified “teiú” of the genus *Tupinambis* sp. (Squamata: Teiidae). In addition, this species was also collected by parasitizing two different rodent species, *Thrichomys pachyurus* (Wagner, 1845) (Rodentia: Echimyidae) and *Thrichomys laurentius* Thomas, 1904 (Rodentia: Echimyidae), in the states of Piauí and an unspecified locality, respectively.

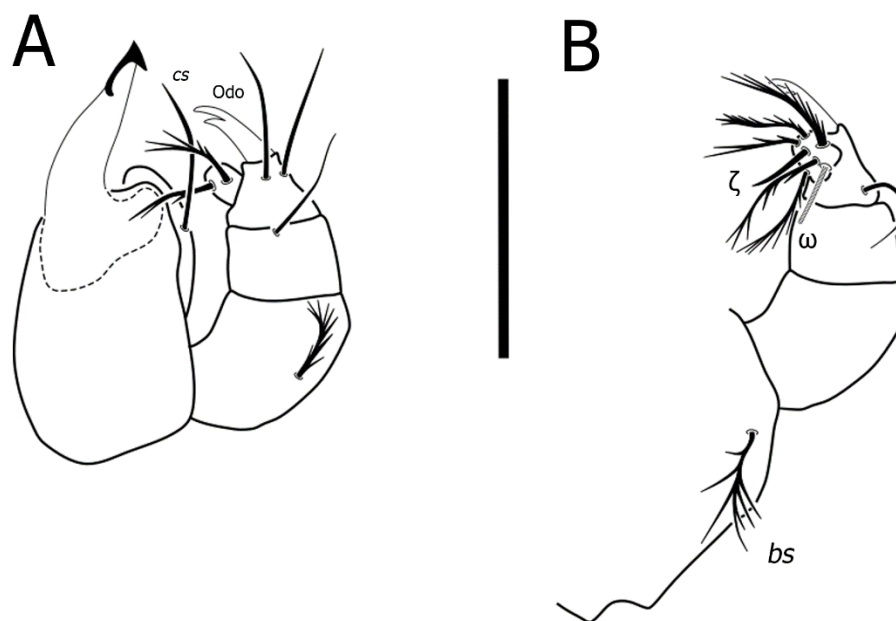
#### ***Eutrombicula* sp. n. 4**

**(Figures 31-34, Tables 13-16)**

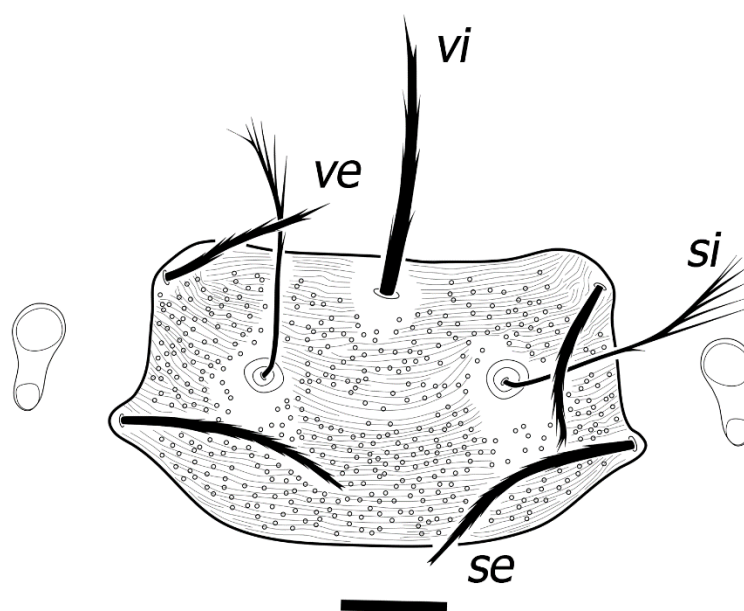
**Diagnosis.** Larva. Palpfemur with single branched seta; palpgenu with single nude seta; dorsal, lateral and ventral setae nude on the palptibia; adoral (*cs*) setae nude; outer prong larger than inner prong, this one comes out a little bit above the middle of the odontus; prodorsal sclerite heavily punctuated with horizontal striations; flageliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed; C row with 8 setae; D row with 6

setae; E row with 4 setae; F and H rows with two setae each; with 34 opisthosomal setae including 12 ventral setae; coxal field I with distal margin elongated covering the margin of coxal field II; base of famulus ( $\epsilon$ ) on Ta I and II distal and proximal to solenidion ( $\omega$ ), respectively; one mastiseta on Ta III.

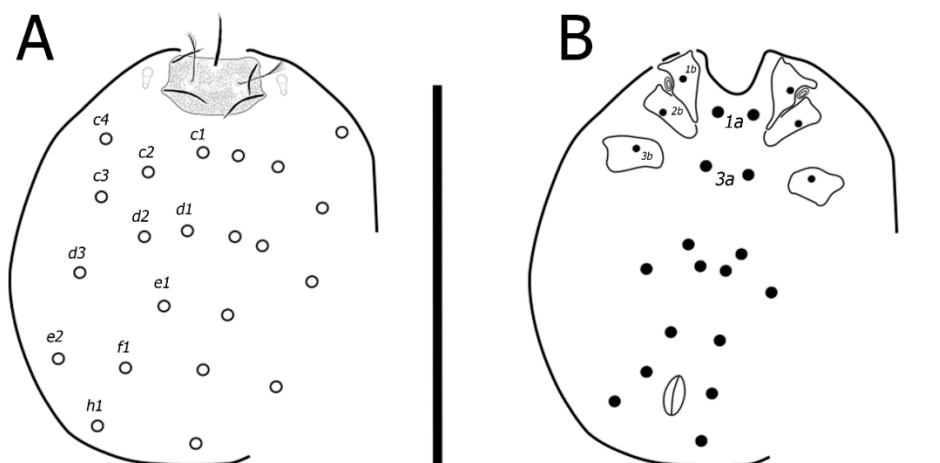
**Description.** Larvae (holotype, paratypes and additional material). *Gnathosoma* – fPp = B/N/NNN/7B $\omega\zeta$ ; odontus bifurcate, outer prong larger than inner prong, this one comes out a little bit above the middle of the odontus; cheliceral blade with tricuspid cap; gnathobase with few punctuations and horizontal striations, subcapitular (*bs*) setae branched and adoral (*cs*) setae nude (Figs. 31A and B). *Idiosoma* - eyes 2/2, anterior lens larger, with ocular plate; subrectangular prodorsal sclerite heavily punctuated with horizontal striations, anterior margin slightly sinuous, lateral margin convex and posterior margin of prodorsal sclerite slightly concave (Fig. 32), with flagelliform trichobothria (*si*), distal half with setules thin and long, sparsely distributed, and 5 branched normal setae [pair of *ve* (= AL) seta, single *vi* (= AM) seta and pair of *se* (= PL) seta];  $vi > si > se > ve$ . Opisthosoma (Figs. 33A and B) with 34 setae; dorsal opisthosoma with 22 setae, C row with 4 pairs of setae, D row with 3 pairs of setae, E row with 2 pairs of setae, F and H rows with one pair of setae each, and 12 ventral opisthosomal setae with 10 setae anterior to anus and 2 setae posterior. *Legs* – femur of legs I-III each divided into basifemur and telofemur, each leg terminated with paired claws, and claw like empodium without onychotriches, coxal fields with few punctuations and strong horizontal striations, and coxal field I with distal margin elongated covering the margin of coxal field II; *Leg I* - coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3  $\sigma$  and  $\kappa$ ; tibia 8B, 2  $\phi$  and  $\kappa$ ; tarsus 22B with  $\omega$ ,  $\epsilon$ , dorsal eupathidium ( $\zeta'$ ) with companion seta (*z*) and subterminal eupathidium ( $\zeta''$ ), base of famulus ( $\epsilon$ ) distal to solenidion ( $\omega$ ) (Fig. 34A). *Leg II* - coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B,  $\sigma$ ; tibia 6B, 2  $\phi$ ; tarsus 16B with  $\omega$ ,  $\epsilon$  and subterminal eupathidium ( $\zeta$ ), base of  $\epsilon$  proximal to  $\omega$  (Fig. 34B). *Leg III* - coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B,  $\sigma$ , tibia 6B,  $\phi$ ; tarsus 14B and one mastiseta (MTa) (Fig. 34C).



