

A Revision of *Parasecia* (Trombidiformes: Trombiculidae) With a Description of a New Species, a New Genus and a Key to Species

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Subject Editor: Howard Ginsberg

Received 1 May 2020; Editorial decision 16 June 2020

Abstract

Chiggers of the genus *Parasecia* Loomis parasitize birds, mammals, and reptiles in the Nearctic and Neotropical regions. In the present review, we examined 18 species previously included in the genus, 15 of them being retained in the genus *Parasecia*, one genus is created, *Nahuacarus bulbocalcar* n. gen. (Trombidiformes: Trombiculidae), and new combinations are proposed for two species: *Lorillatum lasiurus* n. comb. and *Lorillatum orphana* n. comb. (Trombidiformes: Trombiculidae). In addition, *Parasecia kansasensis* (Loomis) (Trombidiformes: Trombiculidae) is synonymized with *Parasecia gurneyi* (Ewing) (Trombidiformes: Trombiculidae), *Parasecia gilbetoi* n. sp. (Trombidiformes: Trombiculidae) is described and new locality and host records are added for *Parasecia chara* (Wharton), *Parasecia longicalcar* (Brennan and Jones), *Parasecia manueli* (Brennan and Jones), and *Parasecia thalurlania* (Brennan) (Trombidiformes: Trombiculidae).

Key words: chigger, ectoparasite, new species, new record

The genus *Parasecia* Loomis (1966) was created as a subgenus of *Fonsecia* Radford, 1942 with *Trombicula gurneyi* Ewing, 1937 as the type species. Loomis (1966) included eight other species: *Trombicula aitkeni* Brennan and Jones, 1960, *Trombicula chara* Wharton, 1948, *Trombicula gurneyi campestris* Loomis, 1955, *Trombicula kansasensis* Loomis, 1955, *Trombicula longicalcar* Brennan and Jones, 1960, *Trombicula manueli* Brennan and Jones, 1960, *Trombicula psittaci* Floch and Abonnenc, 1949, and *Trombicula universitatis* Hoffmann, 1963 (Trombidiformes: Trombiculidae).

In 1967, Vercammen-Grandjean created the subgenus *Euneocula* using the same type species that Loomis (1966) included for *Parasecia*. Also, Vercammen-Grandjean (1967) divided *Euneocula* into two groups: ‘gurneyi group’ with *T. gurneyi*, *T. campestris*, and *T. kansasensis* and the ‘manueli group’ with *T. aitkeni*, *T. chara*, *T. longicalcar*, *T. manueli*, and *T. psittaci*. In addition, he transferred *T. universitatis* to *Neotrombicula* Hirst, 1925.

In 1969 Brennan added *Trombicula soucouyanti* Brennan and Yunker, 1966 (Trombidiformes: Trombiculidae) to the group,

and described three additional species from Brazil, *Fonsecia* (*Parasecia*) *fundata* Brennan, 1969, *Fonsecia* (*Parasecia*) *thalurania* Brennan, 1969, and *Fonsecia* (*Parasecia*) *valida* Brennan, 1969 (Trombidiformes: Trombiculidae) with a key of species for the subgenus. Brennan (1971) elevated the subgenus *Fonsecia* (*Parasecia*) to genus, and described *Parasecia orphana* Brennan, 1971 (Trombidiformes: Trombiculidae), bringing the total number of species in *Parasecia* to 13. Brennan and Bronswijk (1975) transferred *Trombicula palmigera* Fauran, 1960 to *Parasecia*. However, *T. palmigera* had already been placed in the genus *Parasoschoengastia* Vercammen-Grandjean, 1960 by Vercammen-Grandjean (1965). Goff and Gettinger (1991) described *Parasecia lasiurus* Goff and Gettinger, 1991 (Trombidiformes: Trombiculidae) from Brazil, and in 1992 Goff described *Parasecia bulbocalcar* Goff, 1992 (Trombidiformes: Trombiculidae) from Mexico along with a new key to 15 species of *Parasecia* excluding *P. gurneyi campestris*. However, he did not consider the new combination for the *Trombicula universitatis* (as *Neotrombicula universitatis*) proposed by Vercammen-Grandjean (1967), and kept this species in the genus *Parasecia*, in the key. Hoffmann (1990) agreed with Vercammen-Grandjean (1967) and considered *T. universitatis* belonging to the genus *Neotrombicula*. Goff and Gettinger (1995) described two other species *Parasecia argentinensis* Goff and Gettinger, 1995 and *Parasecia neuquenensis* Goff and Gettinger, 1995 (Trombidiformes: Trombiculidae). However, Stekolnikov and Gonzalez-Acuña (2012) transferred *P. neuquenensis* to the genus *Paratrombicula*.

Recently, Stekolnikov and González-Acuña (2015) and Jacinavicus et al. (2018) described two additional species, *Parasecia molini* Stekolnikov and González-Acuña, 2015 and *Parasecia fernandae* Jacinavicus and Bassini-Silva, 2018 (Trombidiformes: Trombiculidae), respectively. In the present study we examined 18 species of *Parasecia*, describe a new species, propose a new genus, transfer two species to *Lorillatum* Nadchatram 1861, and present a key of the species for the genus with additional locality and host records.

Material and Methods

In addition to museum preserved material examined listed below, material from recent field collections were also included from Brazil (Mato Grosso do Sul, Minas Gerais, and Rio de Janeiro states). Initially, the specimens were stored in ethanol (100%), and later, were slide-mounted in Hoyer's medium according to Walter and Krantz (2009) for identification. Some specimens were also prepared for Scanning Electron Microscopy (SEM) according to Walter and Krantz (2009) with a Digital Scanning Microscope FEI, Quanta 250, at the Laboratory of Cell Biology, Instituto Butantan, São Paulo, Brazil.

All figures were prepared using a Leica DFC 500 digital camera coupled to the optical microscope Leica DM4000B. Extended focal range images were composed with Leica Application Suite version 2.5.0. All the images were prepared with Adobe Photoshop v. 13.0, and Inkscape V. 2. For measurements of the new species described here, we used a Leica DFC 500 digital camera coupled to the optical microscope Leica DM4000B. Extended focal range images were composed with Leica Application Suite version 2.5.0. The measurements were made in micrometers (μm). The minimum and maximum measurements are for all type series (holotype and paratypes).

The redescriptions based on the specimens examined were compared to the original descriptions and types examination. The terminology and nomenclature followed Bassini-Silva et al. (2018, 2019) and Jacinavicus et al. (2018, 2019). It is worth mentioning that in this study, we considered the opisthosomal setae to include all idiosomal setae except the prodorsal setae, coxal field setae, and sternal setae. Also, in order to help the comparisons with old descriptions that

used the unique chigger terminology system, we put the old terms in parentheses.

The information placed in the section 'Type depository' was taken from the original descriptions. And the section 'Additional

BPBM	United States, Hawaii, Honolulu, Bernice Pauahi Bishop Museum
FMNH	United States, Illinois, Chicago, Field Museum of Natural History Chicago (cited in original description as CNHM)
IBSP	Brazil, São Paulo, Acari Collection of the Instituto Butantan
KU	United States, Kansas, University of Kansas, Snow Entomological Museum
MCZ	United States, Massachusetts, Cambridge, Universidade de Harvard, Museum of Comparative Zoology
CAVAISC-Fiocruz	Brazil, Rio de Janeiro, Instituto Oswaldo Cruz, Collection of Apterous Arthropod Vectors of Importance for Public Health (Coleção de Artrópodes Vetores Ápteros de Importância em Saúde das Comunidades)
MZUSP	Brazil, São Paulo, Museu de Zoologia da Universidade de São Paulo
NHMUK	United Kingdom, London, South Kensington, The Natural History Museum (formerly British Museum [Natural History]) (cited in original description as BMNH or BM)
OMNH	United States, Oklahoma, Norman, Sam Noble Oklahoma Museum of Natural History
RML	United States, Montana, Hamilton, Rocky Mountain Laboratories
SAM	Australia, South Australia, Adelaide, South Australian Museum
UNAM	Mexico, Mexico City, Universidad Nacional Autónoma de México, Instituto de Biología
USNM	United States, Washington, DC, National Museum of Natural History (formerly United States National Museum), which is housed at the Systematic Entomology Laboratory (BARC-USDA-ARS), cited in original descriptions as NMNH
ZIN	Russia, St. Petersburg, Zoological Institute of Russian Academy of Sciences

Material' are the previously published records, and the section 'New records' corresponds to the unpublished records.

Follows the abbreviations of the collections/institutes used in this manuscript:

It is worth mentioning that most of the types and materials that were deposited, according to the original descriptions, in the RML and BPBM collections, are now housed at the USNM collection. Besides that, the KU collection is currently housed at the FMNH collection.

Nomenclature

This paper and the nomenclatural act(s) it contains have been registered in Zoobank (www.zoobank.org), the official register of the International Commission on Zoological Nomenclature. The LSID (Life Science Identifier) number of the publication is: urn:lsid:zoobank.org:pub:4D26A5D8-8933-4C7D-ABF8-278CDC5E57A3.

Results

After examining types and additional material of *Parasecia* along with their original descriptions we concluded *Parasecia* has 15 valid species.

Table 1. Distribution of the species of the genus *Parasecia* (Trombidiformes: Trombiculidae), in alphabetic order

Species	Distribution	References
<i>Parasecia aitkeni</i> (Brennan and Jones 1960)	Bolivia Brazil Surinam Trinidad and Tobago Venezuela	Brennan 1970 Whitaker and Dietz 1987 Brennan and Lukoschus 1971 Brennan and Jones 1960; Brennan 1969 Brennan and Reed 1975
<i>Parasecia argentinensis</i> Goff and Gettinger 1995	Argentina	Goff and Gettinger 1995
<i>Parasecia campestris</i> (Loomis, 1955)	United States	Loomis 1955
<i>Parasecia chara</i> (Wharton, 1948)	Peru	Wharton 1948; Brennan and Jones 1961; This study
<i>Parasecia fernandae</i> Jacinavicius and Bassini-Silva, 2018	Brazil	Jacinavicius et al. 2018
<i>Parasecia fundata</i> (Brennan, 1969)	Brazil Costa Rica	Brennan 1969 Stekolnikov et al. 2007
<i>Parasecia gilbertoi</i> n. sp.	Brazil	This study
<i>Parasecia gurneyi</i> (Ewing, 1937)	Canada Mexico United States	Johnston and DeGiusti 1961 Loomis 1969 Ewing 1937; 1943; Loomis 1955; Brennan and White, 1960; Loomis and Crossley 1963; Crossley and Proctor, 1971; Loomis et al. 1972; Wrenn 1974; Dood and Kurta 1988; Wilson and Durden 2003; Reeves et al. 2004; Walters et al. 2011
<i>Parasecia longicalcar</i> (Brennan and Jones, 1960)	Guyana Mexico Panama Surinam Trinidad and Tobago Venezuela	Brennan 1969 Colín-Martínez et al. 2018 Brennan and Yunker 1966 Brennan and Bronswijk 1975 Brennan and Jones 1960; Brennan 1967 Brennan and Reed 1975; This study
<i>Parasecia manueli</i> (Brennan and Jones, 1960)	Brazil Colombia Cuba Peru Surinam Trinidad and Tobago Venezuela	Jacinavicius et al. 2018; This study Brennan 1968 Daniel and Stekolnikov 2003 Brennan and Jones 1961 Brennan and Lukoschus 1971; Brennan and Bronswijk 1975 Brennan and Jones 1960 Brennan and Reed 1975
<i>Parasecia molini</i> Stekolnikov et al., 2015	Chile	Stekolnikov et al. 2015
<i>Parasecia psittaci</i> (Floch and Abonnenc, 1949)	French Guiana Trinidad and Tobago Venezuela	Floch and Abonnenc 1949 Brennan and Jones 1960 Brennan and Reed 1975
<i>Parasecia soucouyanti</i> (Brennan and Yunker, 1966)	Mexico Panama Venezuela	Colín-Martínez et al. 2018 Brennan and Yunker 1966 Brennan and Reed 1975
<i>Parasecia thalurania</i> (Brennan, 1969)	Brazil	Brennan 1969; This study
<i>Parasecia valida</i> (Brennan 1969)	Brazil Surinam	Brennan 1969 Brennan and Lukoschus 1971

Two species were transferred to *Lorillatum* (*Lorillatum lasiurus* n. comb. and *Lorillatum orphana* n. comb.) one species was transferred to a new genus (*Nahuacarus bulbocalcar* n. gen.). In addition, *P. kansasensis* is placed in synonymy with *P. gurneyi* and *Parasecia gilbertoi* sp. n. is described below. Table 1 summarizes the distribution of each species belonging to the genus *Parasecia*. While the Supp Table S1 (online only) shows the association of hosts with the species within the genus *Parasecia*. Table 2 includes the number of dorsal and ventral opisthosomal setae only for the usable type species, but it is worth remembering that all the material recorded in this study was examined. In some species the F and H row are not aligned, we choose to combine these rows in the same column of the tables. The morphometric data for the new species are shown in Tables 3–6.

Genus *Parasecia* Loomis, 1966

Fonsecia (*Parasecia*) Loomis 1966: 191; Brennan 1969: 662.

Fonsecia (*Eunneocula*) Vercaemmen-Grandjean 1967: 129.

Parasecia: Brennan and Reed 1975: 48; Brennan and Goff 1977: 561; Goff 1992: 965; Hoffmann 1990: 107; Stekolnikov and González-Acuña 2015: 14; Jacinavicius et al. 2018: 206.

Type species: *Trombicula gurneyi* Ewing, 1937

Diagnosis

Larva. Palptarsus with seven branched setae, ζ and ω ; odontus trifurcate; cheliceral blade with tricuspid cap; eyes 2/2, each pair on an ocular plate separate from the prodorsal sclerite; prodorsal sclerite rectangular, with a pair of flagelliform trichobothria (*si*), *se* setae on the prodorsal sclerite; femora of legs I–III each divided into a basifemur and telofemur; seta *elcI* never observed; coxal fields unisetose and with few punctuations; empodium present but without onychotriches; genu leg I with three solenidia (σ); genu leg II and III with one solenidion (σ) each; tarsus legs I and II each with

Table 2. Numbers of opisthosomal setae

Species	Identifications	C row	D row	E row	F and H rows	Total Dorsals	Prenals	Postanals	Total Ventrals	Total
<i>Parasecia aitkeni</i>	RML 33628(H)	10	8	8	14	40	8	19	27	67
	RML33628(1) ^a	10	8	8	16	42	9	15	24	66
	RML33628(2) ^a	10	8	8	18	44	8	15	23	67
	RML33628(4) ^a	10	8	-	-	-	-	-	-	68
	RML33628(5) ^a	10	8	8	14	40	8	20	28	68
<i>Parasecia campestris</i>	RL4908079(1) ^a	8	6	2	4	20	12	8	20	40
	RL4908079(2) ^a	8	6	2	4	20	12	8	20	40
<i>Paraecia chara</i>	-	12	8	8	13	41	18	21	39	80
	-	12	8	8	14	42	18	24	42	84
<i>Parasecia fundata</i>	RML49323(H)	8	6	6	10	30	10	8	18	48
	RML4932(1) ^a	8	6	6	10	30	10	12	22	52
	RML49323(2) ^a	8	6	6	10	30	10	12	22	52
	RML49323(3) ^a	8	6	6	12	32	10	12	22	54
	RML49323(4) ^a	8	6	6	10	30	10	12	22	52
	RML49323(5) ^a	8	6	6	10	30	10	14	24	54
<i>Parasecia gurneyi</i> (= <i>Parasecia kansasensis</i>)	UNSM 1262(3) ^a	8	6	4	2	20	12	4	16	36
	UNSM 1262(4) ^a	8	6	4	2	20	12	10	22	40
	-	8	6	4	2	20	12	6	18	38
<i>Parasecia longicalcar</i>	RML 33416(H)	8	6	6	9	29	12	15	27	56
	RML33416(2) ^a	8	6	6	9	29	12	13	25	54
	RML33416(5) ^a	8	6	6	6	26	12	15	27	53
<i>Parasecia manueli</i>	RML34190(H)	8	6	2	6	22	10	6	16	38
	RML33856(2) ^a	8	6	2	6	22	10	6	16	38
	RML33856(3) ^a	8	6	2	6	22	10	6	16	38
<i>Parasecia molini</i>	ZIN 7705(1) ^a	8	6	2	6	22	12	-	12	34
<i>Parasecia psittaci</i>	#357	12	10	10	16	48	8	21	29	77
<i>Parasecia soucouyanti</i>	RML40711(H)	8	6	2	6	22	12	10	22	44
	RML40711(1) ^a	8	6	2	6	22	10	12	23	44
	RML40711(2) ^a	8	6	2	4	20	10	12	22	42
	RML40711(4) ^a	8	6	2	4	20	10	13	23	43
	RML40711(5) ^a	8	6	2	6	22	10	10	20	42
	RML 49374(H)	10	10	8	29	57	8	40	48	105
<i>Parasecia thalurania</i>	RML49092(H)	8	6	2	4	20	10	12	22	42
	RML49092(1) ^a	8	6	2	6	22	11	6	17	39
	RML49092(2) ^a	8	6	2	4	20	12	8	20	40
	RML49092(3) ^a	8	6	2	4	20	10	9	19	39
	RML49092(4) ^a	8	6	2	4	20	11	7	19	39
	RML49092(5) ^a	8	6	2	6	22	12	8	20	42
	RML49092(6) ^a	8	6	2	4	20	10	8	18	38
	RML49092(7) ^a	8	6	2	4	20	10	9	19	39
	RML49092(8) ^a	8	6	2	4	20	10	8	18	40
	RML49092(9) ^a	8	6	2	8	24	8	12	20	44
<i>Parasecia gilbertoi</i> n. sp.	IBSP 12326(H)	8	6	2	8	24	8	12	20	44
	IBSP 12326(1) ^a	8	6	2	8	24	8	12	20	44
	IBSP 12326(2) ^a	8	6	2	8	24	8	12	20	44
	IBSP 12326(3) ^a	8	6	2	8	24	8	12	20	44
	IBSP 12326(4) ^a	8	6	2	8	24	8	12	20	44
	IBSP 12326(5) ^a	8	6	2	8	24	8	12	20	44
	IBSP 12326(6) ^a	8	6	2	6	22	8	12	20	42
	IBSP 12326(7) ^a	8	6	2	8	24	8	12	20	44
	IBSP 12326(8) ^a	8	6	2	6	22	8	12	20	42
	IBSP 12326(9) ^a	8	6	2	8	24	8	12	20	44
<i>Nabuacarus bulbocalcar</i> n. gen.	Holotype(H)	8	6	6	22	48	32	32	64	112
	Paratype(1) ^a	8	6	6	20	46	30	32	62	108
	Paratype(2) ^a	8	6	6	20	46	32	30	62	108
	Paratype(3) ^a	8	6	6	22	48	34	30	64	112
	Paratype(4) ^a	8	6	6	20	46	30	30	60	106
	Paratype(5) ^a	8	6	6	22	48	30	32	62	110
	Paratype(6) ^a	8	6	6	20	46	32	34	66	112
	Paratype(7) ^a	8	6	6	22	48	32	32	64	112
<i>Lorillatum lasirurus</i> n. comb.	Holotype	8	6	4	2	20	6	6	12	32

Table 2. Continued

Species	Identifications	C row	D row	E row	F and H rows	Total Dorsals	Prenals	Postanals	Total Ventrals	Total
<i>Lorillatum orphana</i> n. comb.	RML50351(H)	8	6	2	4	20	9	4	13	33
	RML50351(1) ^a	8	6	2	4	20	8	6	14	34
	RML50351(2) ^a	8	6	2	4	20	8	6	14	34
	RML50351(3) ^a	8	6	2	4	20	8	6	14	34
	RML50351(4) ^a	8	6	2	4	20	8	6	14	34

^a The number in parenthesis represents a collection code; (H) represents the holotype.

Table 3. Standard measurements of *Parasecia gilbertoi* n. sp. (n = 11)

	AW	PW	SB	ASB	PSB	SD	P-PL	AP	vi	ve	se	si	1a	3a	DMIN	DMAX	VMIN	VMAX
Holotype	59	70	28	27	17	44	17	17	37	27	49	59	35	39	37	45	28	36
Paratypes (mean)	59	70	26	25	19	44	16	19	36	27	47	49	34	34	33	43	29	37
Minimum	56	68	24	18	17	40	12	16	33	24	44	44	29	30	31	40	27	35
Maximum	60	76	28	29	25	49	19	22	39	30	51	59	36	39	37	50	31	41

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; P-PL, distance from posterolateral to extreme posterior margin of prodorsal sclerite; AP, distance between the bases of *ve* and *se*; *vi*, anteromedial 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 opisthosomal setae; VMAX, maximum length of ventral opisthosomal setae.

Table 4. Standard measurements of *Parasecia gilbertoi* n. sp. (n = 11)

	Cx I	Tr I	Bf I	Tf I	Ge I	Ti I	Ta I (L)	Ta I (W)	Cx II	Tr II	Bf II	Tf II	Ge II	Ti II	Ta II (L)	Ta II (W)
Holotype	40	29	20	18	25	33	49	12	55	24	15	16	18	26	43	18
Paratypes (mean)	41	31	19	18	25	33	50	13	55	25	15	18	19	28	45	19
Minimum	39	29	18	17	23	34	48	12	53	24	14	16	17	26	42	18
Maximum	43	32	20	18	26	32	52	13	56	26	16	19	20	29	47	19

Cx I, length of coxa on leg I; Tr I, length of trochanter on leg I; Bf I, length of basifemur on leg I; Tf 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; Bf II, length of basifemur on leg II; Tf 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 5. Standard measurements of *Parasecia gilbertoi* n. sp. (n = 11)

	Cx III	Tr III	Bf III	Tf III	Ge III	Ti III	TaIII (L)	TaW (W)	I	II	III	IP
Holotype	52	32	25	21	23	36	58	16	174	142	195	511
Paratypes (Mean)	51	32	25	21	24	38	54	17	175	148	191	514
Minimum	50	30	24	19	23	35	49	15	169	139	180	488
Maximum	52	33	25	22	24	40	58	19	180	157	202	539

Cx III, length of coxa on leg III; Tr III, length of trochanter on leg III; Bf III, length of basifemur on leg III; Tf 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 (base of trochanter to base of pretarsus).

Table 6. Standard measurements of *Parasecia gilbertoi* n. sp. (n = 11)

	σ' I	σ'' I	σ''' I	κ I	φ' I	φ'' I	κ I	ω I	ε I	ζ' I	ζ'' I	z	σ II	φ' II	φ'' II	ω II	ε II	ζ II	σ III	φ III
Holotype	18	17	18	4	11	14	3	14	3	23	14	9	14	17	20	18	3	14	13	16
Paratypes (Mean)	17	16	17	4	11	13	3	14	3	23	13	9	14	18	19	19	3	13	12	15
Minimum	17	16	17	4	10	13	3	14	3	22	12	8	14	17	18	18	3	12	12	15
Maximum	18	17	18	4	12	14	3	15	3	24	14	10	14	20	21	20	3	14	13	16

σ' I, σ'' I, σ''' I, length of the solenidia on genu of the leg I; κ I, length of microseta on genu of the leg I; φ' I, φ'' I, length of the solenidia on tibia of the leg I; κ I, length of microseta on tibia of the leg I; ω I, length of solenidion on tarsus of the leg I; ε I, length of famulus on tarsus of the leg I; ζ' I, ζ'' I, length of dorsal eupathidium on tarsus of the leg I; ζ'' I, length of subterminal eupathidium on tarsus of the leg I; z, length of companion seta on tarsus of the leg I; σ II, length of the solenidia on genu of the leg II; φ' II, φ'' II, length of the solenidia on tibia of the leg II; ω II, length of solenidion on tarsus of the leg II; ε II, length of famulus on tarsus of the leg II; ζ II, length of subterminal eupathidium on tarsus of the leg II; σ III, length of the solenidia on genu of the leg III; φ III, length of solenidion on tarsus of the leg III.

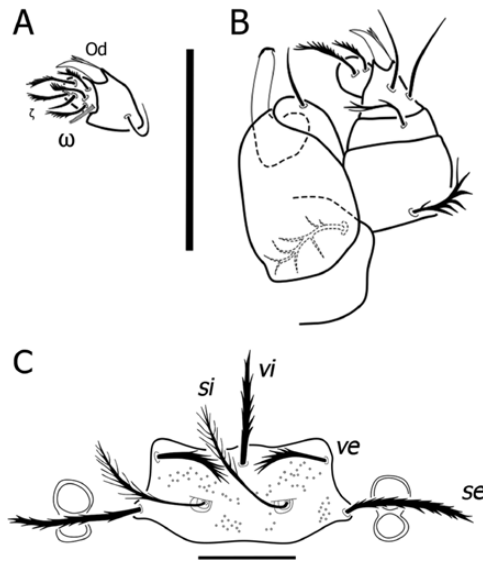


Fig. 1. Morphological details of *Parasecia aitkeni* (Brennan and Jones, 1960): A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; *ve*, external vertical setae; *se*, external scapular setae; *vi*, internal vertical setae; *si*, internal scapular trichobothria. Scales: A–C 50 μ m.

subterminal eupathid (ζ); tarsus leg I with dorsal eupathid (ζ); and companion seta (*z*).

Parasecia aitkeni (Brennan and Jones, 1960)

Trombicula aitkeni Brennan and Jones 1960: 510.

Fonsecia (*Parasecia*) *aitkeni*: Loomis 1966: 191; Brennan 1969: 664.

Fonsecia (*Euneocula*) *aitkeni*: Vercammen-Grandjean 1967: 130.

Parasecia aitkeni: Brennan 1970: 811; Brennan and Lukoschus 1971: 44; Brennan and Reed 1975: 59; Brennan and Bronswijk 1975: 246; Whitaker and Dietz 1987: 190; Goff 1992: 967; Whitaker, Wrenn and Lewis 1993: 411.

(Figs. 1 and 2, Table 2)

Diagnosis

Palpgenu with a single branched seta; all three palptibial setae nude; adoral (*cs*) setae nude; C row with 10 setae; E row with eight setae; H row with 8–11 irregularly placed setae; 66 to 68 opisthosomal setae; prodorsal sclerite longer than wide; base famulus (ϵ) on tarsus leg I and II proximal to solenidion (ω); masticeta on tarsus III absent.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/NNN/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (*bs*) setae branched, adoral (*cs*) setae nude (Fig. 1A and B). *Idiosoma*—eyes 2/2, each pair set on an ocular plate separate from the prodorsal sclerite, anterior lens larger; prodorsal sclerite shape rectangular (Fig. 1C), longer than wide, with a pair of flagelliform trichobothria (*si*) with distal two-thirds covered with long, slender setules, and five branched normal setae (a pair of *ve* [= AL] seta; a pair of *se* [= PL] seta; and a single *vi* [= AM] seta); *si* > *se* > *vi* > *ve*; the lateral margins of the prodorsal sclerite concave, and

a sinuous anterior and posterior margin. Opisthosoma (Fig. 2A and B, Table 2) with 66 to 68 setae, dorsal opisthosomal C row with five pairs of setae, with the *c*₅ pair in an anterior position (= humeral setae), D row with four pairs of setae, E row with four pair of setae, F row with three pairs of setae, H row with 8–11 irregularly placed setae, for a total of 40 to 44 dorsal opisthosomal setae and 23 to 28 ventral opisthosomal setae (8–9 setae anterior and 15 to 20 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 a basifemur and telofemur, each leg terminated with a pair of claws and a claw-like empodium, without onychotriches, coxal fields with few punctuations; Leg I—coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 σ and a distal κ ; tibia 8B, 2 ϕ and a distal κ ; tarsus 21B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (*z*) and a subterminal eupathid (ζ''), base of famulus (ϵ) proximal to solenidion (ω) (Fig. 2C). Leg II—coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 ϕ ; tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 2D). Leg III—coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ , tibia 6B, ϕ ; tarsus 14B (Fig. 2E).

Type depository

RML (holotype and paratypes), USNM (paratypes), FMNH (paratypes), NHMUK (paratypes) and SAM (paratypes).

Types and additional material examined

HOLOTYPE: larva (RML 33628), Cumaca, Sangre Grande region, Trinidad and Tobago, 8-VI-1954, *Nectomys squamipes*. **PARATYPES:** four larvae (RML 33628), same data; one larva (RML 33633), same data; one larva (RML 33620), same locality and host, 2-VI-1954; three larvae (RML 33621), same data; one larva (RML 33623), same data; four larvae (RML 33626), same host and locality, 5-VI-1954. **Additional Material:** BOLIVIA—four larvae (RML 50182), mouth of Baures River, Baures village, Beni Department, Iténez Province, 10-X-1964, *Hylaeamys megacephalus* (= *Oryzomys capito*); Dr. Richard G. Van Gelder coll. SURINAM—one larva (RML 55418), Coronie District, 2-V-1970, *Philander opossum*. TRINIDAD AND TOBAGO—six larvae (RML 38263), Bush Bush Wildlife Sanctuary, Nariva Swamp, 24-IX-1961, *Marmosa* sp. T. H. G. Aitken coll.

Note

In the original description, holotype presents 60 total opisthosomal setae, but we observed 66 to 68 setae (Table 2). Moreover, the position of the famulus on tarsus leg I was found to be proximal to the solenidion whereas the original description placed in distal to the solenidion.

Parasecia argentinensis Goff and Gettinger, 1995

Parasecia argentinensis Goff and Gettinger 1995: 445.

Diagnosis

Palpgenu with a single branched seta; dorsal setae of the palptibia branched; lateral and ventral setae of the palptibia nude; adoral (*cs*) setae branched; C row with 10 setae; E row with six setae; H row with two setae; 48 to 50 for all opisthosomal setae; prodorsal sclerite wider than long; base of ϵ distal to ω on leg I and proximal on leg II; one masticeta on tarsus of leg III.

Type depository

USNM (holotype), BPBM (paratypes), OMNH (paratypes).