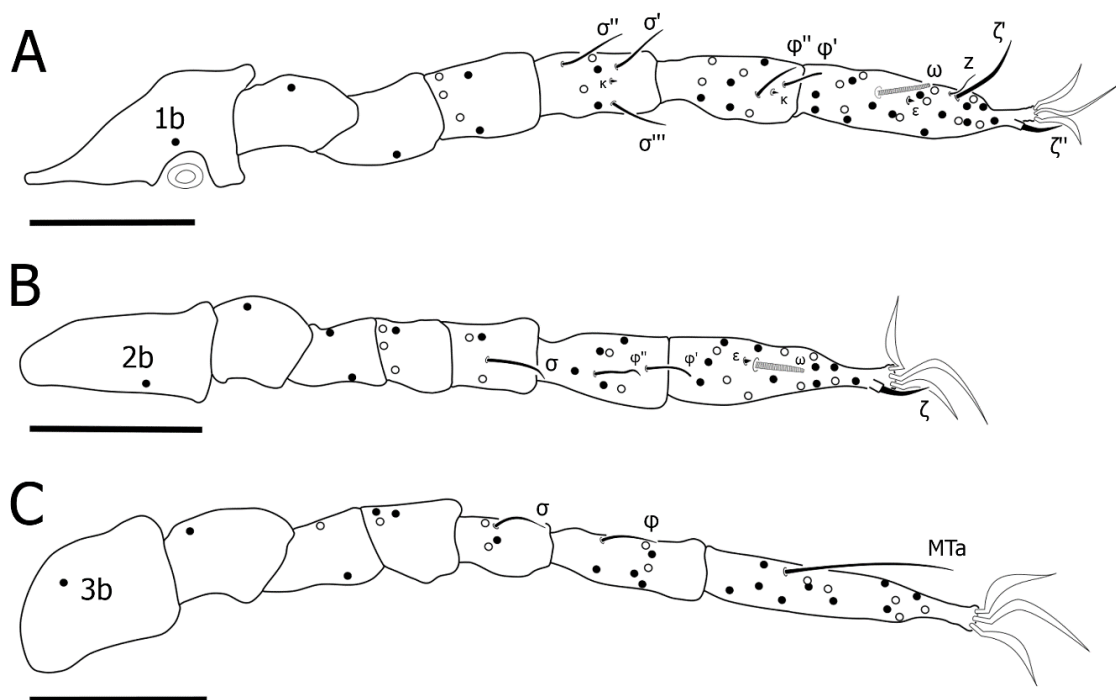
**Figure 31.** *Eutrombicula* sp. n. 4; A – dorsal view of gnathosoma; B – ventral view of palp. Symbols:  $\omega$  = solenidion on palptarsus;  $\zeta$  = subterminal eupathidium of palptarsus; Odo = odontus; cs = adoral setae; bs = subcapitular setae. Scales: A and B 50  $\mu$ m.



**Figure 32.** *Eutrombicula* sp. n. 4; prodorsal sclerite. Symbols: ve = external vertical setae; se = external scapular setae; vi = internal vertical setae; si = internal scapular setae (trichobothria). Scales: 20  $\mu$ m.



**Figure 33.** *Eutrombicula* sp. n. 4; A – dorsal view of idiosoma; B – ventral view of idiosoma. Symbols:  $c_1$ - $c_4$  = C row setae;  $d_1$ - $d_3$  = D row setae;  $e_1$ - $e_2$  = E row setae;  $f_1$  = F row setae;  $h_1$  = H row setae;  $1a$  = anterior sternal setae;  $3a$  = posterior sternal setae;  $1b$  = coxal field I seta;  $2b$  = coxal field II seta;  $3b$  = coxal field III seta. Scales: A and B 500  $\mu$ m.



**Figure 34.** *Eutrombicula* sp. n. 4; A – Leg I; B – Leg II; C – Leg III; Solid circles = ventral leg setae; open circles = dorsal leg setae; Symbols:  $\zeta'$  = dorsal eupathidium on Ta I;  $\zeta''$  and  $\zeta$  = subterminal eupathidium on Ta I and II, respectively;  $\omega$  = solenidium on Ta I and II;  $\sigma$ ,  $\sigma'$ ,  $\sigma''$ ,  $\sigma'''$  = solenidia on Ge I-III;  $\kappa$  = microsetae on Ge I and Ti I;  $\phi'$ ,  $\phi''$ ,  $\phi$  = solenidia on Ti I-III;  $\varepsilon$  = famulus on Ta I and II;  $1b$  = coxal field I seta;  $2b$  = coxal field II seta;  $3b$  = coxal field III seta; MTa = masetae on Ta III. Scales: A-C 50  $\mu$ m.

**Table 13.** Standard measurements of *Eutrombicula* sp. n. 4.

	AW	PW	SB	ASB	PSB	SD	AP	<i>vi</i>	<i>ve</i>	<i>se</i>	<i>si</i>	<i>Ia</i>	<i>3a</i>	DMIN	DMAX	VMIN	VMAX
<b>Holotype</b>	81	95	45	23	31	54	27	52	31	41	47	48	39	33	44	32	38
<b>Minimum</b>	78	94	44	20	30	50	27	50	30	38	43	45	38	32	40	31	37
<b>Maximum</b>	84	98	46	23	32	55	29	53	32	42	47	49	41	35	45	34	39
<b>Mean</b>	81	96	45	21	31	52	28	51	31	40	45	47	39	33	42	32	38

Legend: AW = distance between the bases of the *ve* setae; PW = distance between the bases of the *se* setae; SB = distance between the trichobothria (*si*) bases; ASB = distance from trichobothria (*si*) bases to extreme anterior margin of the prodorsal sclerite; PSB = distance from trichobothria (*si*) bases to extreme posterior margin of the prodorsal sclerite; SD = ASB + PSB; AP = distance between the bases of *ve* and *se*; *ve* = external vertical setae; *se* = external scapular setae; *vi* = internal vertical setae; *si* = internal scapular setae (trichobothria); *Ia* = anterior sternal setae; *3a* = posterior sternal setae; DMIN = minimum length of dorsal opisthosomal setae; DMAX = maximum length of dorsal opisthosomal setae; VMIN = minimum length of ventral idiosomal setae; VMAX = maximum length of ventral idiosomal setae.

**Table 14.** Standard measurements of *Eutrombicula* sp. n. 4.

	Cx I	Tr I	BFe I	TFe I	Ge I	Ti I	Ta I (L)	Ta I (W)	Cx II	Tr II	BFe II	TFe II	Ge II	Ti II	Ta II (L)	Ta II (W)
<b>Holotype</b>	63	38	35	33	36	44	71	17	59	28	26	23	26	39	68	21
<b>Minimum</b>	62	38	31	32	32	40	70	17	58	26	25	22	25	39	67	20
<b>Maximum</b>	64	41	36	34	36	44	72	18	60	28	26	23	26	40	72	22
<b>Mean</b>	63	39	33	33	34	42	71	17	59	26	25	22	25	39	69	21

Legend: Cx I - length of coxal field I; Tr I - length of trochanter on leg I; BFe I - length of basifemur on leg I; TFe I - length of telofemur on leg I; Ge I - length of genu on leg I; Ti I - length of tibia on leg I; Ta I (L) - length of tarsus on leg I; Ta I (W) - width of tarsus on leg I; Cx II - length of coxal field II; Tr II - length of trochanter on leg II; BFe II - length of basifemur on leg II; TFe II - length of telofemur on leg II; Ge II - length of genu on leg II; Ti II - length of tibia on leg II; Ta II (L) - length of tarsus on leg II; Ta II (W) – width of tarsus on leg II.

**Table 15.** Standard measurements of *Eutrombicula* sp. n. 4.

	<b>Cx III</b>	<b>Tr III</b>	<b>BFe III</b>	<b>TFe III</b>	<b>Ge III</b>	<b>Ti III</b>	<b>TaIII (L)</b>	<b>Ta III (W)</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IP</b>
<b>Holotype</b>	44	36	34	28	30	48	83	15	257	210	176	809
<b>Minimum</b>	42	34	34	28	29	46	82	14	243	204	171	780
<b>Maximum</b>	46	38	37	30	30	50	83	15	263	215	185	833
<b>Mean</b>	44	36	35	29	29	48	82	14	253	209	178	806

Legend: Cx III - length of coxal field III; Tr III - length of trochanter on leg III; BFe III - length of basifemur on leg III; TFe III - length of telofemur on leg III; Ge III - length of genu on leg III; Ti III - length of tibia on leg III; Ta III (L) - length of tarsus on leg III; Ta III (W) - width of tarsus on leg III; I = length of leg I (trochanter to tarsus); II = length of leg II (trochanter to tarsus); III = length of leg III (trochanter to tarsus); IP - sum of leg lengths (proximal end of coxal field to the pretarsus).

**Table 16.** Standard measurements of *Eutrombicula* sp. n. 4.

	$\sigma$ I	$\kappa$ I	$\varphi'$ I	$\varphi''$ I	$\kappa$ I	$\omega$ I	$\varepsilon$ I	$\zeta'$ I	z	$\zeta''$ I	$\sigma$ II	$\varphi'$ II	$\varphi''$ II	$\omega$ II	$\varepsilon$ II	$\zeta$ II	$\sigma$ III	$\varphi$ III	MTa
<b>Holotype</b>	14	2	11	12	2	16	2	17	8	11	18	13	14	15	2	14	15	17	50
<b>Minimum</b>	14	2	10	11	2	16	2	17	8	11	17	12	14	15	2	14	15	17	50
<b>Maximum</b>	17	2	12	12	2	18	2	20	10	11	18	13	14	17	2	15	17	18	52
<b>Mean</b>	15	2	11	11	2	17	2	18	9	11	17	12	14	16	2	14	16	17	51

Legend: I =  $\sigma$  I,  $\sigma$  II,  $\sigma$  III = length of the solenidia on Ge I-III;  $\kappa$  I = length of microseta on Ge and Ti I;  $\varphi'$  I,  $\varphi''$  I = length of the solenidia on Ti I;  $\kappa$  I = length of microseta on Ti I;  $\omega$  I = length of solenidion on Ta I;  $\varepsilon$  I = length of famulus on Ta I;  $\zeta'$  I = length of dorsal eupathidium on Ta I; z = length of companion seta on Ta I;  $\zeta''$  I = length of subterminal eupathidium on Ta I;  $\varphi'$  II,  $\varphi''$  II = length of the solenidia on Ti II;  $\omega$  II = length of solenidion on Ta II;  $\varepsilon$  II = length of famulus on Ta II;  $\zeta$  II = length of subterminal eupathidium on Ta II;  $\varphi$  III = length of the solenidia on Ti III; MTa = length of mastiseta on Ta III.



**Type material. HOLOTYPE:** larva (IBSP 12955B), Tucuruí Municipality, Pará State, 1 Dec. 2016, ex *Kentropyx calcarata* Spix, 1825 (Squamata: Teiidae). **PARATYPES:** 17 larvae (IBSP 12955B), same data as holotype.

**Additional records.** 1 larva (IBSP 14831), Santa Bárbara d'Oeste Municipality, São Paulo State, 20 Oct. 2017, *Aspronema dorsivittatum* (Cope, 1862) (Squamata: Scincidae), J. A. Mendoza-Roldan coll.; 2 larvae (IBSP 14833), same locality and host, 23 Oct. 2017; 2 larvae (IBSP 14840), São Paulo Municipality, São Paulo State, 10 Jul. 2017, *Tropidurus itambere* Rodrigues, 1987 (Squamata: Tropiduridae); 1 larvae (IBSP 11669), Mato Grosso State, 28 Mar. 2013, ex *Kentropyx paulensis* (Boettger, 1893) (Squamata: Teiidae), C. Strussmann coll.; 8 larvae (IBSP 11673B), same locality, 27 Mar. 2013, *Ameivula* sp. (Squamata: Teiidae); 2 larvae (IBSP 11675B), same locality and date, ex *Tropidurus oreadicus* Rodrigues, 1987 (Squamata: Tropiduridae); 1 larva (IBSP 14835), Pacajá Municipality, Pará State, 9 Oct. 2017, ex *Copeoglossum nigropunctatum* (Spix, 1825) (Squamata: Scincidae), J. A. Mendoza-Roldan coll.; 1 larva (IBSP 14836), same locality and host, 9 Oct. 2017; 1 larva (IBSP 12950C), Tucuruí Municipality, Pará State, 22 Aug. 2016, *Arthrosaura reticulata* (O'Shaughnessy, 1881) (Squamata: Gymnophthalmidae); 12 larvae (IBSP 12951B), same locality, 27 Aug. 2016, ex *Kentropyx calcarata* Spix, 1825 (Squamata: Teiidae); 2 larvae (IBSP 12952), same locality and host, 28 Aug. 2016; 11 larvae (IBSP 12956), same data; 3 larvae (IBSP 14872), Maranhão State, 15 Sep. 2018, ex *Tropidurus* sp. (Squamata: Tropiduridae).

**Hosts and distribution in Brazil.** This new species was collected in four Brazilian states parasitizing different species of lizards. In the Pará State, this new species has been collected parasitizing the yellowbelly arthrosaura, *Arthrosaura reticulata* (O'Shaughnessy, 1881) (Squamata: Gymnophthalmidae), the black-spotted skink, *Copeoglossum nigropunctatum* (Spix, 1825) (Squamata: Scincidae), the striped forest whiptail, *Kentropyx calcarata* Spix, 1825 (Squamata: Teiidae); In the São Paulo State, this new species has been collected parasitizing the Paraguay mabuya, *Aspronema dorsivittatum* (Cope, 1862) (Squamata: Scincidae) and *Tropidurus itambere* Rodrigues, 1987 (Squamata: Tropiduridae); In the Mato Grosso State, this new species has been collected parasitizing *Ameivula* sp. (Squamata: Teiidae), the Boettger's kentropyx, *Kentropyx paulensis* (Boettger, 1893) (Squamata: Teiidae) and *Tropidurus oreadicus* Rodrigues, 1987 (Squamata: Tropiduridae); and in the Maranhão State, parasitizing an unidentified *Tropidurus* sp. (Squamata: Tropiduridae).

**Key of Brazilian larval species of the genus *Eutrombicula***

1. Prodorsal sclerite ornamented with striations plus punctuations.....2
  - Prodorsal sclerite ornamented with only punctuations.....3
2. (1) Palpgenu and ventral setae on the palptibia nude.....*Eutrombicula* sp. n. 4
  - Palpgenu and ventral setae on the palptibia branched.....*Eutrombicula* sp. n. 3
3. (1) Mastisetae absent on the Ta III.....4
  - Tarsus of leg III with at least one mastisetae.....5
4. (3) Ventral setae on the palptibia branched (B-N-NNB), odontus bifurcate with the outer prong much bigger than the inner prong, and inner prong in the medium region of odontus.....*Eutrombicula* sp. n. 1
  - Ventral setae on the palptibia nude (B-N-NNN), odontus bifurcate with the outer and inner prongs in the same size, divided at the tip of the odontus.....*Eutrombicula* sp. n. 2
5. (3) Tibia of the leg III with at least one mastisetae and the dorsal opisthosomal C row with ten setae.....6
  - Tibia of the leg III without mastisetae and the dorsal opisthosomal C row with eight setae.....8
6. (5) Tarsus of the leg III with two mastisetae.....*Eutrombicula spipi*
  - Tarsus of the leg III with more than two mastisetae.....7
7. (6) Tarsus of the leg III with four mastisetae.....*Eutrombicula daemonei*
  - Tarsus of the leg III with three mastisetae.....*Eutrombicula batatas*
8. (5) Odontus bifurcate with the outer and inner prongs divided above half of the odontus.....9
  - Odontus bifurcate with outer prong much bigger than inner prong, which the inner prong coming out of the middle of odontus.....10
9. (8) Setae on the palpgenu branched, outer and inner prongs are almost the same size, divided at the tip of the odontus.....*Eutrombicula alfreddugesi*
  - Setae on the palpgenu nude, bifurcate odontus with the outer prong slightly larger than the inner prong, this one comes out a little bit above the middle of the odontus.....*Eutrombicula butantanensis*
10. (8) Setae on the palpgenu and ventral setae on the palptibia branched.....*Eutrombicula tinami*
  - Setae on the palpgenu and ventral setae on the palptibia nude.....*Eutrombicula goeldii*

## 7.4 DISCUSSION

In this study, we chose not to put synonymic lists of the species, since there are already several other studies that list them. Besides that, some species have two to three pages of synonymic list. Then, to consult the complete synonymic list of the species *E. alfreddugesi*, *E. batatas* and *E. goeldii*, the following studies can be consulted: (Fuller, 1952; Jenkins, 1949; Hoffmann, 1990; Jacinavicius et al. 2019).

Regarding about the species *E. alfreddugesi*, this species was recorded in Brazil by the following studies: Fonseca (1932), Cunha-Barros and Rocha (2000), Cunha-Barros et al. (1995; 2003), Carvalho et al. (2006), Rocha et al. (2008; 2020), Delfino et al. (2011), Menezes et al. (2011), Gomides et al. (2015), Faccini et al. (2017), Xavier et al. (2019), Mendoza-Roldan et al. (2020) and Jacinavicius et al. (2020).

Of these records, we are able to examine, due to our efforts submitted to the IBSP collection, the material published by Fonseca (1932), which the types of *E. butantanensis* (IBSP 28), were examined and the species status was revived in the present study; The material published by Rocha et al. (2008) and Menezes et al. (2011), which had been identified as *E. alfreddugesi*, is actually the new species, *Eutrombicula* **sp. n. 2** and *Eutrombicula* **sp. n. 3**. In these publications there was no mention of the deposit number of these materials in any collection, but it was possible to trace that it was material deposited in the IBSP collection. The material (IBSP 10547) published by Faccini et al. (2017), which had also been identified as *E. alfreddugesi*, is in reality *E. goeldii*; while the material (IBSP 12090C) published by Jacinavicius et al. (2020), after the reidentification, represents the *Eutrombicula* **sp. n. 3**. And yet the material published by Mendoza-Roldan et al. (2020), also identified as *E. alfreddugesi*, after the reidentification, they are *E. goeldii* (accession number IBSP 12917 and IBSP 14834), *Eutrombicula* **sp. n. 4** (accession number IBSP 12950, IBSP 12952, IBSP 14831, IBSP 14833, IBSP 14835, IBSP 14836 and IBSP 14840), and *Eutrombicula* **sp. n. 3** (IBSP 12971 and IBSP 14829). While, the material identified by Jacinavicius et al. (2020) has been re-examined and now belongs to *Eutrombicula* **sp. n. 3**.