Note

The type series of this species could not be located and was not examined, either additional material for *P. argentinensis*. We leave the 'type depository' section according to the original description, however, the three collections (USNM, BPBM, OMNH) were consulted and the types or material were not found in any of them. Also, we noticed that discrepancies in the number of the branched setae on the tibia leg II between the figure and original description. The illustration shows six branched setae, but the original description mentions eight branched setae. Since the Trombiculidae consistently have six branched tibial setae on the leg II, we believe that the drawing is correct.

Parasecia campestris (Loomis, 1955)

Trombicula gurneyi campestris Loomis 1955: 258; Loomis 1956: 1317; Brennan and Jones 1959: 12.

Fonsecia (Parasecia) gurneyi campestris: Loomis 1966: 191; Brennan 1969: 665.

Fonsecia (Euneocula) campestris: Vercammen-Grandjean 1967: 129. (Figs. 3 and 4, Table 2)

Diagnosis

Palpgenu with a single branched seta; ventral setae of the palptibia branched; dorsal and lateral setae of the palptibia nude; adoral (*cs*) setae nude; C row with eight setae; D row with six setae; E row with two setae; without H row; 40 opisthosomal setae; prodorsal sclerite longer than wide; base of ϵ distal to ω on leg I and proximal on the leg II; mastiseta on tarsus III absent.

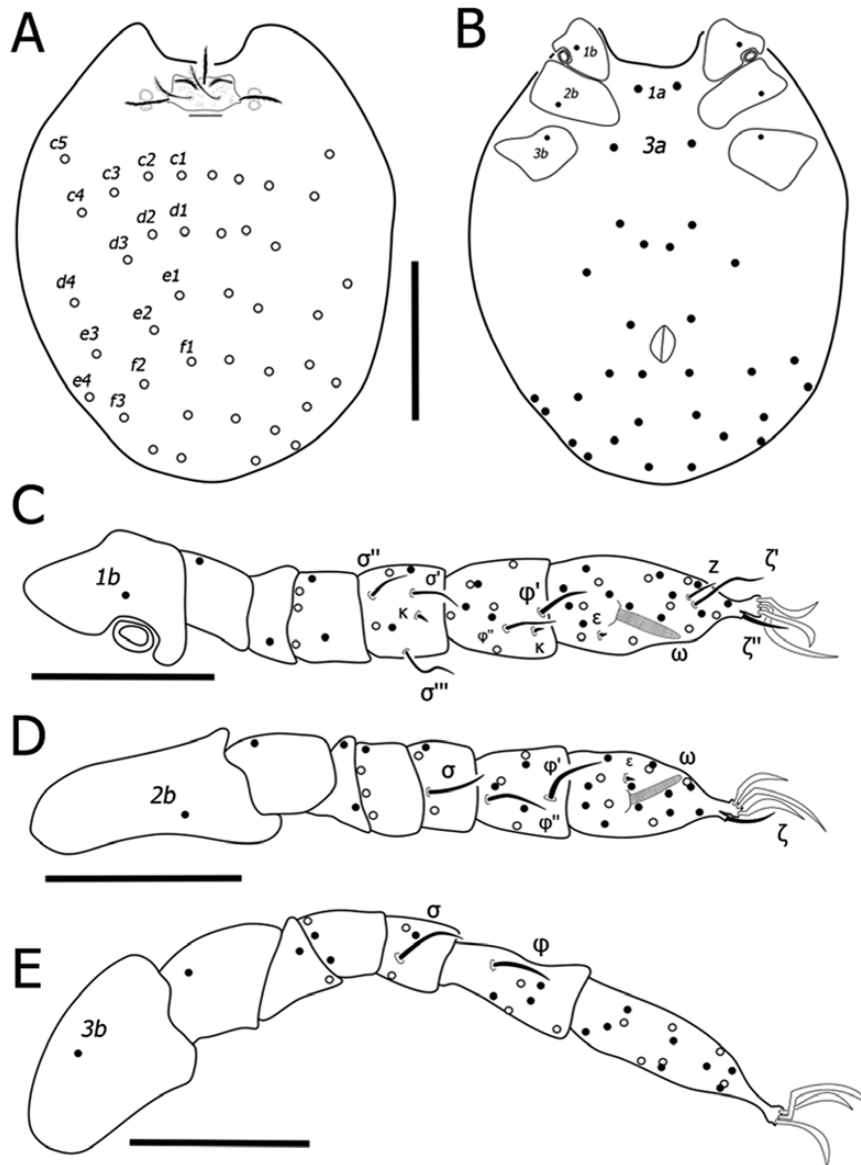


Fig. 2. Morphological details of *Parasecia aitkeni* (Brennan and Jones, 1960): A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: *c1*–*c5*, C row setae; *d1*–*d4*, D row setae; *e1*–*e4*, E row setae; *f1*–*f3*, 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; ζ' , dorsal eupathid tarsus leg I; ζ'' , ζ''' , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , σ'' , and σ''' , solenidia on the genu of legs I, II and III; κ , microsetae on genu and tibia of leg I; φ , φ' , and φ'' , solenidia on tibiae legs I, II, and III; *e*, famulus on tarsi of legs I and II; *z*, companion seta on tarsi of leg I. Scales: A and B 100 μ m; C–E 50 μ m.

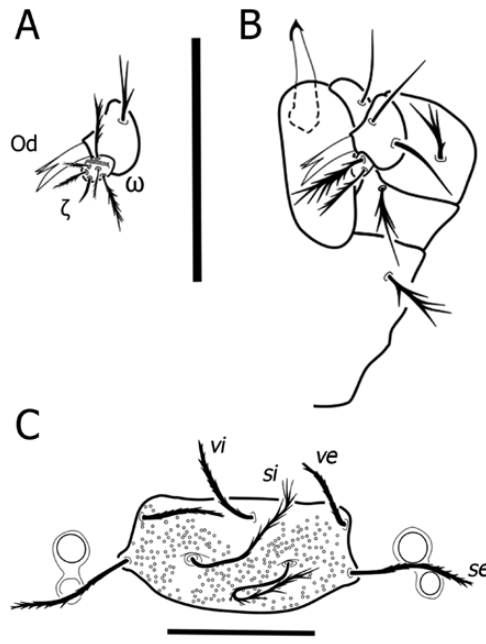


Fig. 3. Morphological details of *Parasecia campestris* (Loomis, 1955): A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; *ve*, external vertical setae; *se*, external scapular setae; *vi*, internal vertical setae; *si*, internal scapular trichobothria. Scales: A–C 50 μ m.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/NNB/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (*bs*) setae branched, adoral (*cs*) setae nude (Fig. 3A and B). *Idiosoma*—eyes 2/2, each pair set in an ocular plate separate from the prodorsal sclerite, anterior lens larger; prodorsal sclerite shape rectangular (Fig. 3C) longer than wide, with a pair of flagelliform trichobothria (*si*) with half covered with long and slender setules, and five branched normal setae (a pair of *ve* [= AL] setae; a pair of *se* [= PL] setae; and a single *vi* [= AM] seta); *si* > *se* > *vi* > *ve*; the lateral margins of the prodorsal sclerite concave, straight anterior margin and slightly rounded posterior margin. Opisthosoma (Fig. 4A and B, Table 2) with 40 setae, dorsal opisthosomal C row with four pairs of setae, with the *c*₄ pair in an anterior position (= humeral setae), D row with three pairs of setae, E row with a pair of setae, F row with two pairs of setae, without H row, for a total of 20 dorsal opisthosomal setae and 20 ventral opisthosomal setae (12 setae anterior and eight setae posterior to the anus). Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 σ and a distal κ ; tibia 8B, 2 φ and a distal κ ; tarsus 21B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (*z*) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 4C). *Leg II*—coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 φ ; tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 4D). *Leg III*—coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ ; tibia 6B, φ ; tarsus 14B (Fig. 4E).

Type depository

KU (holotype and paratypes).

Types examined

PARATYPE: two larvae (RL 490807), Rawlins County, Kansas State, United States, 7–VIII-1949, *Citellus tridecemlineatus*; R. B. Loomis and Robert E. Elbel coll.

Note

Loomis (1955) reported a bifurcate odontus and all three setae on the palptibia as nude. We observe a trifurcate odontus and the ventral seta on the palptibia is branched. In addition, variation in the total number of opisthosomal setae is (Table 2) not reported by the author.

Parasecia chara (Wharton, 1948)

Trombicula chara Wharton 1948: 98; Radford 1954: 250; Brennan and Jones 1961: 194.

Trombicula (*Trombicula*) *chara*: Wharton and Fuller 1952: 63.

Fonsecia (*Parasecia*) *chara*: Loomis 1966: 191; Brennan 1969: 665.

Fonsecia (*Euneocula*) *chara*: Vercammen-Grandjean 1967: 130.

Parasecia chara: Goff 1992: 967.

(Figs. 5 and 6, Table 2)

Diagnosis

Palptenu with a single branched seta; all three palptibial setae branched; adoral (*cs*) setae branched; C row with 12 setae; E row with eight setae; F and H row with 14 irregularly placed setae; 80 to 84 total opisthosomal setae; prodorsal sclerite longer than wide; base of ϵ distal to ω on leg I and proximal on leg II; one mastiseta on tarsus of leg III.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/BBB/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (*bs*) setae branched, adoral (*cs*) setae branched (Fig. 5A and B). *Idiosoma*—eyes 2/2, each pair set in an ocular plate separate from the prodorsal sclerite, anterior lens larger; prodorsal sclerite shape rectangular (Fig. 5C) longer than wide, with a pair of flagelliform trichobothria (*si*) with distal two-thirds covered with long and slender setules, and five branched normal setae (a pair of *ve* [= AL] seta; a pair of *se* [= PL] seta; and a single *vi* [= AM] seta); *si* > *se* > *vi* > *ve*; the lateral margins curved inside the prodorsal sclerite, and sinuous anterior and posterior margin. Opisthosoma (Fig. 6A and B, Table 2) with 80 to 84 setae, dorsal opisthosomal C row with six pairs of setae, with the *c*₆ pair in an anterior position (= humeral setae), D row with four pairs of setae, E row with four pair of setae, F and H row with 13 irregularly placed setae, for a total of 41 dorsal opisthosomal setae and 39 to 42 ventral opisthosomal setae (18 setae anterior and 21 to 24 setae posterior to the anus). Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 σ and a distal κ ; tibia 8B, 2 φ and a distal κ ; tarsus 21B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (*z*) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 6C). *Leg II*—coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 φ ; tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 6D). *Leg III*—coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ ; tibia 6B, φ ; tarsus 14B with mastiseta (Fig. 6E).

Type depository

MCZ (syntypes), USNM (syntypes), RML (syntypes), and SAM (syntypes).

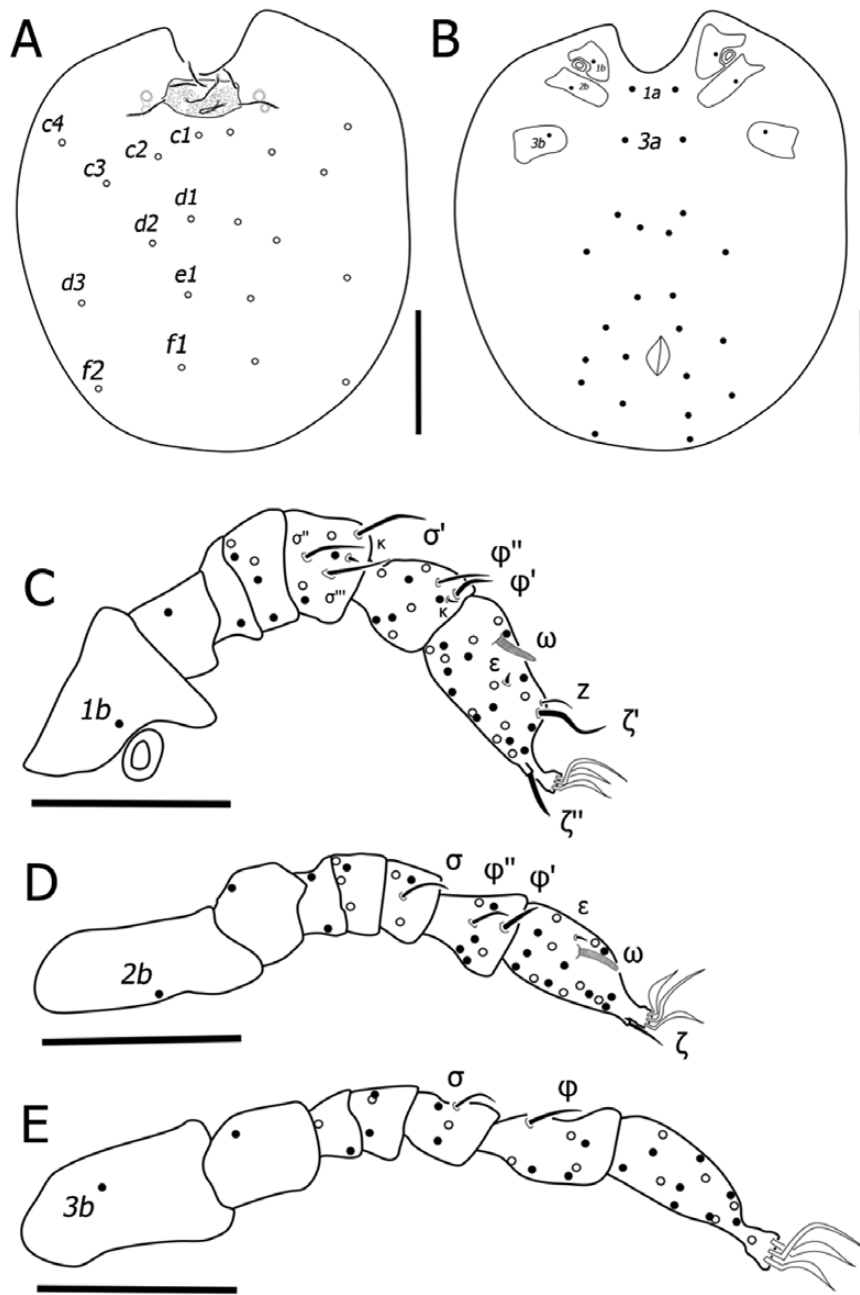


Fig. 4. Morphological details of *Parasecia campestris* (Loomis, 1955): A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: *c1–c4*, C row setae; *d1–d3*, D row setae; *e1*, E row setae; *f1–f2*, 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; ζ' , dorsal eupathid tarsus leg I; ζ , ζ , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , σ'' , and σ''' , solenidia on the genu of legs I, II and III; κ , microsetae on genu and tibia of leg I; φ , φ' , and φ'' , solenidia on tibiae legs I, II and III; ϵ , famulus on tarsi of legs I and II; *z*, companion seta on tarsi of leg I. Scales: A and B 100 μm ; C–E 50 μm .