On the other hand, the lots mentioned below, published by Mendoza-Roldan et al. (2020), also identified as *E. alfreddugesi*, did not even belong to the genus *Eutrombicula*, as explained below: IBSP 14876 did not have a chigger specimen, but there were specimens of mites of the family Ixodorhynchidae (Mesostigmata); while the material IBSP 14879 (erroneously published by Mendoza-Roldan et al. 2020 as IBSP 1488): were also not found chiggers, there were only tick larvae (Ixodida), this also happened with the lot under the

number IBSP 12949. While the lot under the number IBSP 14863, was published as slide-mounted material, after examination in the collection, it was found that the material was in 100% alcohol, however the material was not found, as chigger mites are difficult to examine in a liquid medium, we did not we are considering this lot. In addition, the lot IBSP 14839 was reidentified by us and found that the specimen belongs to the genus *Blankaartia*, and not *Eutrombicula*. So far, the material under the accession number IBSP 14828 was not possible to identify, the only specimen was missing the diagnostic characters for the correct identification. Therefore, the lots described above (IBSP 14828, 14876, 14879, 12949, 14863 and 14839) are not considered in the present study. Until now, the material identified as *E. alfreddugesi* from the following works has not been examined: Cunha-Barros and Rocha (1995 - RJ; 2000 - RJ), Cunha-Barros et al. (2003 - RJ), Carvalho et al. (2006 – GO, DF, MG), Delfino et al. (2011 - CE), Gomides et al. (2015 – MT, PA), Xavier et al. (2019 – BA, SE), and Rocha et al. (2020 – BA, ES, RJ).

After all this, we conclude that *E. alfreddugesi* has been wrongly identified and recorded for many years in Brazil. Only after examining this material that we realized that the frequency with which this species is found is much less than what has been published and recorded. From now on, we would like to highlight the importance of basic taxonomic studies for any other study with these mites, since, there were so many studies that had the species wrongly identified.

Jenkins (1949) synonymized *E. butantanensis* with *E. alfreddugesi*, but after examining the types of *E. butantanensis*, we observed differences that justify the separation in two different species, the main characteristics that separate *E. butantanensis* from *E. alfreddugesi* are: palpgenu with single nude seta and outer prong slightly larger than the inner prong, this one comes out a little bit above the middle of the odontus for *E. butantanensis* vs. palpgenu each with single branched seta; outer and inner prongs are almost the same size, divided at the tip of the odontus for *E. alfreddugesi*.

Furthermore, after examining the types of *Eutrombicula ophidica* and comparing it with the redescription of *E. butantanensis* elaborated in the present study, we came to the conclusion that both species have the same quantity and position of the dorsal and ventral setae of the opisthosoma (20 dorsal opisthosoma setae and 12 ventral opisthosoma setae), the same shape of the odontus (outer prong slightly larger than the inner prong) and the same palpal formula (B/N/NNB). Unlike what was in the original description, where Fonseca (1932) described *E. ophidica* by having B/B/NNB, prongs of the odontus subequal (like *E. alfreddugesi*) and 22 dorsal opisthosoma setae and 16 ventral opisthosoma setae.

After all, and in accordance with the ICZN, *E. butantanensis* is being resuscitated and completely separated from *E. alfreddugesi*, while *E. ophidica* is considered a junior synonym of *E. butantanensis*.

In addition, the records reported by Mendoza-Roldan et al. (2020), identified as *E. ophidica*, were reexamined and reidentified in the present study, and we came to the conclusion that the lots under the numbers IBSP 12955 and IBSP 12956 belong, in fact, to the species *Eutrombicula* **sp. n. 4**; while the lot under the number IBSP 12914 has been reidentified as *E. goeldii*.

Also, *Eutrombicula tropica* was pointed out by Mendoza-Roldan et al. (2020) in Brazil, represented by two larvae collected in the Queimada Grande Island, São Paulo State parasitizing the Hoge's mabuya, *Psychosaura macrorhyncha* (Hoge, 1946) (Squamata: Scincidae), under the collection number - IBSP 12906 (Mendoza-Roldan et al. 2020). In the present study, this material was examined, and reidentified as *Eutrombicula* **sp. n. 3**. In other words, the species *E. tropica* does not exist in Brazil until the present moment.

To date, the species *Eutrombicula bruyanti* (Oudemans, 1910) has not been found since its original description. Then, following the description made by Oudemans (1910), possibly this species does not belong to the genus *Eutrombicula*. Clearly, *E. bruyanti* needs to be redescribed and then put in its proper genus. Until this is resolved, we prefer not to place this species in the key, nor to list it as a species belonging to the genus *Eutrombicula*.

In the present study, four new species are being described, two of which have the prodorsal sclerite ornamented with striations, unlike what happens with some genera, such as *Neoschoengastia*, which is characterized by having striations on the prodorsal sclerite. Here, we are not describing a new genus to relocate these species because of this character; we understand that the striations of the new species are different from the ornaments observed in *Neoschoengastia*. The new species present the prodorsal sclerite with all visible margins and ornamented with straight lines across its surface, without interfering in its shape or form. While in *Neoschoengastia* species, the posterior margin is often covered and affected by the curvilinear striations. Because of this, we believe that these species belong to the genus *Eutrombicula* and have a different ornamentation on the surface of the prodorsal sclerite.

After consulting the original descriptions and redescriptions of the species belonging to the genus *Eutrombicula*, just two species have been described having the prodorsal sclerite with horizontal striations, *Eutrombicula cubensis* Daniel and Stekolnikov, 2004 and *Eutrombicula leiocephali* Daniel and Stekolnikov, 2004. Both species belong to the same group of the species *Eutrombicula* **sp. n. 3** and *Eutrombicula* **sp. n. 4**. The species

*Eutrombicula* **sp. n. 3** is more similar to *Eutrombicula leiocephali*, due the fact that both species have the palpgenu and the ventral palptibial setae branched (B/B/NNB), but they differ because, *Eutrombicula* **sp. n. 3** has the outer and inner prongs at the same size, divided at the tip of the odontus (vs. outer prong much bigger than inner prong, which the inner prong coming out of the middle of odontus) and a normal solenidion ( $\omega$ ) on Ta I (vs. inflated distal tip). While, *Eutrombicula* **sp. n. 4** is the one that most distances itself from the two species described by Daniel and Stekolnikov (2004), since it has the palpgenu setae and the ventral palptibial setae nude - B/N/NNN (vs. B/N/NNB in *E. cubensis* and B/B/NNB in *E. leiocephali*), the outer prong larger than inner prong, this one comes out a little bit above the middle of the odontus (vs. the outer and inner prongs at the same size, divided at the tip of the odontus in *E. cubensis*, and outer prong much bigger than inner prong, which the inner prong coming out of the middle of odontus in *E. leiocephali*) and a normal solenidion ( $\omega$ ) on Ta I (vs. distal tip inflated in *E. leiocephali*).

The coxal fields of the species *E. cubensis* and *E. leiocephali* have not been described or drawn, because of this, it is not possible to compare the shape of the coxal fields of new species with these species.

In the study made by Daniel and Stekolnikov (2004), it was highlighted that the three species described by them could have a variation on the character status of the mastiseta on the Ta III (branched or nude). In other words, would mean that the species may have or not this mastiseta. But after the examination of the species in the present study, we can see that there is a possibility that more than one species parasitizes the same host. Due this fact it has somewhat similar characteristics, they can be identified being the same species, such as the species *Eutrombicula* **sp. n. 1** and *Eutrombicula* **sp. n. 3** sp. n. (previously identified as *E. alfreddugesi*), that were collected parasitizing the same host, *M. atticolus*, in the Mato Grosso State, and are distinguished by the ornamentation of the prodorsal sclerite, formula palpal, shape of the coxal field I and the presence or absence of the mastisetae on Ta III, as highlighted in the larval key presented in the present study. The presence and absence of the mastisetae on Ta III may serve as an indication of having more than one species in the same host and a more detailed analysis must be done, since besides of this characteristic, several others were found in the species described, as shown above.

In addition to the co-parasitism highlighted above, the present study also highlights co-parasitism among some other species of the present study, twice, the species *Eutrombicula* **sp. n. 3** and *Eutrombicula* **sp. n. 4** were collected co-parasitizing *K. calcarata* in the Pará State; and also, twice, the species *Eutrombicula* **sp. n. 1** and *Eutrombicula* **sp. n. 4** were

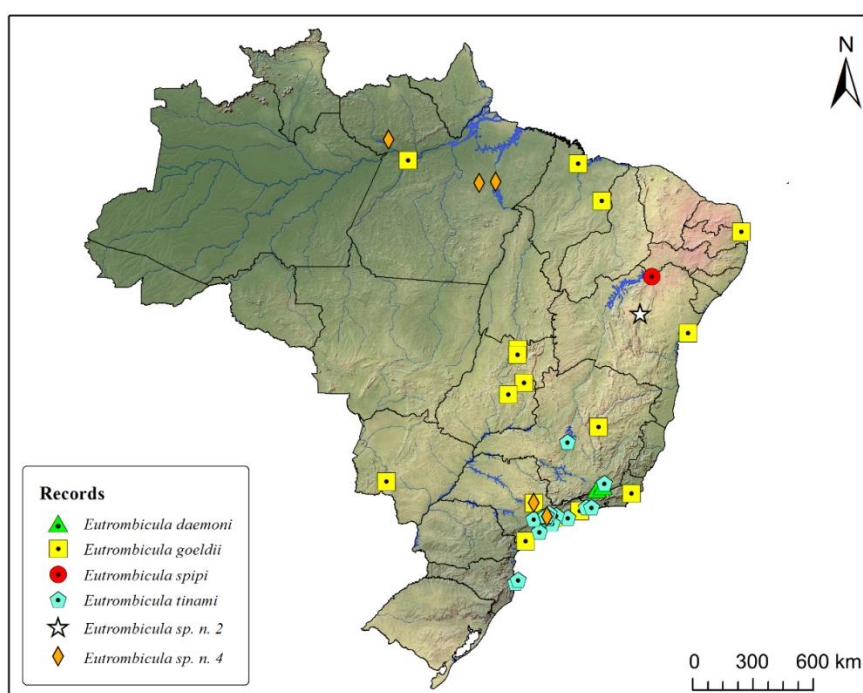
found co-parasitizing the same hosts, *Ameivula* sp. and *T. oreadicus*, both records were in the Mato Grosso State. In addition to the aforementioned co-parasitisms, the species *Eutrombicula* sp. n. 2 and *Eutrombicula* sp. n. 3 were found in the same host in the Bahia State for seven different times, these hosts were *T. cocorobensis*, *T. hispidus* and *T. semitaeniatus*.

We have not ruled out the possibility of a hybrid between species that cohabit in the same environment, but we need more evidence to be able to say if they are variations that separate species, or if they are variations of the same species. So far, the morphological evidence highlighted in the present study is stable and was observed in all examined specimens, so we keep them as different species.

Therefore, after the present study, the current distribution of *Eutrombicula* species in Brazil is represented in the maps of the Figures 35 and 36. Of the *Eutrombicula* species found parasitizing only one host group (reptiles, birds and mammals), six species were found parasitizing only lizards and snakes (Class Reptilia) in Brazil, they are: *Eutrombicula alfreddugesi* which is reduced to just one locality, Acre State, parasitizing a snake; *Eutrombicula butantanensis* which, until now, has only been found in the São Paulo State, parasitizing different species of snakes and lizards; *Eutrombicula* sp. n. 1 found in the states of Mato Grosso and Pernambuco parasitizing only lizards, as well as, *Eutrombicula* sp. n. 2 in the Bahia State. And yet, the species *Eutrombicula* sp. n. 4 which was found in the states of Maranhão, Mato Grosso, Pará and São Paulo, also parasitizing lizards. And a species, *E. spipi*, that was found parasitizing only mammals (Class Mammalia, Family Didelphidae) in the Pernambuco State. Of the five missing species, *Eutrombicula* sp. n. 3 was found in the states of Bahia, Mato Grosso, Minas Gerais, Pará, Pernambuco, Piauí and São Paulo parasitizing species from two large classes of hosts, reptiles and mammals. While three species were found parasitizing different species of birds and mammals, they are: *E. daemoni* that was found only in the Minas Gerais State; *E. batatas* that was found in the states of Amazonas, Maranhão, Mato Grosso, Pará, Paraná, Pernambuco, Rio de Janeiro, Rio Grande do Sul, São Paulo, and the Federal District; and *E. tinami* which was found in the states of Minas Gerais, Rio de Janeiro, Santa Catarina, and São Paulo. Only one species was found in the national territory, parasitizing the three large class groups of hosts (Reptilia, Aves and Mammalia), *E. goeldii*, which was found in the following states: Bahia, Goiás, Mato Grosso do Sul, Maranhão, Minas Gerais, Pará, Paraíba, Rio de Janeiro, São Paulo, and the Federal District. It is worth remembering that all the records mentioned above are only in Brazil, not taking into account the records in other countries, which several species mentioned above

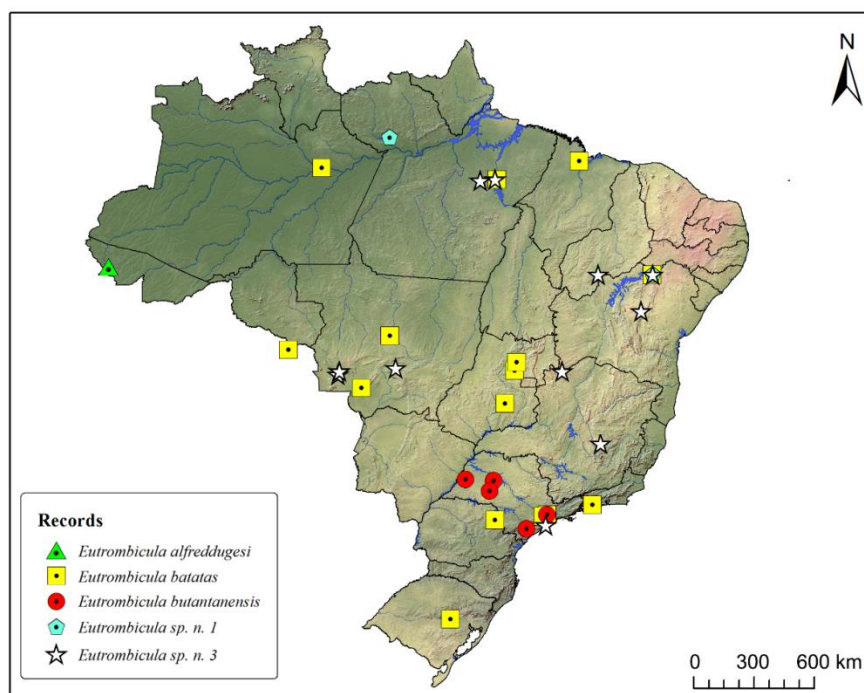
have. These other records can be consulted in the following studies: Jacinavicius et al. (2018a; 2019).

Due to the skin lesions on humans that these mites can cause, in addition to the fact that they also cause trombiculiasis in poultry animals and pets, this genus deserves greater taxonomic attention, since, after the present study, many species were mistakenly identified, either due to the lack of a taxonomist in the study, or lack of adequate tools for correct identification. In this way, the correct identification of these mites can initiate basic studies of ecology and behavior, and later, we can draw broader conclusions from each species present in this genus.



**Figure 35.** Geographical distribution of *Eutrombicula* spp. in Brazil.





**Figure 36.** Geographical distribution of *Eutrombicula* spp. in Brazil.

## 7.5 REFERENCES

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**8. CHAPTER 7 – FIRST RECORD OF *Blankaartia sinnamaryi* (FLOCH & FAURAN, 1956) (TROMBIDIFORMES: TROMBICULIDAE) PARASITIZING THE STRIPED OWL IN NORTHEASTERN BRAZIL**

**8.1 INTRODUCTION**

The Neotropical and Nearctic chigger species *Blankaartia sinnamaryi* (Floch and Fauran, 1956) has historically been found parasitizing birds but also rarely parasitizing reptiles and mammals (Bassini-Silva *et al.*, 2017; 2018). Little is known about this widespread species that has been found in the following countries: Costa Rica (Arnold, 1970; Stekolnikov *et al.*, 2007), Cuba (Daniel and Stekolnikov, 2003), French Guiana (Floch and Fauran, 1956), Jamaica (Brennan, 1953), Panama (Brennan and Yunker, 1966), Peru (Brennan and Jones, 1961), Suriname (Brennan and Bronswijk, 1975), Trinidad & Tobago (Brennan and Jones, 1960), USA (Brennan, 1965; Spalding *et al.*, 1997), and Venezuela (Brennan and Reed, 1975). Bassini-Silva *et al.* (2017; 2018) recently discovered this species in Minas Gerais and Rio de Janeiro states in southeastern Brazil, parasitizing bird species in the Passeriformes and Piciformes. Here, we are reporting this species parasitizing the striped owl, *Pseudoscops clamator* (Vieillot, 1808) (Strigiformes: Strigidae) in Paraíba State in the northeastern Brazil for the first time. Also, we are providing notes on the trombiculiasis caused by this mite in its host.

**8.2 CASE REPORT**

A wild young male *Pseudoscops clamator* (Vieillot, 1808) (Strigiformes: Strigidae) was collected alive in João Pessoa Municipality, Paraíba State (34° 50' 0" W, 7° 5' 0" S) by the environmental police. The bird was sent to the Zoobotanic Park Arruda Câmara, João Pessoa municipality, Paraíba state for care due to a trauma wing and hind limb injury due to an electric shock. During the animal's examination, saccular lesions with "red spots" inside were observed (Figure 1A) along the animal's flank and hind leg. Several more saccular lesions also on the flank were observed without red spots (Figure 1B). These lesions were accompanied by a small accumulation of what

appeared to be connective tissue. The owl did not show any itching or any other clinical signs of ectoparasites.