Types and additional material examined

SYNTYPES: two larvae, Caccachara Valley, Puna Department, Peru, 5-X-1946, *Phyllotis darwini*, Pearson O. P. coll. **Additional Material:** PERU—three larvae (RML 31546), Pairumani, Puno Province, 15-IV-1951, *Phyllotis osilae*; seven larvae (RML 31547), 13 km Limbani District, Sandia Province, Puno Department, 22-IX-1951, *Chinchillula sabamae*; eight larva (RML 31550), same locality and host, 11-VI-1951; five larvae (RML 31553), same locality and host, 19-VI-1951; two larvae (RML 31560), same locality and host, 12-VII-1951; four larvae (RML 31551), same data;

18 larvae (RML 31554), same locality, 14-VI-1951, *Neotomys ebriosus*; two larvae (RML 31558), same locality, 31-VIII-1951, *Punomys lemminus*.

New records. PERU—two larvae (RT B-15352), Puno City, Puno Department, Puno Province, 16-XII-1951, *Calomys* sp.; two larvae (RT B-15356), Tacna City, Tacna Department, Tacna Province, 28-I-1952, *Phyllotis darwini*.

Note. Wharton (1948) and subsequent authors missed the ζ on the palptarsus. After examining the types and material, we confirmed the presence of ζ and an ocular plate.

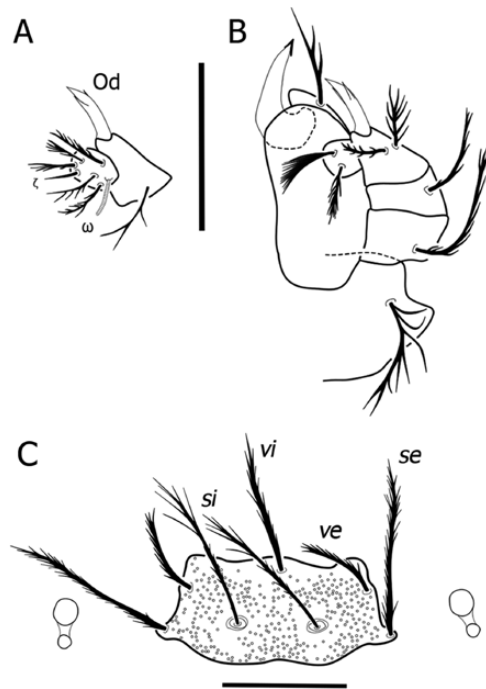


Fig. 5. Morphological details of *Parasecia chara* (Wharton, 1948): A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; *ve*, external vertical setae; *se*, external scapular setae; *vi*, internal vertical setae; *si*, internal scapular trichobothria. Scales: A–C 50 μ m.

Parasecia fernandae Jacinavicius and Bassini-Silva, 2018

Parasecia fernandae Jacinavicius and Bassini-Silva 2018: 206

Diagnosis

Palpgenu with a single branched seta; ventral setae of the palptibia branched; dorsal and lateral setae of the palptibia nude; adoral (*cs*) setae nude; C row with 12 setae; E row with eight setae; F and H row with 23 irregularly placed setae; ~81 total opisthosomal setae; prodorsal sclerite longer than wide; base of both ϵ distal to ω on legs I and II; one mastisetia on tarsus leg III.

Type depository

CAVAISC-Fiocruz (holotype and paratypes), IBSP (paratypes).

Types examined

PARATYPES: two larvae, Parque Nacional Restinga de Jurubatiba, Macaé municipality, Rio de Janeiro State, Brazil, 15-V-2001, *Nectomys squamipes*.

Parasecia fundata (Brennan, 1969)

Fonsecia (*Parasecia*) *fundata* Brennan 1969: 664.

Parasecia fundata: Goff 1992: 967; Stekolnikov et al. 2007: 66.

(Figs. 7 and 8, Table 2)

Diagnosis

Palpgenu with a single branched seta; all three palptibial setae nude; adoral (*cs*) setae nude; C row with eight setae; E row with six setae; H row with four or six setae; 48 to 54 total opisthosomal setae; prodorsal sclerite longer than wide; base of ϵ distal to ω of the leg I and proximal on the leg II; mastisetia on tarsus III absent.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/NNN/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (*bs*) setae branched, adoral (*cs*) setae nude (Fig. 7A and B). *Idiosoma*—eyes 2/2, each pair set in an ocular plate separate from the prodorsal sclerite, anterior lens larger; prodorsal sclerite shape rectangular (Fig. 7C) longer than wide, with a pair of flagelliform trichobothria (*si*) with distal two-thirds covered with long and slender setules, and five branched normal setae (a pair of *ve* [= AL] seta; a pair of *se* [= PL] seta; and a single *vi* [= AM] seta); *si* > *se* > *vi* > *ve*; the lateral margins of the prodorsal sclerite concave, and sinuous anterior and posterior margins. Opisthosoma (Fig. 8A and B, Table 2) with 48 to 54 setae, dorsal opisthosomal C row with four pairs of setae, with the c_4 pair in an anterior position (= humeral setae), D row with three pairs of setae and H row with 2–3 pairs of setae, for a total of 30 to 32 dorsal opisthosomal setae and 18 to 24 ventral opisthosomal setae (10 setae anterior and 8–14 setae posterior to the anus). Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 σ and a distal κ ; tibia 8B, 2 φ and a distal κ ; tarsus 21B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (*z*) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 8C). *Leg II*—coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 φ ; tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 8D). *Leg III*—coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ , tibia 6B, φ ; tarsus 15B (Fig. 8E).

Type depository

RML (holotype and paratypes), USNM (paratypes), and NHMUK (paratypes).

Type and material examined

HOLOTYPE: larva (RML 49323), Utinga State Park, Belém, Pará State, Brazil, 5-I-1968, *Caluromys philander*; **PARATYPES:** six larvae (RML 49323), same data; **Material:** BRAZIL—1 larva (RML 49354), Serra do Navio, Amapá State, 6-III-1968, *Proechimys guyannensis*; nine larvae (RML 49373), Guamá Ecological Research Area, Belém, Pará State, 12-III-1968, *Glyphorhynchus spirurus*; three larvae (RML 50344), same locality and host, 13-VI-1968; nine larvae (RML 49098), Utinga State Park, Belém, Pará State, 8-IV-1968, *Didelphis marsupialis*.

Note

We observed a variation on the total of the opisthosomal setae (Table 2), differently described by Brennan (1969). In addition, the lateral seta of the palptarsus was described as nude or branched (Brennan 1969), and in the key of the *Parasecia* spp. (Goff, 1992), this same seta was cited as nude. After examining the types, we confirm that the lateral setae of the palptarsus are nude.

Parasecia gurneyi (Ewing, 1937)

Trombicula gurneyi Ewing 1937: 169; Crossley 1960: 261; Johnston and DeGiusti 1961: 12; Loomis and Crossley 1963: 379; Brennan and White 1960: 350.

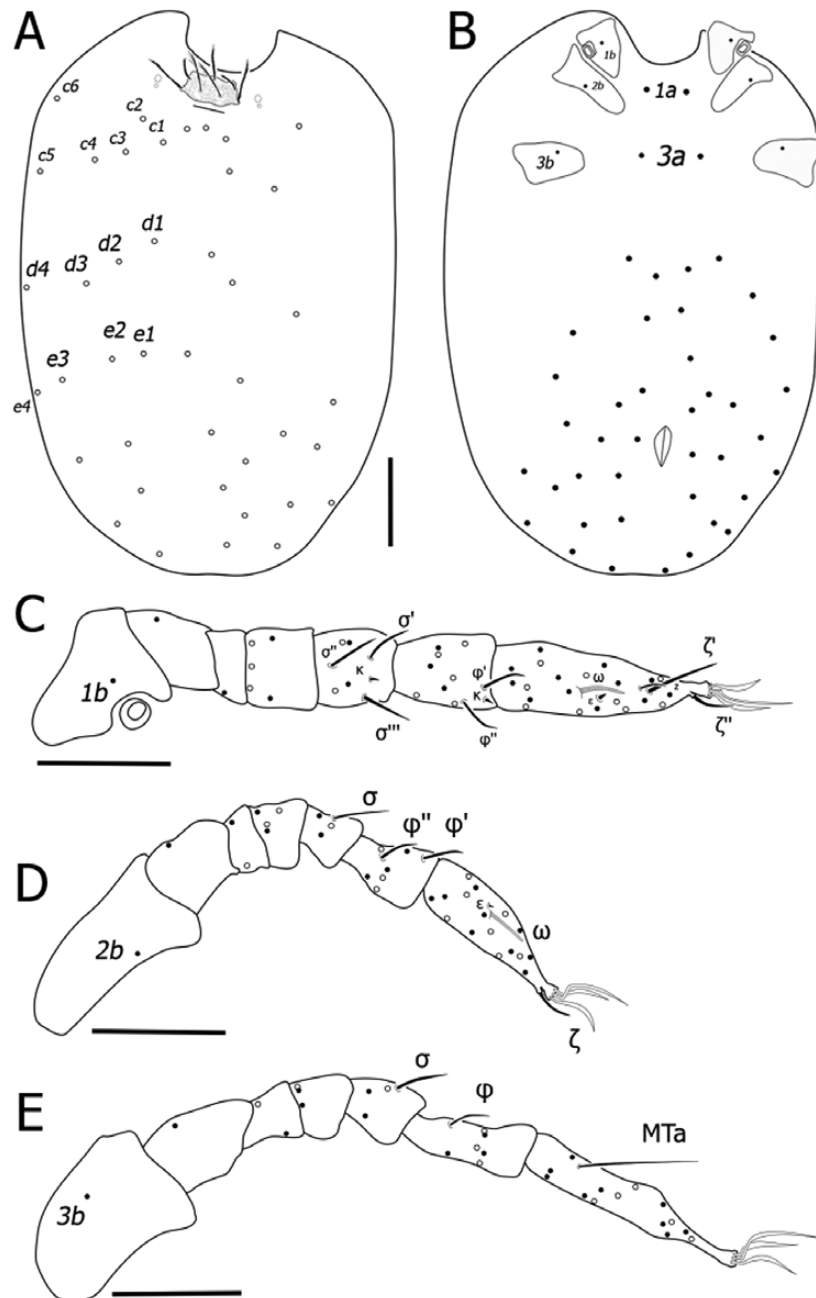


Fig. 6. Morphological details of *Parasecia chara* (Wharton, 1948): A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: *c1–c6*, C row setae; *d1–d4*, D row setae; *e1–e4*, E row setae; *1a*, anterior sternal setae; *3a*, posterior sternal setae; *1b*, coxal field I seta; *2b*, coxal field II seta; *3b*, coxal field III seta; ζ' , dorsal eupathid tarsus leg I; ζ , ζ' , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , σ'' , and σ''' , solenidia on the genu of legs I, II, and III; κ , microsetae on genu and tibia of leg I; ϕ , ϕ' , and ϕ'' , solenidia on tibiae legs I, II, and III; *e*, famulus on tarsi of legs I and II; *z*, companion seta on tarsi of leg I; MTa, mastiseta on tarsus leg III. Scales: A and B 100 μm ; C–E 50 μm .

Trombicula gurneyi gurneyi: Loomis 1955: 252; Loomis 1956: 1312; Brennan and Jones 1959: 12.
Eutrombicula gurneyi: Ewing 1938: 294; Radford 1942: 67.
Trombicula hamertoni Radford 1942: 62; Radford 1946: 589; Radford 1947: 275; (Syn. Loomis 1955: 252).
Acariscus gurneyi: Ewing 1943: 58.
Trombicula (Eutrombicula) gurneyi: Thor and Willmann 1947: 291; Vercammen-Grandjean and Audy 1965: 283.
Trombicula (Trombicula) gurneyi: Wharton and Fuller 1952: 65; Fuller 1952: 99.

Trombicula (Trombicula) hamertoni: Wharton and Fuller 1952: 66; Fuller 1952: 99.
Trombicula kansasensis Loomis 1955: 260; Loomis 1956: 1319; Brennan and Jones 1959: 12; Crossley 1960: 262. New synonymy
Trombicula (Eutrombicula) kansasensis: Vercammen-Grandjean and Audy 1965: 283. New synonymy
Fonsecia (Parasecia) gurneyi: Loomis 1966: 191; Brennan 1969: 665; Loomis et al. 1972: 1; Crossley and Proctor 1971: 185.
Fonsecia (Parasecia) kansasensis: Loomis 1966: 191; Brennan 1969: 665. New synonymy

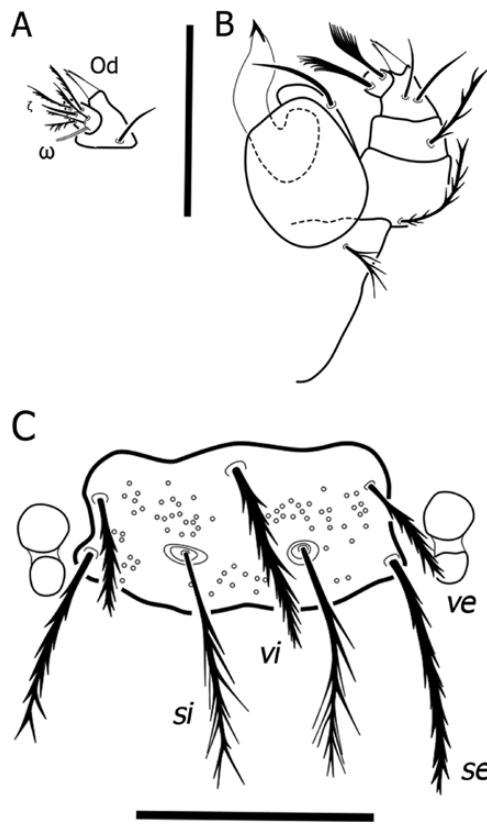


Fig. 7. Morphological details of *Parasecia fundata* (Brennan, 1969): A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; *ve*, external vertical setae; *se*, external scapular setae; *vi*, internal vertical setae; *si*, internal scapular trichobothria. Scales: A–C 50 μ m.

Fonsecia (*Euneocula*) *kansasensis*: Vercammen-Grandjean 1967: 129. New synonymy

Fonsecia gurneyi: Wrenn 1974: 233.

Fonsecia (*Euneocula*) *gurneyi*: Vercammen-Grandjean 1967: 129.

Fonsecia (*Parasecia*) *gurneyi gurneyi* Loomis 1969: 9; Dohany and Cromroy 1976: 186.

Parasecia kansasensis: Loomis and Wrenn 1984: 155; Hoffmann 1990: 109; Goff 1992: 967. New synonymy

Parasecia gurneyi: Hoffmann 1990: 108; Goff 1992: 967; Whitaker et al. 1993: 409; Dood and Kurta 1988: 116; Wilson and Durden 2003: 1210; Reeves et al. 2004: 6; Walters et al. 2011: 41. (Figs. 9 and 10, Table 2)

Diagnosis

Palpgenu with a single nude seta; all three palptibial setae nude; adoral (*cs*) setae nude; C row with eight setae; E row with four setae; with or without one pair of setae on the H row (depends on the engorgement); 36 to 40 total opisthosomal setae; prodorsal sclerite longer than wide; base of ϵ distal to ω of the leg I and proximal on the leg II; mastiseta on tarsus III absent.