Soon after, the owl was euthanized and it was realized that the red dots were chiggers which were then removed with the aid of tweezers and scalpel. Two larvae were recovered by veterinarians who stored them in 70 % alcohol. The recovered larvae were sent to the Laboratório de Coleções Zoológicas (LCZ), Instituto Butantan, São Paulo State for identification. The material was slide-mounted in Hoyer's medium according to Walter & Krantz (2009) and deposited in the Acari Collection of Butantan Institute (IBSP), under the accession number IBSP 16505.

The two larvae slide-mounted were identified as *Blankaartia sinnamaryi* (Floch & Fauran, 1956) using the published generic chigger key by Brennan & Goff (1977). The species was confirmed by comparison with the material identified by Bassini-Silva *et al.* (2017; 2018) deposited in IBSP collection). The following characteristics identify this species: heart-shaped idiosoma; palptibia with nude dorsal and lateral setae plus a branched ventral seta; adoral setae branched; trifurcate odontus (Odo); pentagonal prodorsal sclerite; C row with 8 setae; D row with 6 setae; Ta I with  $\epsilon$  positioned distal to  $\omega$ , and only one mastiseta on Ta III (Bassini-Silva *et al.*, 2017; 2018).

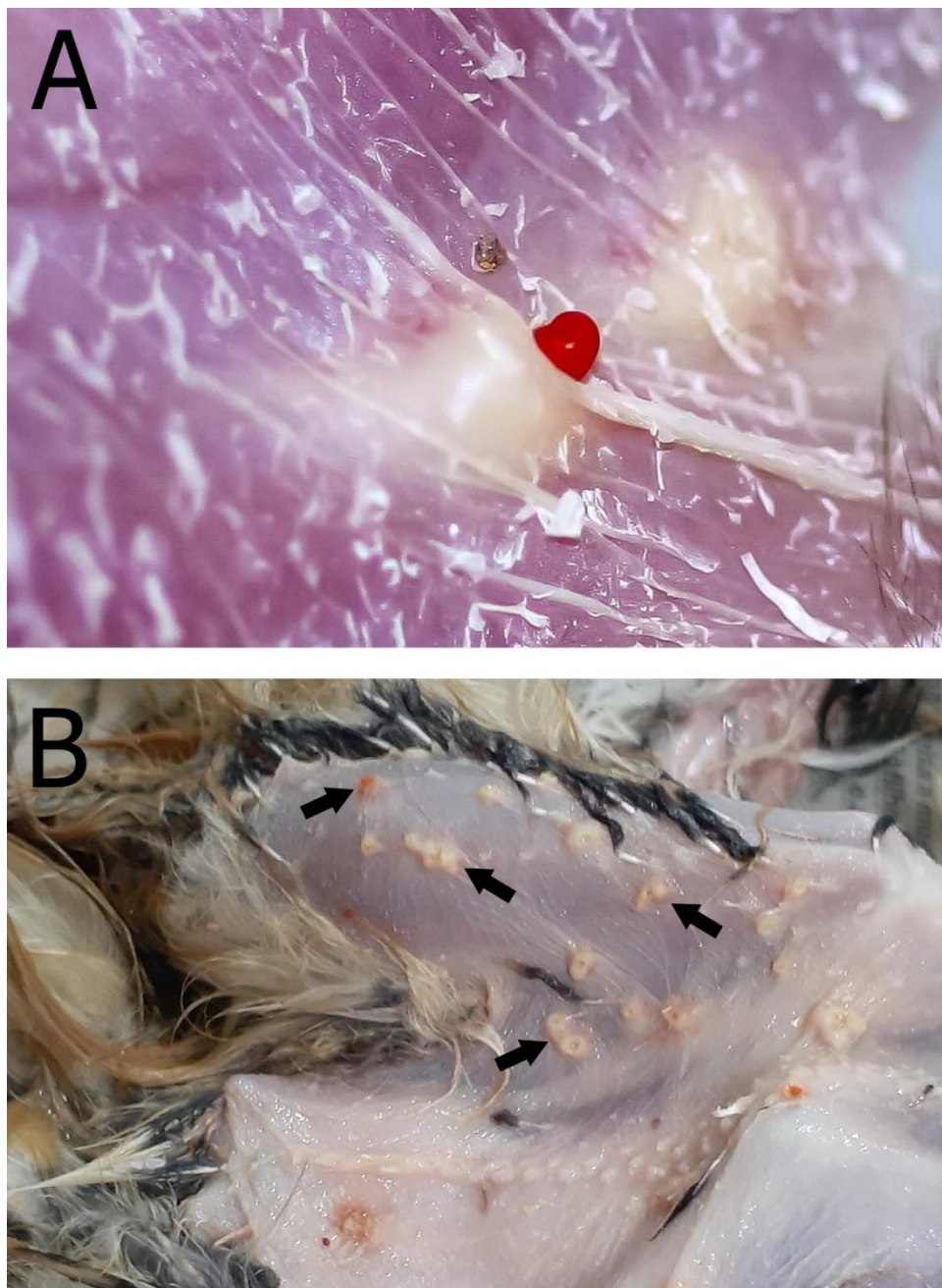
### 8.3 DISCUSSION

This case report represents the third time *B. sinnamaryi* was collected parasitizing birds in the Order Strigiformes. Brennan and Yunker (1966) reported this species parasitizing the Middle American screech owl, *Megascops guatemalae* (Sharpe, 1875), and the mottled owl, *Strix virgata* (Cassin, 1849). *Pseudoscops clamator* is designated a new host for *B. sinnamaryi*.

The lesions observed in this case were identical to those described by Bassini-Silva *et al.* (2018). These lesions are easy to detect because chigger larvae are red and deform the bite region. However, these chiggers are difficult to collect because in many cases the chiggers have already detached leaving only the host lesion.

In the present study, we highlight the species' importance as a cause of trombiculiasis in its hosts. This case report is the first time that the species *B. sinnamaryi* is collected in northeastern Brazil. It also represents the first report of a chigger from Paraíba state.





**Figure 1.** Larvae of *Blankaartia sinnamaryi* (Floch & Fauran, 1956) attached to their host. A. Close up of a larva parasitizing the host. B. Saccular lesions on the owl's flank and hind limb. The Black arrows are pointing out these injuries.

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## 9. CHAPTER 8 – MOLECULAR DETECTION OF *Rickettsia* spp. IN CHIGGERS (TROMBIDIFORMES: TROMBICULIDAE) COLLECTED PARASITIZING BIRDS IN BRAZIL

### 9.1 INTRODUCTION

Over the years, chiggers have been proven to be vectors of *Orientia tsutsugamushi*, which causes scrub typhus in the Asian region (Hase et al. 1978; Takahashi et al. 2004). The only record for this disease in the Americas was made by Weitzel et al. (2016) that reported cases of exanthematic typhus by *O. tsutsugamushi* in people from the island of Chiloé, Chile, suggesting that they were transmitted by chigger mites.

On the other hand, other studies have found several chiggers naturally infected by some species of pathogenic bacteria, Mit'kova *et al.* (2015) found in Slovakia, two species of *Rickettsia*, *R. monacensis* and *R. helvetica*, in *Hirsutiella zachvatkini* (Schluger, 1948) and of *R. monacensis* in *Kepkatrombicula storkani* (Daniel, 1956). There are also records in Spain, where the species *Neotrombicula autumnalis* (Shaw, 1790) was found naturally infected by *Anaplasma phagocytophilum* (Fernández-Soto *et al.*, 2006). In Germany, *N. autumnalis* was found infected by *Borrelia burgdorferi sensu lato* (Kampen *et al.*, 2004), whereas in the Czech Republic, species such as *N. autumnalis*, *Neotrombicula carpathica* Schluger & Vysotzkaya and *Neotrombicula inopinata* (Oudemans, 1909) collected parasitizing birds were infected by *Borrelia garinii* e *Borrelia valaisiana* (Literak *et al.*, 2008). Kabeya et al. (2010) detected *Bartonella tami* in some species of the genus *Leptotrombidium* collected from wild rodents in Thailand. In Panama, Brennan & Yunker (1966) detected *Coxiella burnetii* in *Intercutestrix mondolfi* (Brennan & Yunker, 1969). Later, Yunker et al. (1975) were able to isolate *C. burnetii* from the chigger species *I. mondolfii* collected parasitizing *Proechimys semispinosus* (Rodentia: Echimyidae) and found serological evidence that the species *Tecomatlana sandovali* Hoffmann, 1947 collected from *Saccopteryx bilineata* (Chiroptera: Emballonuridae), was also infected with this bacterium.

Fonseca (1932) emphasized the importance of blood-sucking mites in Brazil, as potential vectors in the epidemiological cycle of this rickettsial disease. Bassini-Silva et al. (2018) detected *Rickettsia felis*-like in *Blankartia sinnamaryi* (Floch & Fauran, 1956) collected parasitizing birds in southeastern Brazil.

Here, we are providing molecular data of chiggers' parasites of birds in Brazil. In addition, we are reporting the detection of two different strains of *Rickettsia* in two chigger

species, *Blankaartia sinnamaryi* (Floch and Fauran, 1956) and *Eutrombicula tinami* (Oudemans, 1910).