Redescription

Larve. *Gnathosoma*—fPp = B/N/NNN/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (*bs*) setae branched, adoral (*cs*) setae nude (Fig. 9A and B). *Idiosoma*—eyes 2/2, each pair set in an ocular plate separate

from the prodorsal sclerite, anterior lens larger; prodorsal sclerite shape rectangular (Fig. 9C) longer than wide, with a pair of flagelli-form trichobothria (*si*) with distal two-thirds covered with long and slender setules, and five branched normal setae (a pair of *ve* (= AL) seta; a pair of *se* (= PL) seta; and a single *vi* (= AM) seta); *si* > *se* > *vi* > *ve*; the lateral margins of the prodorsal sclerite concave, and sinuous anterior and posterior margin. Opisthosoma (Fig. 10A and B, Table 2) with 36 to 40 setae, dorsal opisthosomal C row with four pairs of setae, with the c_4 pair in an anterior position (= humeral setae), D row with three pairs of setae, E row with two pairs of setae, F row with one pair of setae, with or without one pair of setae on the H row, for a total of 20 to 22 dorsal opisthosomal setae and 16 to 22 ventral opisthosomal setae (12 setae anterior and 4–10 setae posterior to the anus). Two pairs of sternal setae (1a, 3a) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta 1*b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, three σ and a distal κ ; tibia 8B, two ϕ and a distal κ ; tarsus 22B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (*z*) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 10C). *Leg II*—coxal field seta 2*b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 ϕ ; tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 10D). *Leg III*—coxal field seta 3*b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ , tibia 6B, ϕ ; tarsus 14B (Fig. 10E).

Type depository

USNM (holotype and paratypes).

Types and additional material examined (*P. gurneyi*)

SYNTYPES: six larvae (UNSM 1262), Priest Bridge; Patuxent River, Prince George County, Maryland State, 24-IV-1937; *Eumeces fasciatus* L. (= *Plestiodon fasciatus*) (Squamata: Scincidae); A. B. Gurney coll. **Additional Material:** United States—one larva (RL 520630-6), Douglas County, Kansas State, 20-VI-1952, *Neotoma micropus*; one larva (RML 40472), Brownsville, Cameron County, Texas State, 20-VII-1960, *Peromyscus leucopus*; one larva (RML 40486), same locality and host, 2-XII-1960. R. B. Eads coll.; three larvae (RML 38189), same locality, 10-IX-1962, *Neotoma micropus*; two larvae (RML 34952), Tuscaloosa County, Alabama State, 14-VIII-1956, *Nycticeius humeralis*.

Types examined (*P. kansasensis*)

PARATYPES: three larvae, Douglas County, Kansas State, 17-X-1950, *Pituophis catenifer*.

Note

Loomis (1955) redescribed this species and stated species had 5BS on palptarsus, 20B in tarsus of leg I, 16B in tarsus of leg II and a bifurcate odontus. Our observation concluded this species had 7BS, trifurcate odontus, 22B, and 14B on legs I and II, respectively. There are still differences in the number of idiosomal setae. After analyzing type material of *P. kansasensis* with *P. gurneyi* we found that *P. kansasensis* is a synonym of *P. gurneyi*. The original description of *P. kansasensis* inaccurately listed the species as having one pair of eyes. The only difference detected was variation in number of the opisthosomal setae between the specimens of both species (Table 2), considered here as an intraspecific variation.

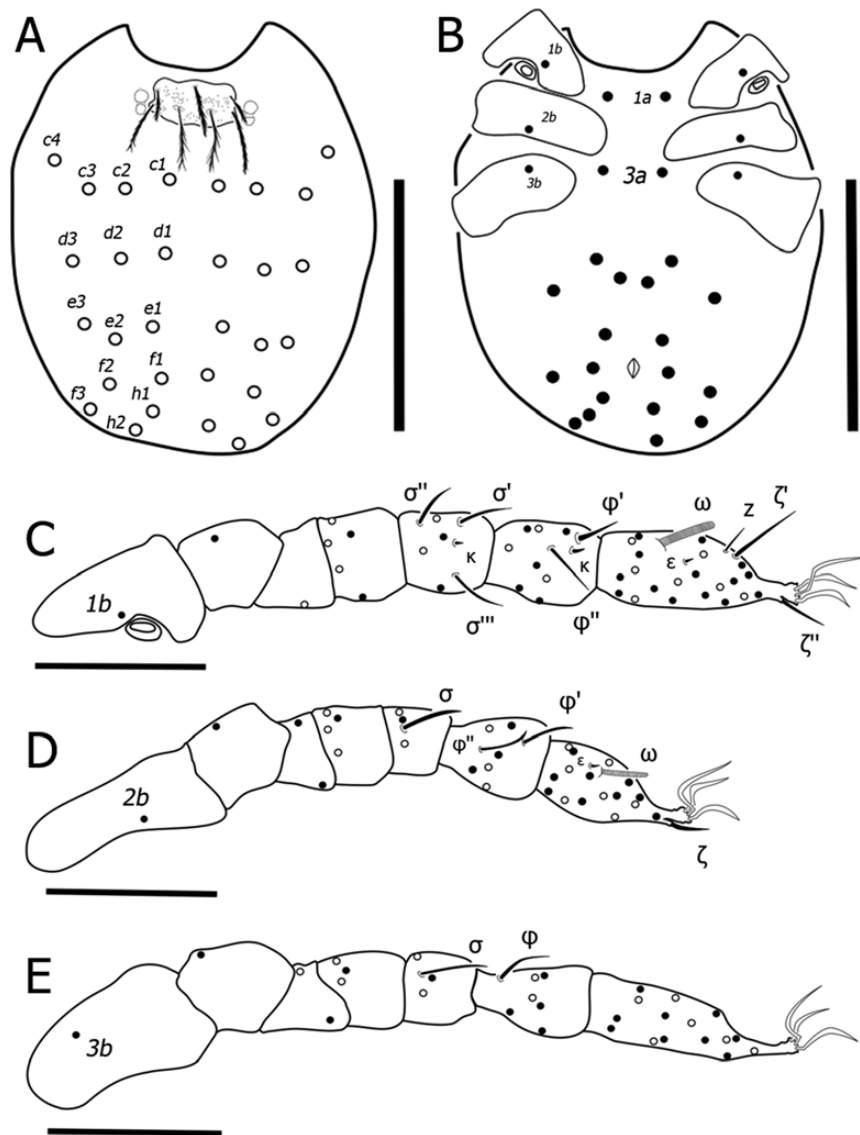


Fig. 8. Morphological details of *Parasecia fundata* (Brennan, 1969): A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: *c1–c4*, C row setae; *d1–d3*, D row setae; *e1–e3*, E row setae; *f1–f3*, F row setae; *h1–h2*, 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; ζ' , dorsal eupathid tarsus leg I; ζ'' , ζ , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , σ'' , and σ''' , solenidia on the genu of legs I, II, and III; κ , microsetae on genu and tibia of leg I; φ , φ' , and φ'' , solenidia on tibiae legs I, II, and III; ϵ , famulus on tarsi of legs I and II; *z*, companion seta on tarsi of leg I. Scales: A and B 100 μm ; C–E 50 μm .

Parasecia longicalcar (Brennan and Jones, 1960)

Trombicula longicalcar Brennan and Jones 1960: 517; Brennan and Yunker 1966: 255; Brennan 1967: 155.

Fonsecia (*Parasecia*) *longicalcar*: Loomis 1966: 191; Brennan 1969: 665.

Fonsecia (*Euneocula*) *longicalcar*: Vercammen-Grandjean 1967: 130.

Parasecia longicalcar: Brennan and Bronswijk 1975: 245; Brennan and Reed 1975: 59; Goff 1992: 967.

(Figs. 11 and 12, Table 2)

Diagnosis

Palpgenu with a single branched seta; all three palptibial setae nude; length of the solenidium on the palptarsus twice the length of the palptarsus; adoral (*cs*) setae nude; C row with eight setae; E row with six setae; H row with four or six setae; 53 to 56 total opisthosomal

setae; prodorsal sclerite longer than wide; base of ϵ distal to ω of the leg I and proximal on the leg II; mastiseta on tarsus III absent.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/NNN/7B ω ζ ; length of the ω on the palptarsus twice the length of the palptarsus, odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (*bs*) setae branched, adoral (*cs*) setae nude (Fig. 11A and B). *Idiosoma*—eyes 2/2 of the same size, each pair set in an ocular plate separate from the prodorsal sclerite; prodorsal sclerite shape rectangular (Fig. 11C) longer than wide, with a pair of flagelliform trichobothria (*si*) with distal two-thirds covered with long and slender setules, and five branched normal setae (a pair of *ve* (= AL) seta; a pair of *se* (= PL) seta; and a single *vi* (= AM) seta); *si* > *se* > *vi* > *ve*; the lateral margins of the prodorsal sclerite concave, slightly

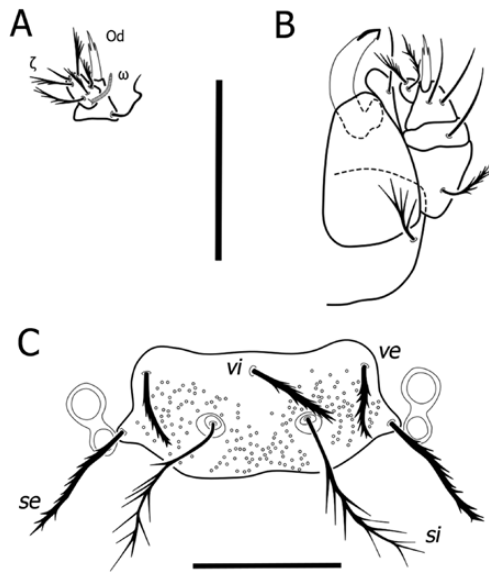


Fig. 9. Morphological details of *Parasecia gurneyi* (Ewing, 1937): A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; *ve*, external vertical setae; *se*, external scapular setae; *vi*, internal vertical setae; *si*, internal scapular trichobothria. Scales: A–C 50 μ m.

sinuous anterior margin and sinuous posterior margin. Opisthosoma (Fig. 12A and B, Table 2) with 53 to 56 setae, dorsal opisthosomal C row with four pairs of setae, with the c_4 pair in an anterior position (= humeral setae), D row with three pairs of setae, E row with three pairs of setae, F row with two pairs of setae and H row with 2–3 pairs of setae, for a total of 26 to 29 dorsal opisthosomal setae and 25 to 27 ventral opisthosomal setae (12 setae anterior and 13 to 15 setae posterior to the anus). Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 σ and a distal κ ; tibia 8B, 2 ϕ and a distal κ ; tarsus 21B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (*z*) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 12C). *Leg II*—coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 ϕ ; tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 12D). *Leg III*—coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ ; tibia 6B, ϕ ; tarsus 15B (Fig. 12E).

Note

We observed an intraspecific variation for the number of the total of the opisthosomal setae (Table 2).

Type depository

RML (holotype and paratypes), FMNH (paratypes), NHMUK (paratypes), and SAM (paratypes).

Type and additional material examined

HOLOTYPE: Larva (RML 33916), Melajo Forest Reserve, Sangre Grande Region, Trinidad and Tobago, 24-IV-1956, *Amazona amazonica*. **PARATYPES:** five larvae (RML 33802), same locality and host, 6-III-1956; four larvae (RML 33916), same locality and host, 24-IV-1956; seven larvae (RML 34171), same locality, 08-X-1956,

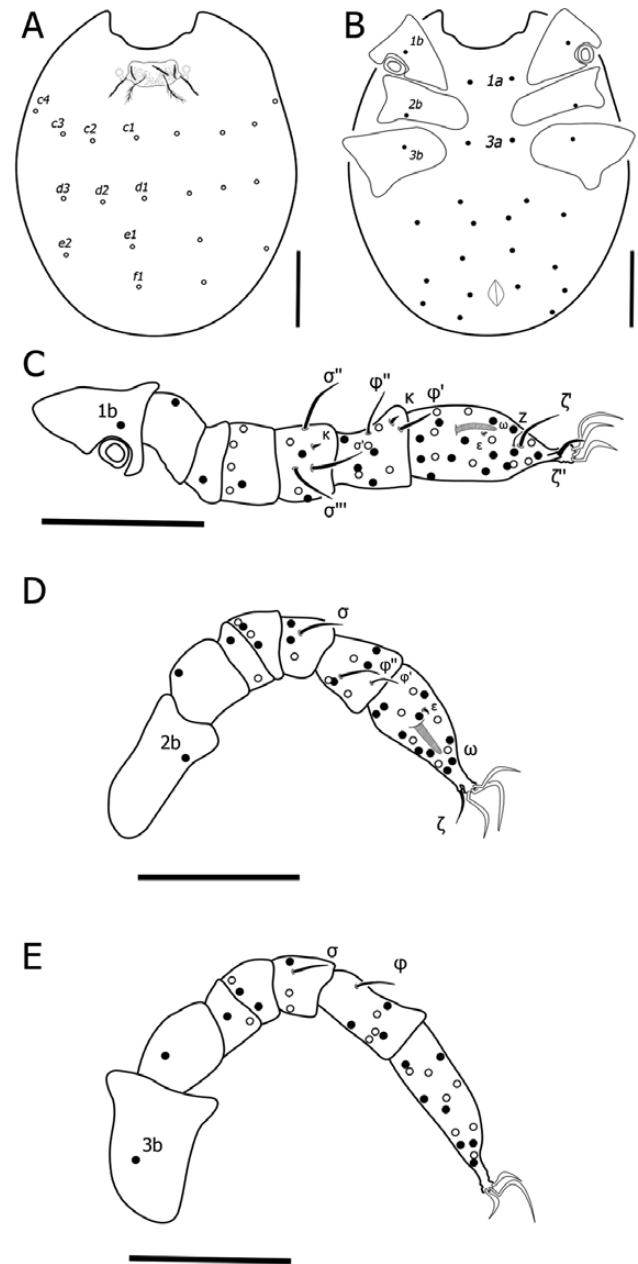


Fig. 10. Morphological details of *Parasecia gurneyi* (Ewing, 1937): A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: c_1 – c_4 , C row setae; d_1 – d_3 , D row setae; e_1 – e_2 , E row setae; f_1 , 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; ζ' , dorsal eupathid tarsus leg I; ζ'' , ζ , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , σ'' , and σ''' , solenidia on the genu of legs I, II, and III; κ , microsetae on genu and tibia of leg I; ϕ , ϕ' , and ϕ'' , solenidia on tibiae legs I, II, and III; ϵ , famulus on tarsi of legs I and II; *z*, companion seta on tarsi of leg I. Scales: A and B 100 μ m; C–E 50 μ m.