## 9.2 MATERIAL AND METHODS

### 9.2.1 Molecular analysis

All material used in the present study came from collections of chiggers from the Bahia, Minas Gerais, Rio de Janeiro, Santa Catarina São Paulo States, and the Federal District. The mites were preserved in 100% ethyl alcohol PA, stored in -80°C freezer, and were deposited in the Acari Collection of the Instituto Butantan (IBSP). The chiggers were individually submitted to DNA extraction using the Guanidine Isothiocyanate (GT) lysis protocol following Chomckzynski (1993). Each mite was placed into a plastic microtube and punctured in the idiosomal region with a sterile needle (1.20 \* 40 - 18G).

Conventional PCRs targeting a partial fragment of the mite 18S ribosomal gene and a section of the mite mitochondrial cytochrome oxidase I (COI) gene were initially performed using thermal conditions and employed primers listed in Table 1. All reactions included a positive (DNA extracted from *Quadrasetta brasiliensis* Goff and Gettinger, 1989) and a negative (DNA-free ultrapure water) control. As 18S rRNA and COI gene-PCRs were used as endogenous controls, negative samples were excluded from further analyses.

Positive samples were then screened for bacteria genera *Anaplasma*, *Borrelia*, and *Rickettsia* through conventional and heminested PCR protocols. All the reactions included a negative control (DNA-free Milli-Q water) and an appropriate positive control. Reactions yielding amplicons of the expected size were treated with ExoSAP-IT (USB Corporation®, OH) following the manufacturer instructions (3 µl of ExoSAP with 7.5 µl of the amplified DNA). Sanger sequencing of the amplicons was performed at the “Centro de pesquisa sobre Genoma Humano e Células Tronco do Instituto de Biociências da USP”. Obtained sequences were assembled and trimmed with Geneious R9 (Kearse et al. 2012), and then submitted to BLASTn analyses ([www.ncbi.nlm.nih.gov/blast](http://www.ncbi.nlm.nih.gov/blast)) in order to infer closest similarities with other homologous sequences (Altschul et al. 1990).

### 9.2.2 Morphological tools

After DNA extraction, exoskeletons of the chigger specimens were recovered and slide-mounted using Hoyer's medium in order to perform morphological identifications according to Walter and Krantz (2009). They were identified at the genus level using the Neotropical and Nearctic keys published by Brennan and Goff (1977). Specimens were identified to the species level by comparing them to the original descriptions.

Morphological characters and the measurements of types were performed using a Leica microscope DM4000B, with a camera lucida. Extended focal range images were compiled with the Leica Application Suite version 2.5.0 software. The images were prepared with Adobe Photoshop v. 13.0 and Inkscape v.1.0.1. All the specimens examined were deposited in the Acari Collection of the Instituto Butantan, São Paulo, Brazil (IBSP).

## 9.3 RESULTS

Three hundred sixty six specimens of chiggers from the states of Bahia, Minas Gerais, Pará, Rio de Janeiro, Santa Catarina, São Paulo, and the Federal District were examined and identified as: 108 specimens of *Blankaartia sinnamaryi* (Floch & Fauran, 1956), 30 of *Eutrombicula batatas* (Linneaus, 1758), 2 of *Eutrombicula daemoni* Bassini-Silva and Jacinavicius, 2018, 67 of *Eutrombicula goeldii* (Oudemans, 1910), 157 of *Eutrombicula tinami* (Oudemans, 1910) and 2 of *Parasecia gilbertoi* Bassini-Silva, Jacinavicius and Barros-Battesti, 2020 (Table 2).

First, all samples were subjected to the endogenous control test. For this, the 18S and COI genes were used. Fifty-one samples amplified for the 18S gene, of these 25 from *B. sinnamaryi*, 4 from *E. batatas*, 2 from *E. daemoni*, 10 from *E. goeldii*, 8 from *E. tinami* and 2 from *P. gilbertoi*. Unfortunately, none of the samples amplified for the COI gene.

The attempts to sequence the expected size amplicons for the 18S gene were successful for 19 samples, and of these, seven sequenced samples yielded an identical haplotype for the species *Eutrombicula goeldii* (accession number: MG817639), two samples for *Eutrombicula daemoni* (accession numbers: MG707783 and MG70778); while two different haplotypes were obtained for the species *Blankaartia sinnamaryi*, three sequenced samples (accession number MG783391) yielding a haplotype; and another four sequenced samples yielded another haplotype (accession number: MG817638), whereas for

*Eutrombicula tinami*, it was obtained a sample with a haplotype, and two samples with another haplotype (accession numbers, respectively: MG817640 and MG817641).

After BLAST analysis, the consensus for all sequences of the 18S gene was similar to the corresponding deposited sequence of *Eutrombicula splendens* (KY922160). The haplotype of *E. goeldii* was 99.3% (432/435-pb) similar, while the haplotype of *E. daemoni* was 99.7% (408/409-pb), *B. sinnamaryi* haplotypes were 98.5% (400/406-bp) and 98.9% (451/456-bp), and *E. tinami* haplotypes were 99.7% (398/399-bp) and 99.5% (397/399-bp), similar.

The 51 samples that amplified for 18S gene were again submitted to PCR in order to detect pathogens. Of these, just 11 samples (4 from *B. sinnamaryi*, 2 from *E. tinami*, 4 from *Eutrombicula* sp. and from 1 *Parasecia* sp.) amplified sequences of *Rickettsia* sp., however no other pathogen was detected. The *ompA* and *ompB* genes were tested for the 11 samples that amplified for the *gltA* gene, and only one sample amplified for the *ompB* gene.

So, the attempts to sequence the amplicons of sizes expected only for the *gltA* gene were successful and for four samples, and these generated sequences were subjected to analysis in BLAST. The consensus for *gltA* sequences showed that one of them was 100% (350/350-bp; accession number: MG906647) identical with the *Rickettsia felis* species (KY172878), two sequences were 100% (350/350-bp; accession number: MG906648 and MG906657) identical with ‘*Candidatus Rickettsia colombianensi*’ (MF034493 and MG563768) and a sequence was 98.8% (346/350-bp; accession number: MG906658) similar with ‘*Candidatus Rickettsia colombianensi*’ (MF034493 and MG563768).

Two species of chigger mites (*B. sinnamaryi* and *E. tinami*) were found with *Rickettsia* spp. Of these, a specimen of *B. sinnamaryi* was collected parasitizing *Tachyphonus coronatus* (Passeriformes: Thraupidae) in Minas Gerais State and another specimen was obtained from *Turdus leucomelas* (Passeriformes: Turdidae) in Bahia State. One specimen of *E. tinami* was collected parasitizing *Zonotrichia capensis* (Passeriformes: Passerellidae) and another one was collected from *Tachyphonus coronatus* (Passeriformes: Thraupidae), both from Santa Catarina State.

#### 9.4 DISCUSSION

The successful amplification rates for each chigger 18S rRNA gene was 23.15% (25/108) for *B. sinnamaryi*, 13.33% (4/30) for *E. batatas*, 100% (2/2) for *E. daemoni*, 14.92% (10/67) from *E. goeldii*, 5.09% (8/157) for *E. tinami*, 100% (2/2) for *P. gilbertoi*.

In all, the present study presented 13.93% (51/366) of success in amplifying the 18S gene for different species of chiggers, while Jacinavicius et al. (2019) found 7.26% (20/317). The present study presented a slightly higher rate in relation to this recent published work. This higher success rate may be directly linked to the fact that the species that was more successful individually was *B. sinnamaryi* with 23.15% (25/108), as already seen in Bassini-Silva et al. (2018). The success rate [72.5% (29/40)] for only this species is high in relation to the other species analyzed. Jacinavicius et al. (2019) were not successful in amplifying the 18S gene for the species *E. tinami*, however, in the present study we managed to obtain two different haplotypes for this species, but it is worth mentioning that 157 specimens of this species were tested.

Herein we are providing for the first time 18S sequences for *Eutrombicula goeldii* (Oudemans, 1910) and *Eutrombicula tinami* (Oudemans, 1910).

These data come to help a future molecular phylogenetic construction that can infer in separating the families of chiggers that are sometimes treated as subfamilies. Since, according to Hillis and Dixon (1991), Cruickshank (2002) and Jacinavicius et al. (2019), this gene has a slow rate of evolution meaning that it is a good marker for inferences in the classification of families.

Regarding the *Rickettsia* sequences detected in the mites in the present study, three specimens were detected with “*Ca. Rickettsia colombianensi*” and a specimen detected with *Rickettsia felis*-like. Both of these rickettsiae have been found in chiggers before, “*Ca. Rickettsia colombianensi*” was found in *Herpetacarus hertigi* (Brennan, 1970), *Quadrasetta trapezoides* (Brennan and Jones, 1964) and *Trombewingia bakeri* (Fonseca, 1955), collected parasitizing rodents in São Paulo State (Jacinavicius et al. 2019), and *Rickettsia felis*-like was detected in *B. sinnamaryi* parasitizing birds in Minas Gerais State (Bassini-Silva et al. 2018). Also, it was the first time that a strain of *Rickettsia* was detected in the chigger species *E. tinami*, and the first time that the “*Ca. Rickettsia colombianensi*” was detected in a chigger parasitizing birds. In addition, again *B. sinnamaryi* was detected with *Rickettsia felis*-like, suggesting that there may be some relationship between the mite and the bacteria. However, more studies need to be done to explain this relationship. On the other hand, we had no success in detecting the presence of *Anaplasma* sp. and *Borrelia* sp. in the analyzed chiggers.