Sciurus granatensis; one larva (RML 34144), Rio Grande stream, Sangre Grande Region, Trinidad and Tobago, 16-VII-1956, *Pseustes sulphureus*; two larvae (RML 34685), Tabaquite Road, Princes Town, Trinidad and Tobago, 18-III-1956, *Desmodus rotundus*; two larvae (RML 34776), La brea, Trinidad and Tobago, 14-IV-1958, same host. **Additional Material:** GUYANA—four larvae (RML 39055), Bartica Municipality, Cuyuni-Mazaruni Region, 24-X-1963,

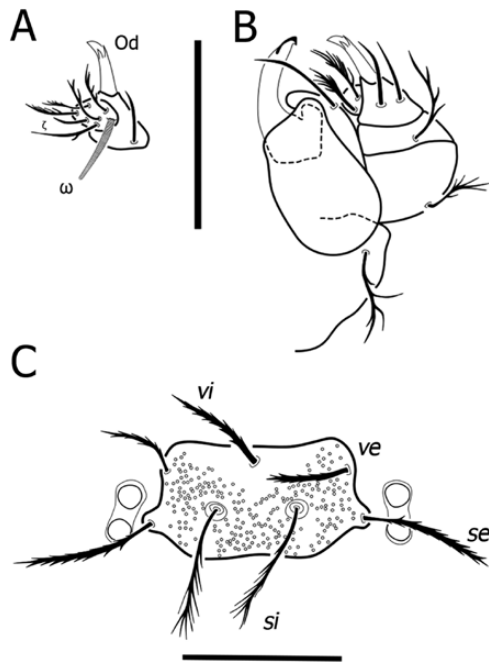


Fig. 11. Morphological details of *Parasecia longicalcar* (Brennan and Jones, 1960); A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; ve, external vertical setae; se, external scapular setae; vi, internal vertical setae; si, internal scapular trichobothria. Scales: A–C 50 μ m.

Artibeus lituratus, J. N. Davis coll. PANAMA—three larvae (RML 43751), Bocas del Toro Province, 23-VII-1961, *Vampyrum spectrum*; four larvae (RML 44295), Summit Botanical Gardens, Panama City, Panama Province, 23-I-1962, *Didelphis marsupialis*; seven larvae (RML 44506), Las Palmitas, Los Santos Province, 27-I-1962, *Desmodus rotundus*; nine larvae (RML 44496), Pedro Miguel River, Panama City, Panama Province, 21-II-1962, *Coendou rothschildi*; five larvae (RML 44512-2), same locality and host, 28-II-1962; Thomas H. G. Aitken coll. VENEZUELA—seven larvae (RML 48355), Urama, Carabobo State, 12-XI-1965, *Proechimys semispinosus*; two larvae (RML 48454), same locality, 8-XI-1965, *Scopteryx bilineata*; three larvae (RML 48341), Puerto Tuy, Miranda State, 15-XI-1966, same host; four larvae (RML 53274), Hacienda Socopito, Falcon State, 20-V-1968, *Zygodontomys brevicauda*; two larvae (RML 53395), same locality and host, 22-V-1968; two larvae (RML 53405), same locality and host, 28-V-1968; one larva (RML 53396), same locality, 22-V-1968, *Rhipidomys venezuelae*, Smithsonian Army coll.

New Records

VENEZUELA—nine larvae (RML 55947), Apure State, 22-I-1968, *Mimon crenulatum*.

Parasecia manueli (Brennan and Jones, 1960)

Trombicula manueli Brennan and Jones 1960: 520; Brennan and Jones 1961: 197; Brennan and Yunker 1966: 255.

Fonsecia (*Parasecia*) *manueli*: Loomis 1966: 191; Brennan 1968: 684; Brennan 1969: 666.

Fonsecia (*Euneocula*) *manueli*: Vercammen-Grandjean 1967: 130.

Parasecia manueli: Brennan and Lukoschus 1971: 44; Brennan and Reed 1975: 59; Brennan and Bronswijk 1975: 246; Goff 1992:

967; Whitaker et al. 1993: 410; Daniel and Stekonilkov 2003: 149; Jacinavicius et al. 2018: 208.

(Figs. 13 and 14, Table 2)

Diagnosis

Palp genu with a single branched seta; all three palptibial setae nude; adoral (cs) setae nude; C row with eight setae; E row with two setae; H row with two setae; 38 total opisthosomal setae; prodorsal sclerite longer than wide; base of ϵ distal to ω on leg I and proximal on leg II; mastiseta on tarsus III absent.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/NNN/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (bs) setae branched, adoral (cs) setae nude (Fig. 13A and B). *Idiosoma*—eyes 2/2, each pair set in an ocular plate separate from the prodorsal sclerite, anterior lens larger; prodorsal sclerite shape rectangular (Fig. 13C) longer than wide, with a pair of flagelliform trichobothria (si) with distal two-thirds covered with long and slender setules, and five branched normal setae (a pair of ve [= AL] seta; a pair of se [= PL] seta; and a single vi [= AM] seta); si > se > vi > ve; the lateral margins of the prodorsal sclerite concave, slightly sinuous anterior margin and sinuous posterior margin. Opisthosoma (Fig. 14A and B, Table 2) with 38 setae, dorsal opisthosomal C row with four pairs of setae, with the c_4 pair in an anterior position (= humeral setae), D row with three pairs of setae, E row with a pair of setae, F row with two pairs of setae and H row with a pair of setae, for a total of 22 dorsal opisthosomal setae and 16 ventral opisthosomal setae (10 setae anterior and six setae posterior to the anus). Two pairs of sternal setae (1a, 3a) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta 1b branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 σ and a distal κ ; tibia 8B, 2 φ and a distal κ ; tarsus 22B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (z) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 14C). *Leg II*—coxal field seta 2b (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 φ ; tarsus 15B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 14D). *Leg III*—coxal field seta 3b (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ , tibia 6B, φ ; tarsus 14B (Fig. 14E).

Note.

There was no variation in the number of the total of the opisthosomal setae in the types examined, while in the original description, they indicate a variation of 36–40 opisthosomal setae.

Type depository

RML (holotype and paratypes), FMNH (paratypes), NHMUK (paratypes) and SAM (paratypes).

Type and additional material examined

HOLOTYPE: larva (RML 34190), Saint Andrew County, Trinidad and Tobago, 7-II-1957, *Zygodontomys brevicauda* J. A. Allen and Chapman (Rodentia: Cricetidae). **PARATYPES:** three larvae (RML 33856), Maingot Road, Tunapuna City, Tunapuna–Piarco Region, Trinidad and Tobago, 19-X-1955, same host; six larvae (RML 33847), same locality and host, 3-X-1955; three larvae (RML 33844), same locality and host, 4-X-1955; eight larvae (RML

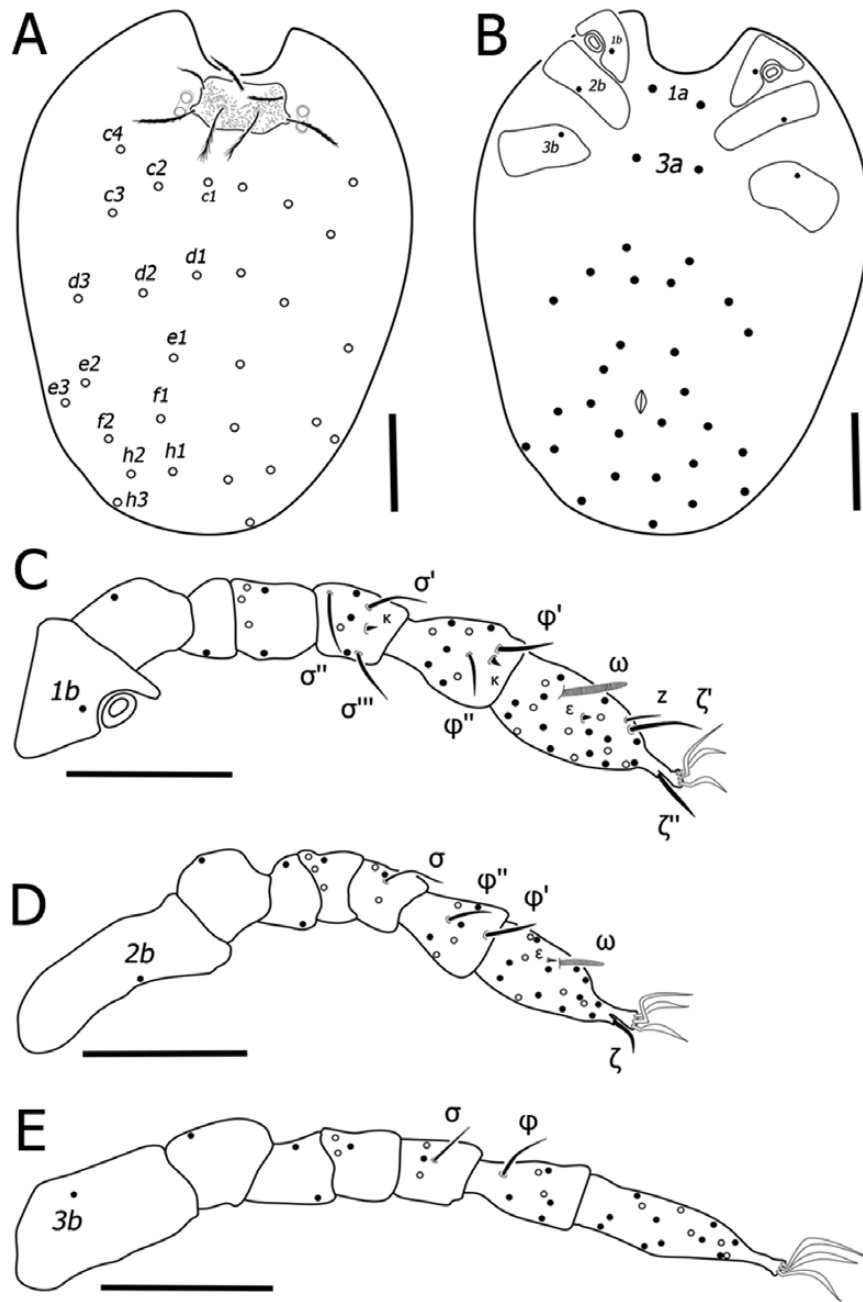


Fig. 12. Morphological details of *Parasecia longicalcar* (Brennan and Jones, 1960); A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: *c1–c4*, C row setae; *d1–d3*, D row setae; *e1–e3*, E row setae; *f1–f2*, F row setae; *h1–h3*, 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; ζ' , dorsal eupathid tarsus leg I; ζ'' , ζ , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , σ'' , and σ''' , solenidia on the genu of legs I, II and III; κ , microsetae on genu and tibia of leg I; ϕ , ϕ' , and ϕ'' , solenidia on tibiae legs I, II, and III; ϵ , famulus on tarsi of legs I and II; *z*, companion seta on tarsi of leg I. Scales: A and B 100 μm ; C–E 50 μm .

33846), same data; one larva (RML 33848), same locality and host, 24-X-1955; one larva (RML 33851), same data; two larvae (RML 35794), same locality and host, 21-II-1956; one larva (RML 35795), same data; one larva (RML 33812), same locality and host, 13-II-1956; two larvae (RML 35783), same locality and host, 19-V-1956; six larvae (RML 33856), same data; one larva (RML 33864), same locality and host, 15-XI-1955; two larvae (RML 33896), same locality and host, 7-IV-1956; one larva (RML 33858), same locality and host, 10-I-1956; one larva (RML 33857), same locality and host, 19-V-1956; one larva (RML 33665), same locality

and host, 4-VI-1955; one larva (RML 33680), same locality and host, 13-VI-1955. **Additional Material:** COLOMBIA—one larva (RML 47665), La Playa, North Santander Department, 11-I-1967, *Nephelomys albigularis*; PANAMA—two larvae (RML 33673), Piña, Colón Province, 28-XII-1960, *Didelphis marsupialis*; three larvae (RML 40583), Panama Province, 24-III-1961, *Marmosa robinsoni*; 12 larvae (RML 40796), Cerro Punta, Chiriquí Province, 2-V-1961, *Sciurus granatensis*; SURINAME—nine larvae (RML 58521), Paramaribo District, Santo Boma, 7-VIII-1971, *Proechimys guyanensis*; three larvae (RML 58520), same locality and host,

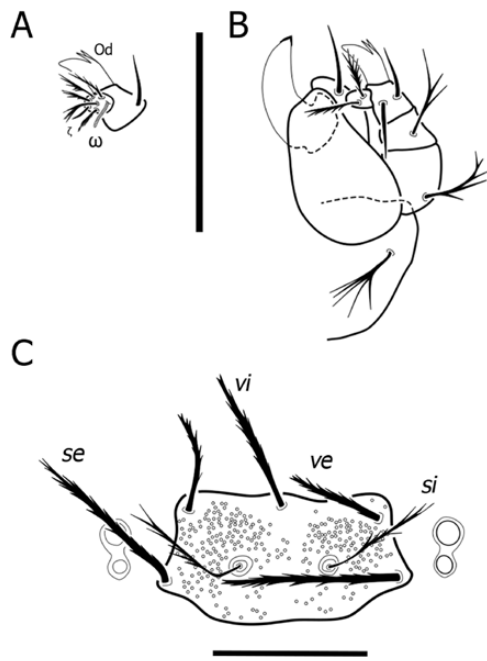


Fig. 13. Morphological details of *Parasecia manueli* (Brennan and Jones, 1960); A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; ve, external vertical setae; se, external scapular setae; vi, internal vertical setae; si, internal scapular trichobothria. Scales: A–C 50 μ m.

6-VIII-1971; two larvae (RML 58610), Brownsberg Nature Park, Brokopondo District, 21-X-1971, same host; one larva (RML 58564), Paramaribo District, Helena Christinaweg road, 9-IX-1971, ‘unidentified bat’; TRINIDAD AND TOBAGO—one larva (RML 33885), Maingot Road, Tunapuna City, Tunapuna–Piarco Region, 29 May 1956, *Rattus rattus*; one larva (RML 33869), same locality, 12-I-1956, *Heteromys anomalus*; one larva (RML 33866), same locality and host, 12-XII-1955; one larva (RML 33855), same locality and host, 10-I-1956; one larva (RML 33879), same locality and host, 13-II-1956; two larvae (RML 33873), same locality, 15-XI-1955, *Necromys urichi*; two larvae (RML 33877), same locality and host, 29-V-1956; two larvae (RML 33871), same locality, 11-XI-1955, *Nectomys squamipes*; one larva (RML 33850), same locality and host, 18-XI-1955; one larva (RML 33825), same locality and host, 9-XI-1956; one larva (RML 33821), same locality and host, 10-II-1956; two larvae (RML 33903), same locality and host, 16-IV-1956; one larva (RML 33832), same locality, 15-XII-1955, *Hylaeamys laticeps*; two larvae (RML 33876), same locality and host, 15-XI-1955; one larva (RML 33866), same locality and host, 10-I-1956; one larva (RML 33818), same locality and host, 26-I-1956; two larvae (RML 33845), same locality and host, 31-I-1956; one larva (RML 33830), same locality, 2-XII-1955, *Zygodontomys brevicauda*; one larva (RML 33835), same locality and host, 10-II-1956; one larva (RML 33819), same locality, 26-I-1956, *Marmosa robinsoni*; one larva (RML 33815), Melajo Forest Reserve, Sangre Grande Region, 12-II-1956, *Heteromys anomalus*; seven larvae (RML 33659), same locality, 14-V-1955, ‘unidentified rat’; one larva (RML 33803), same locality, 16-II-1956, *Myiarchus tuberculifer*; seven larvae (RML 33888), same locality and date, *Veniliornis kirkii*; eight larvae (RML 33800), same locality, 21-II-1956, *Cyanerpes caeruleus*;

two larvae (RML 33804), same locality, 6-III-1956, *Tolmomyia flaviventris*; nine larvae (RML 33882), same locality, 20-III-1956, *Dendrocincla fuliginosa*; two larvae (RML 33915), same locality, 1-V-1956, *Phloeceastes melanoleucus*; one larva (RML 33917), same locality, 25-IV-1956, *Megarynchus pitangua*; 10 larvae (RML 34158), Rio Grande stream, Sangre Grande Region, 16-VIII-1956, ‘unidentified rat’; five larvae (RML 34166), same locality and host, 2-IX-1956; two larvae (RML 34145), same locality, 19-VII-1956, *Marmosa robinsoni*; one larva (RML 33673), Sangre Grande Region, 2-VI-1955, *Nectomys squamipes*; one larva (RML 33674), same locality, 29-V-1955, *Heteromys anomalus*; one larva (RML 36637), Vega de Oropouche, Sangre Grande Region, 16-XII-1959, *Nectomys squamipes*; seven larvae (RML 35055), same locality, 30-IX-1958, *Thraupis palmarum*; one larva (RML 33890), Port of Spain City, Saint George County, 15-V-1956, *Gonatodes vittatus*; VENEZUELA—eight larvae (RML 48155), Urama, Carabobo State, 11-III-1966, *Zygodontomys brevicauda*; 10 larvae (RML 48135), same locality and host, 13-III-1966; seven larvae (RML 48460), same locality and host, 15-III-1966; one larva (RML 48477), same locality and host, 21-III-1966; nine larvae (RML 48477), Yaracuy State, 21-III-1966, same host; one larva (RML 53651), Tamatana, Amazonas State, 14-V-1967, *Rhipidomys* sp., Smithsonian Army coll; nine larvae (RML 52580), same locality, 4-V-1967, *Proechimys guyannensis*; two larvae (RML 51677), same locality, 9-V-1967, *Proechimys semispinosus*; one larva (RML 50038), La Esmeralda, Amazonas State, 8-III-1967, *Philander opossum*; one larva (RML 50033), same locality, 5-III-1967, *Echimyus armatus*; three larvae (RML 52543), Carúpano City, Sucre State, 19-VII-1967, *Zygodontomys brevicauda*; one larva (RML 53121), same locality and host, 21-VII-1967; three larvae (RML 58037), same locality and host, 24-VII-1967; nine larvae (RML 53040), same data; six larvae (RML 53044), same locality and date, *Heteromys anomalus*; 10 larvae (RML 53048), same locality and host, 1-VIII-1967; one larva (RML 53047), same locality and date, *Sigmomys alstoni*; one larva (RML 53127), same locality, 23-VII-1967, *Proechimys guyannensis*; one larva (RML 53129), same locality and host, 24-VII-1967; one larva (RML 52956), same locality and date, *Carollia* sp.; 12 larvae (RML 52586), Cumaná, Sucre State, 30-XII-1966, *Sigmomys alstoni*; seven larvae (RML 52694), San Agustín, Monagas State, 24-VI-1967, *Necromys urichi*; six larvae (RML 52695), same data; eight larvae (RML 52701), same locality, 5-VII-1967, ‘unidentified bird’.

New records

BRAZIL—six larvae (RML 50354), Utinga State Park, Belém, Pará State, 1-XI-1968, *Nectomys squamipes*; six larvae (RML 50355), same locality and host, 10-XI-1968.

Parasecia molini Stekolnikov and González-Acuña, 2015

Parasecia molini Stekolnikov and González-Acuña 2015: 15. (Figs. 15 and 16, Table 2)

Diagnosis

Palpgenu with a single branched seta; ventral setae of the palptibia branched; dorsal and lateral setae of the palptibia nude; adoral (cs) setae nude; C row with eight setae; E row with two setae; H row with two setae; 34 total opisthosomal setae; prodorsal sclerite longer than wide; ve setae much smaller than vi; base of ϵ distal to ω on leg I and proximal on leg II; masticeta on tarsus III absent.

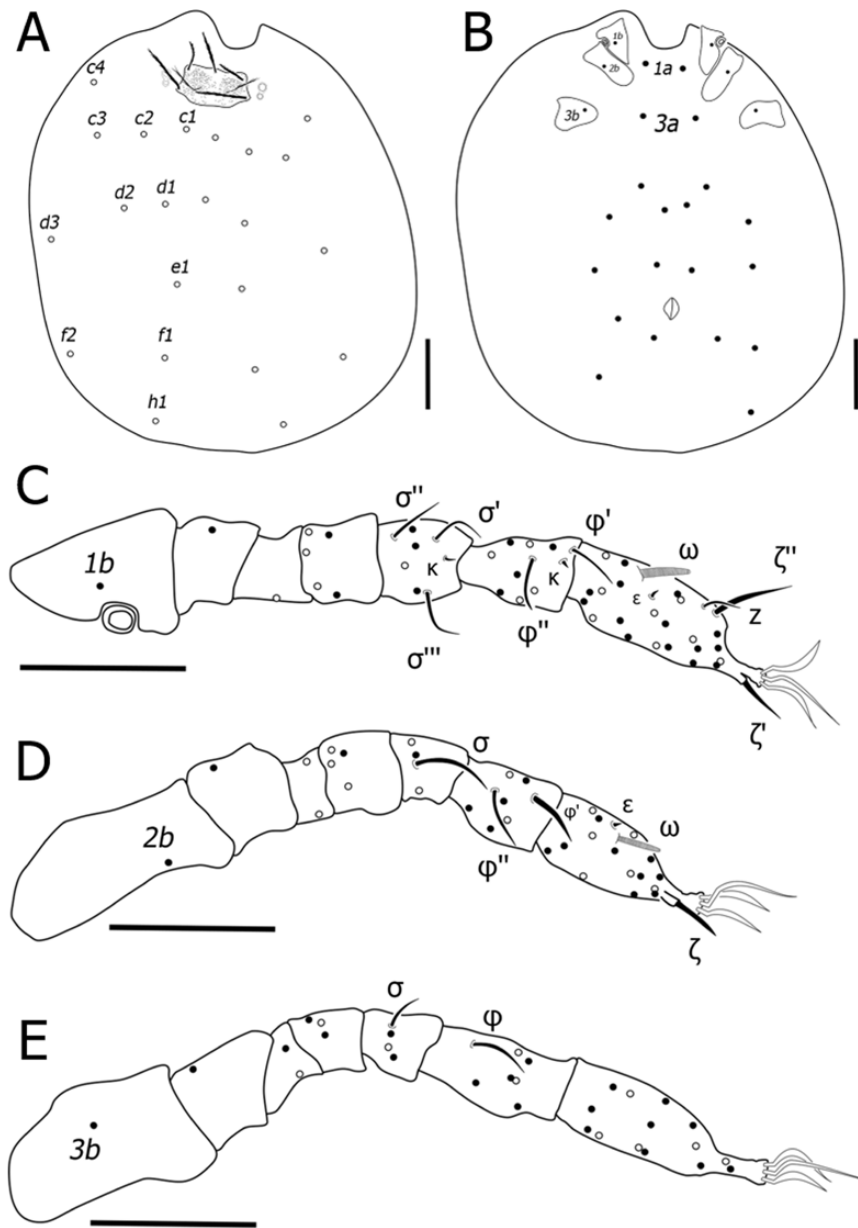


Fig. 14. Morphological details of *Parasecia manueli* (Brennan and Jones, 1960); A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: c_1 – c_4 , C row setae; d_1 – d_3 , D row setae; e_1 , E row setae; f_1 – f_2 , 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; ζ' , dorsal eupathid tarsus leg I; ζ'' , ζ , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , σ'' , and σ''' , solenidia on the genu of legs I, II, and III; κ , microsetae on genu and tibia of leg I; φ , φ' , and φ'' , solenidia on tibiae legs I, II, and III; ϵ , famulus on tarsi of legs I and II; z , companion seta on tarsi of leg I. Scales: A and B 100 μm ; C–E 50 μm .

Redescription

Larvae. *Gnathosoma*—fPp = B/B/NNB/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (bs) setae branched, adoral (cs) setae nude (Fig. 15A and B). *Idiosoma*—eyes 2/2, each pair set in an ocular plate separate from the prodorsal sclerite, anterior lens larger; prodorsal sclerite shape rectangular (Fig. 15C) longer than wide, with a pair of flagelliform trichobothria (*si*) with half covered with long and slender setules, and five branched normal setae (a pair of *ve* [= AL] seta; a pair of *se* [= PL] seta; and a single *vi* [= AM] seta); *si* > *se* > *vi* > *ve*; the lateral margins of the prodorsal sclerite concave, and sinuous anterior and posterior margin. Opisthosoma (Fig. 16A and B,

Table 2) with 34 setae, dorsal opisthosomal C row with four pairs of setae, with the c_4 pair in an anterior position (= humeral setae), D row with three pairs of setae, E row with a pair of setae, F row with two pairs of setae and H row with a pair of setae, for a total of 22 dorsal opisthosomal setae and 12 ventral opisthosomal setae anterior to the anus. Two pairs of sternal setae ($1a$, $3a$) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta $1b$ branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 σ and a distal κ ; tibia 8B, 2 φ and a distal κ ; tarsus 22B with ω , ϵ ,

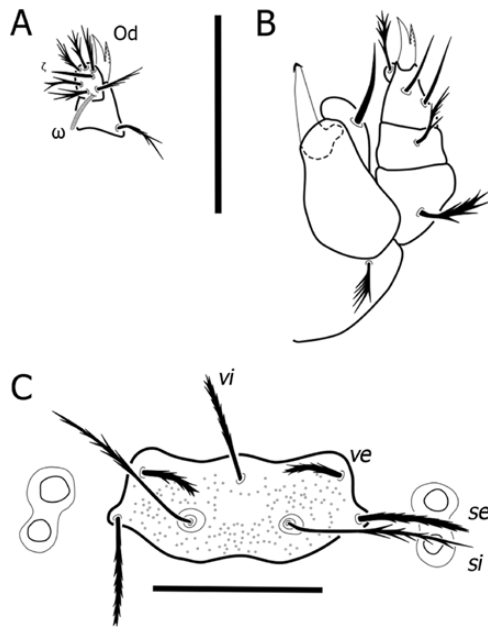


Fig. 15. Morphological details of *Parasecia molini* Stekolnikov and González-Acuña, 2015; A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ' , subterminal eupathid of palptarsus; Od, odontus; ve, external vertical setae; se, external scapular setae; vi, internal vertical setae; si, internal scapular trichobothria. Scales: A–C 50 μm .

dorsal eupathid (ζ') with a companion seta (z) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 16C). *Leg II*—coxal field seta $2b$ (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 φ ; tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 16D). *Leg III*—coxal field seta $3b$ (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ ; tibia 6B, φ ; tarsus 15B (Fig. 16E).

Type depository

ZIN (holotype and paratypes).

Type examined

PARATYPE: one larva (ZIN 7705), Aguas Calientes, Nevados de Chillán Mountain, Biobío Region, Chile, 22-I-2006, *Liolaemus chillanensis*, D. González-Acuña coll.

Parasecia psittaci (Floch and Abonnenc, 1949)

Trombicula psittaci Floch and Abonnenc 1949: 1; Radford 1954: 250; Fauran 1960: 17; Brennan and Jones 1960: 528.

Trombicula (Trombicula) psittaci: Wharton and Fuller 1952: 69.

Fonsecia (Euneocula) psittaci: Vercammen-Grandjean 1967: 130.

Fonsecia (Parasecia) psittaci: Loomis 1966: 191; Brennan 1969: 666.

Parasecia psittaci: Brennan and Reed 1975: 59; Goff 1992: 967.

(Figs. 17 and 18, Table 2)

Diagnosis

Palpgenu with a single branched seta; all three palptibial setae nude; subapical tooth in the inner region of the chelicera; adoral (cs) setae nude; C row with 12 setae; E row with 10 setae; F and H row with 16 irregularly placed setae; 77 total opisthosomal setae; prodorsal sclerite longer than wide; base of ϵ distal to ω of

the leg I and proximal on the leg II; two mastisetae on the tarsus of the leg III.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/NNN/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap and subapical tooth in the inner region of the chelicera; gnathobase punctate, subcapitular (bs) setae branched, adoral (cs) setae nude (Fig. 17A and B). *Idiosoma*—eyes 2/2, anterior lens larger; prodorsal sclerite shape rectangular (Fig. 17C) longer than wide, with a pair of flagelliform trichobothria (si) with distal two-thirds covered with long and slender setules, and five branched normal setae (a pair of ve [= AL] seta; a pair of se [= PL] seta; and a single vi [= AM] seta); si > se > vi > ve; the lateral margins of the prodorsal sclerite concave, and sinuous anterior and posterior margin. Opisthosoma (Fig. 18A and B, Table 2) with 77 setae, dorsal opisthosomal with six pairs of setae, with the c_6 pair in an anterior position (= humeral setae), D row with five pairs of setae, E row with five pairs of setae, F and H rows with 16 irregularly placed setae, for a total of 48 dorsal opisthosomal setae and 29 ventral opisthosomal setae (eight setae anterior and 21 setae posterior to the anus). Two pairs of sternal setae ($1a$, $3a$) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta $1b$ branched (1B); *elcl* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 σ and a distal κ ; tibia 8B, 2 φ and a distal κ ; tarsus 21B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (z) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 18C). *Leg II*—coxal field seta $2b$ (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 φ ; tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 18D). *Leg III*—coxal field seta $3b$ (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ ; tibia 6B, φ ; tarsus 14B with two mastisetae (Fig. 18E).

Type depository

USNM (holotype).

Type and additional material examined

HOLOTYPE: larva (n° 357), no specific locality, French Guiana, 20-V-1948, ‘unidentified perroquet’. **Additional Material:** TRINIDAD AND TOBAGO—24 larvae (RML 34185), Biche, 20-I-1957, *Amazona amazonica*; eight larvae (RML 38238), Bush Bush Wildlife Sanctuary, Nariva Swamp, 5-V-1961, same host.

Note

Floch and Abonnenc (1949) missed the ζ on the palptarsus and the subapical tooth on the chelicerae in their original description. We also noticed a difference in the number of branched setae on tarsus of the legs I–III, the original description reported 18B, 15B, and 10B for legs I–III, respectively, but examination of the holotype and additional material revealed 21B, 16B, 14B, respectively. In addition, the authors reported 34 to 38 ventral opisthosomal and 46 dorsal opisthosomal setae, while we observed 29 ventral and 48 dorsal setae for the holotype (Table 2).

Parasecia soucouyanti (Brennan and Yunker, 1966)

Trombicula soucouyanti Brennan and Yunker 1966: 256.

Fonsecia (Parasecia) soucouyanti: Brennan 1969: 666.