In addition, we are recording *B. sinnamaryi* for the first time in two localities, Camaçari Municipality, Bahia State and Brasília, Federal District, expanding the geographic distribution of this species to central-western region, which was only known to the southeastern and northeastern region of Brazil.



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**Table 1.** Oligonucleotide primers used for the amplification of the genes 18S rRNA and COI (endogenous controls), *gltA*, *ompA* and *ompB* (*Rickettsia*), 16S (Anaplasmataceae) and *Flab B* (*Borrelia*). \*SPF: Spotted Fever Group rickettsiae.

Organisms	Genes	Sequence (5' - 3')	Size (pb)	Reference
Mite	18S	<b>18S-1F:</b> ATATTGGAGGGCAAGTCTGG <b>18S-1R:</b> TGGCATCGTTTATGGTTAG	500	Otto & Wilson (2001)
	COI	<b>bcdF01:</b> CATTTCCHACTAAYCATAARGATATTGG <b>bcdR04:</b> TATAAACYTC DGGATGNCCAAAAAA	560-680	Dabert (2008, 2010)
Family Anaplasmataceae	16S	<b>EHR 16SD:</b> GGTACCYACAGAAGAAGTCC <b>EHR 16SR:</b> TAGCACTCATCGTTTACAG <b>FlaLL:</b> ACATATTCAGATGCAGACAGAGGT <b>FlaRL:</b> GCAATCATAGCCATTGCAGATTGT	345 665	Inokuma <i>et al.</i> (2000)
<i>Borrelia</i>	<i>Flab B</i>	<b>FlaLS:</b> AACAGCTGAAGAGCTTGAAT <b>FlaRS:</b> CTTTGATCACTTATCATTCTAATAGC <b>CS 78:</b> GCAAGTATCGGTGAGGATGTAAT	354	Stromdahl <i>et al.</i> (2003)
<i>Rickettsia</i>	<i>gltA</i>	<b>CS 323:</b> GCTTCCTTAAAATTCAATAAATCAGGAT	350	Labruna <i>et al.</i> (2004)
<i>Rickettsia</i> SPF*	<i>OmpA</i> (1st PCR)	<b>Rr 190.70:</b> ATGGCGAATATTTCTCCAAAA <b>Rr 190.701:</b> GTTCCGTTAATGGCAGCATCT	632	Regnery <i>et al.</i> (1991) and Roux <i>et al.</i> (1996)
	<i>OmpA</i> (Hemi-nested)	<b>Rr190.70:</b> ATGGCGAATATTTCTCCAAAA <b>Rr190.602:</b> AGTGCAGCATTCGCTCCCCCT	532	Regnery <i>et al.</i> (1991)
	<i>OmpB</i>	<b>120.M59:</b> CCGCAGGGTTGGTAACTGC <b>120-807:</b> CCTTTTAGATTACCGCCTAA	862	Roux & Raoult (2000)



10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
10711	<i>Blankaartia sinnamaryi</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12211	<i>Blankaartia sinnamaryi</i>	Paraty - RJ	A	NA	NA	NA	-	-	NA
12323A	<i>Blankaartia sinnamaryi</i>	Juiz de Fora - MG	NA	NA	-	-	-	-	-
12331	<i>Blankaartia sinnamaryi</i>	Juiz de Fora - MG	A	NA	NA	NA	-	-	NA
12336	<i>Blankaartia sinnamaryi</i>	Juiz de Fora - MG	A	NA	NA	NA	-	-	NA
12338	<i>Blankaartia sinnamaryi</i>	Juiz de Fora - MG	A	NA	NA	NA	-	-	NA
12340	<i>Blankaartia sinnamaryi</i>	Juiz de Fora - MG	NA	NA	-	-	-	-	-
12342	<i>Blankaartia sinnamaryi</i>	Juiz de Fora - MG	A	NA	NA	NA	-	-	NA
12343	<i>Blankaartia sinnamaryi</i>	Juiz de Fora - MG	A	NA	NA	NA	-	-	NA
12343	<i>Blankaartia sinnamaryi</i>	Juiz de Fora - MG	NA	NA	-	-	-	-	-
12343	<i>Blankaartia sinnamaryi</i>	Juiz de Fora - MG	NA	NA	-	-	-	-	-
12343	<i>Blankaartia sinnamaryi</i>	Juiz de Fora - MG	NA	NA	-	-	-	-	-
12343	<i>Blankaartia sinnamaryi</i>	Juiz de Fora - MG	NA	NA	-	-	-	-	-













12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12880	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12881	<i>Eutrombicula goeldii</i>	Brasília - DF	A	NA	NA	NA	-	-	NA
12882	<i>Eutrombicula goeldii</i>	Brasília - DF	A	NA	NA	NA	-	-	NA
12884	<i>Eutrombicula goeldii</i>	Brasília - DF	NA	NA	-	-	-	-	-
12890	<i>Eutrombicula goeldii</i>	Camaçari - BA	NA	NA	-	-	-	-	-
12893	<i>Eutrombicula goeldii</i>	Brasília - DF	A	NA	NA	NA	-	-	NA
12898	<i>Eutrombicula goeldii</i>	Brasília - DF	A	NA	NA	NA	-	-	NA
12899	<i>Eutrombicula goeldii</i>	Brasília - DF	NA	NA	-	-	-	-	-
12900	<i>Eutrombicula goeldii</i>	Brasília - DF	NA	NA	-	-	-	-	-







12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12178	<i>Eutrombicula tinami</i>	São Paulo - SP	NA	NA	-	-	-	-	-
12213A	<i>Eutrombicula tinami</i>	Paraty - RJ	A	NA	NA	NA	-	-	NA
12213A	<i>Eutrombicula tinami</i>	Paraty - RJ	A	NA	NA	NA	-	-	NA
12213A	<i>Eutrombicula tinami</i>	Paraty - RJ	A	NA	NA	NA	-	-	NA
12218	<i>Eutrombicula tinami</i>	Paraty - RJ	A	NA	NA	NA	-	-	NA
13121	<i>Eutrombicula tinami</i>	Florianópolis - SC	NA	NA	-	-	-	-	-
13121	<i>Eutrombicula tinami</i>	Florianópolis - SC	NA	NA	-	-	-	-	-







13121	<i>Eutrombicula tinami</i>	Florianópolis - SC	NA	NA	-	-	-	-	-
13121	<i>Eutrombicula tinami</i>	Florianópolis - SC	NA	NA	-	-	-	-	-
13121	<i>Eutrombicula tinami</i>	Florianópolis - SC	NA	NA	-	-	-	-	-
13123	<i>Eutrombicula tinami</i>	Florianópolis - SC	A	NA	NA	A	NA	NA	NA
12345B	<i>Parasecia gilbertoi</i>	Juiz de Fora - MG	A	NA	NA	NA	-	-	NA
12345B	<i>Parasecia gilbertoi</i>	Juiz de Fora - MG	A	NA	NA	NA	-	-	NA

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## 10. CONCLUSIONS

- A catalog of primary and secondary type specimens (holotype, paratype, syntype, lectotype and paralectotype) housed in USNM collection is provided. In total, 1,026 type specimens are listed with 645 representing holotypes, 782 paratypes, 69 syntypes, 19 lectotypes, and 16 paralectotypes of larvae, deutonymphs and adult chiggers.

- The redescrptions for the species *Apolonia tigipioensis*, *Neoschoengastia esorhina*, *Eutrombicula alfreddugesi*, *Eutrombicula goeldii*, *Eutrombicula spipi* and *Eutrombicula tinami* were provided, with complete drawings of the diagnostic characters, and in the case of *N. esorhina*, microscopy images were also provided, as well as, SEM images for *E. batatas*, *E. goeldii* and *E. tinami* were provided.

- New host-associations and locality records were provided for the species *E. alfreddugesi*, *E. batatas*, *E. goeldii* and *E. tinami*.

- *E. tinami* was reported for the first-time biting humans in southeastern Brazil.

- A new species for the genus *Eutrombicula* collected parasitizing a bird (*Myiozetetes similis* - Passeriformes: Tyrannidae) in Minas Gerais has been described.

- Four new species of *Eutrombicula* collected from reptiles and mammals in Brazil were described, most of the material examined of these species was previously identified as *E. alfreddugesi*.

- The species *Eutrombicula butantanensis* has been revived (formerly a synonym of *E. alfreddugesi*). In addition, the types of *E. ophidica* have been examined and now this species is being synonymized with *E. butantanensis*. Also, new records for *E. butantanensis* are provided.

- The distribution of *B. sinnamaryi* was expanded with an additional case report in the Northeast of Brazil, showing some lesions on the host's skin (striped owl) caused by this species.

- Two different strains of *Rickettsia* were detected in two chigger species (*B. sinnamaryi* and *E. tinami*) collected parasitizing birds in Brazil.