Parasecia soucouyanti Brennan and Reed 1975: 59; Goff 1992: 967. (Figs. 19 and 20, Table 2)

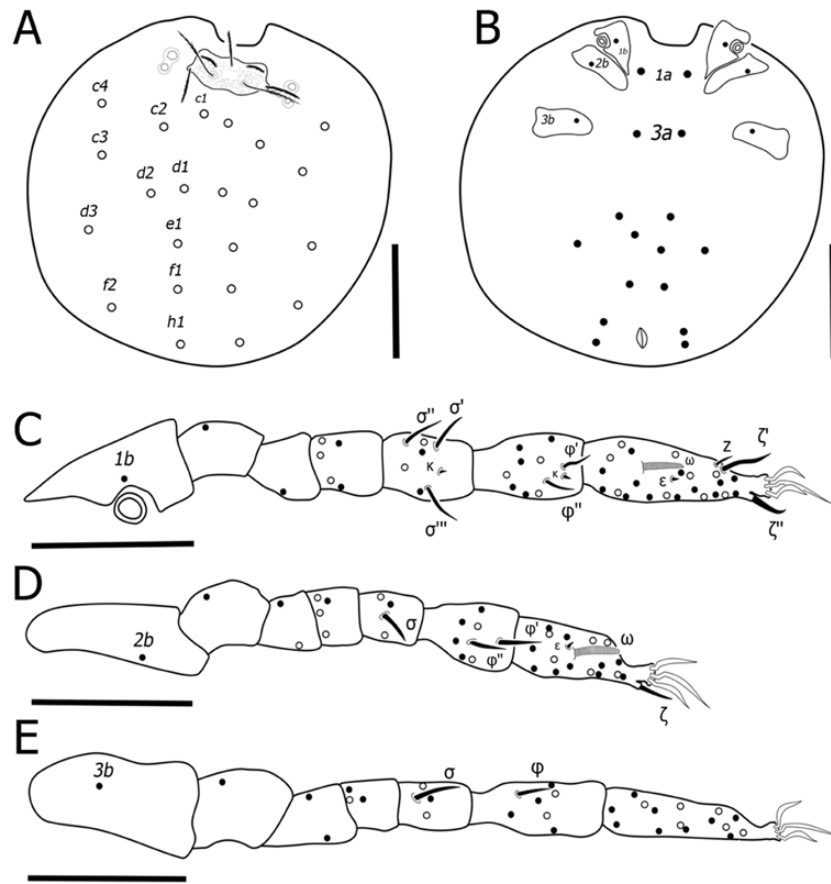


Fig. 16. Morphological details of *Parasecia molini* [Stekolnikov and González-Acuña, 2015](#); A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: *c*₁–*c*₄, C row setae; *d*₁–*d*₃, D row setae; *e*₁, E row setae; *f*₁–*f*₂, 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; ζ', dorsal eupathid tarsus leg I; ζ'', ζ, subterminal eupathid tarsus legs I and II, respectively; ω, solenidion tarsus legs I and II; σ, σ', σ'', and σ''', solenidia on the genu of legs I, II, and III; κ, microsetae on genu and tibia of leg I; φ, φ', and φ'', solenidia on tibiae legs I, II, and III; ε, famulus on tarsi of legs I and II; z, companion seta on tarsi of leg I. Scales: A and B 100 μm; C–E 50 μm.

Diagnosis

Palpgenu with a single branched seta; dorsal and ventral setae of the palptibia branched; lateral setae of the palptibia nude; adoral (cs) setae nude; C row with eight setae; D row with six setae; E row with two setae; H row with two setae; 42 to 44 total opisthosomal setae; prodorsal sclerite wider than long; base of ε distal to ω of the leg I and proximal on the leg II; one mastiseta on tarsus of leg III.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/BNB/7Bωζ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (bs) setae branched, adoral (cs) setae nude ([Fig. 19A](#) and [B](#)). *Idiosoma*—eyes 2/2 of the same size, each pair set in an ocular plate separate from the prodorsal sclerite; prodorsal sclerite shape rectangular ([Fig. 19C](#)) wider than long, with a pair of flagelliform trichobothria (*si*) with one-third covered with long and slender setules, and five branched normal setae (a pair of *ve* [= AL] seta; a pair of *se* [= PL] seta; and a single *vi* [= AM] seta; *si* > *se* > *vi* > *ve*; the lateral margins of the prodorsal sclerite concave, and sinuous anterior and posterior margin. Opisthosoma ([Fig. 20A](#) and [B](#), [Table 2](#)) with 42 to 44 setae, dorsal opisthosomal C row with four pairs of setae, with the *c*₄ pair in an anterior position (= humeral setae), D row with three pairs of setae, E row with a pair of setae, F row with two pairs of setae, and H row with a pair of setae (depending on the degree of engorgement, these setae may be ventral), for a total of 20

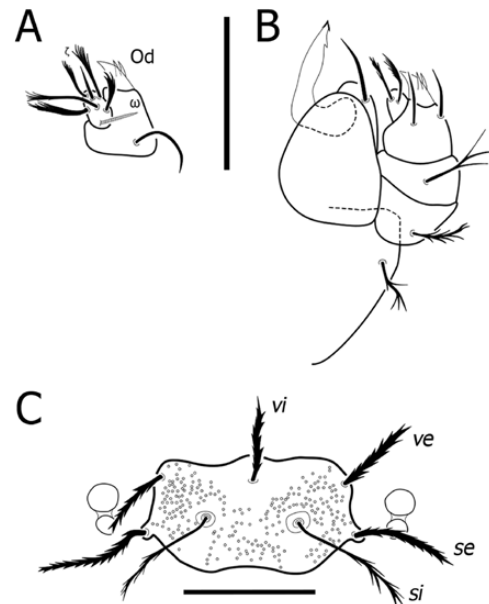


Fig. 17. Morphological details of *Parasecia psittaci* ([Floch and Abonnenc, 1949](#)); A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω, solenidion of palptarsus; ζ, subterminal eupathid of palptarsus; Od, odontus; *ve*, external vertical setae; *se*, external scapular setae; *vi*, internal vertical setae; *si*, internal scapular trichobothria. Scales: A–C 50 μm.

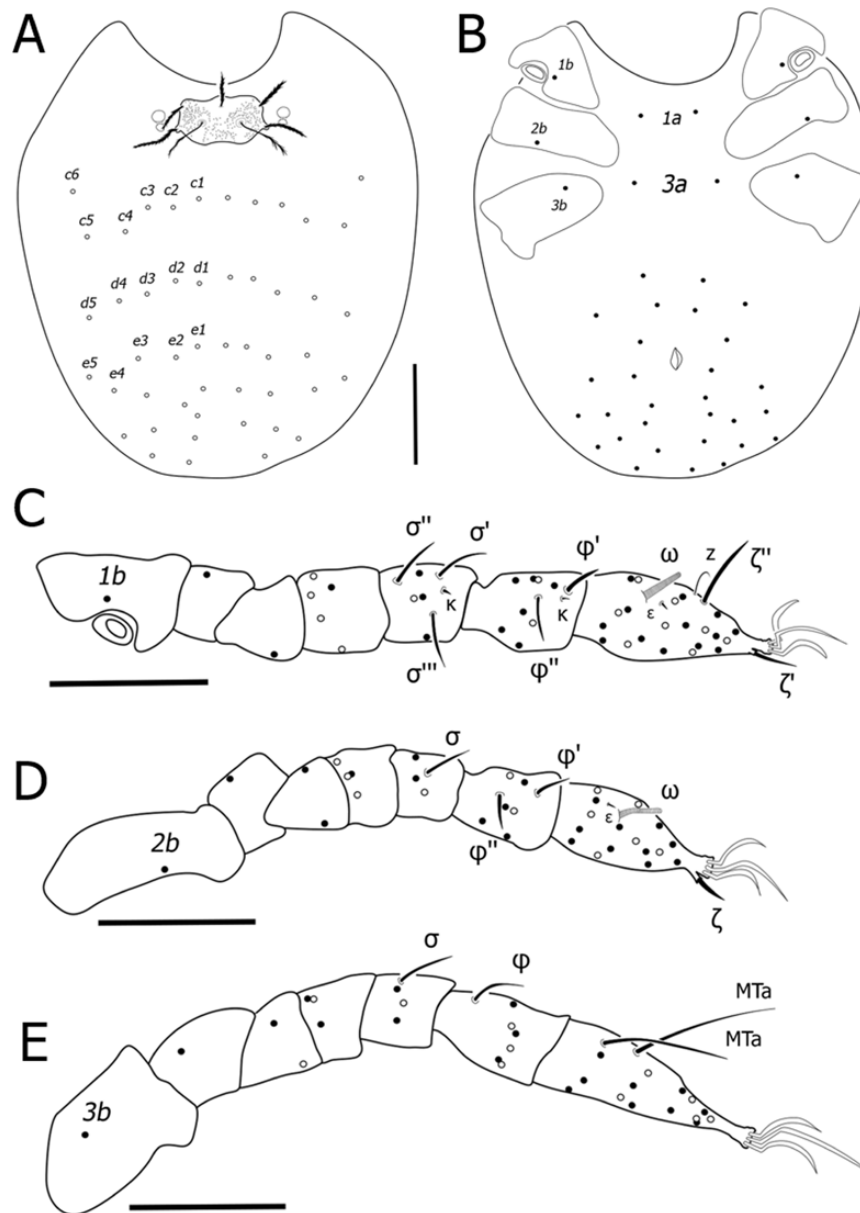


Fig. 18. Morphological details of *Parasecia psittaci* (Floch and Abonnenc, 1949); A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: $c1$ – $c6$, C row setae; $d1$ – $d5$, D row setae; $e1$ – $e5$, 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; ζ' , dorsal eupathid tarsus leg I; ζ'' , ζ , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , σ'' , and σ''' , solenidia on the genu of legs I, II, and III; κ , microsetae on genu and tibia of leg I; φ , φ' , and φ'' , solenidia on tibiae legs I, II, and III; ϵ , famulus on tarsi of legs I and II; z , companion seta on tarsi of leg I; MTa, mastisetae on tarsus leg III. Scales: A and B 100 μ m; C–E 50 μ m.

to 22 dorsal opisthosomal setae, and 20 to 23 ventral opisthosomal setae (10 to 12 setae anterior and 10 to 13 setae posterior to the anus). Two pairs of sternal setae ($1a$, $3a$) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta $1b$ branched (1B); *elci* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 σ and a distal κ ; tibia 8B, 2 φ and a distal κ ; tarsus 22B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (z) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 20C). *Leg II*—coxal field seta $2b$ (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 φ

tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 20D). *Leg III*—coxal field seta $3b$ (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ , tibia 6B, φ ; tarsus 14B with one mastiseteta (Fig. 20E).

Note

The authors reported 40 to 46 total opisthosomal setae, while we observed 42 to 44 (Table 2).

Type depository

RML (holotype and paratypes), FMNH (paratypes), and NHMUK (paratypes).

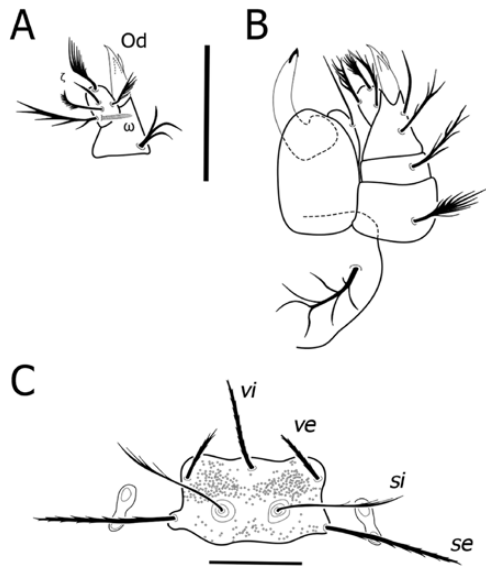


Fig. 19. Morphological details of *Parasecia soucouyanti* (Brennan and Yunker, 1966); A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; *ve*, external vertical setae; *se*, external scapular setae; *vi*, internal vertical setae; *si*, internal scapular trichobothria. Scales: A–C 50 μ m.

Type and material examined

HOLOTYPE: larva (RML 40711), Cerro Punta, Chiriquí Province, Panama, 24-IV-1961, *Sturnira ludovici*. **PARATYPES:** five larvae (RML 40711), same data, C. E. Yunker coll. Material: PANAMA—two larvae (RML 40915), same locality, 5-V-1961, *Myotis* sp., C. E. Yunker coll. VENEZUELA—2 larvae (RML 48764), Cerro El Ávila, El Ávila National Park Pico Avila, Caracas, Federal District, 8-IX-1965, *Rhipidomys venustus*, Smithsonian Army coll.

Parasecia thalurania (Brennan, 1969)

Fonsecia (*Parasecia*) *thalurania* Brennan 1969: 663.

Parasecia thalurania: Goff 1992: 967.

(Figs. 21 and 22, Table 2)

Diagnosis

Palpgenu with a single branched seta; all three palptibial setae nude; subapical tooth on the inner region of chelicera; adoral (*cs*) setae nude; C and D row with 10 setae each; E row with four setae; F and H rows with 29 irregularly placed setae; 105 opisthosomal setae; prodorsal sclerite longer than wide; base of ϵ distal to ω of the leg I and proximal on the leg II; mastiseta on tarsus III absent.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/NNN/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap and a subapical tooth in the inner region of chelicera; gnathobase punctate, subcapitular (*bs*) setae branched, adoral (*cs*) setae nude (Fig. 21A and B). *Idiosoma*—eyes 2/2, anterior lens larger; prodorsal sclerite shape rectangular (Fig. 21C) longer than wide, with a pair of flagelliform trichobothria (*si*) with the distal third covered with long and slender setules, and five branched normal setae (a pair of *ve* [= AL] seta; a pair of *se* [= PL] seta; and a single *vi* [= AM] seta); *si* > *se* > *vi* > *ve*; the lateral margins of the prodorsal sclerite concave, and sinuous anterior and posterior margin. Opisthosoma (Fig. 22A and B, Table 2) with 105

setae, dorsal opisthosomal C row with five pairs of setae, with the c_5 pair in an anterior position (= humeral setae), D row with five pairs of setae, E row with four pairs of setae, F and H rows with 29 irregularly placed setae, for a total of 57 dorsal opisthosomal setae, and 48 ventral opisthosomal setae (eight setae anterior and 40 setae posterior to the anus). Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 σ and a distal κ ; tibia 8B, 2 φ and a distal κ ; tarsus 22B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (*z*) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 22C). *Leg II*—coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 φ ; tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 22D). *Leg III*—coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ ; tibia 6B, φ ; tarsus 15B (Fig. 22E).

Type depository

RML (holotype).

Type examined

HOLOTYPE: larva (RML 49374), Mocambo reserve, Belém, Pará State, Brazil, 15 April 1968, *Thalurania furcata*.

New Records

BRAZIL—two larvae (RML 50343), Mocambo reserve, Belém, Pará State, 24-V-1968, *Glyphorhynchus spirurus*; seven larvae (RML 50344), Guamá Ecological Research Area, Belém, Pará State, 13-VI-1968, same host, Thomas H. G. Aitken coll.

Note

We observed differences in the dorsal and ventral opisthosomal setae between Brennan's (1969) description and our study of the holotype and additional material. The dorsal opisthosomal setae in the first three rows have a similar pattern that is not present in the other rows. In addition, we observed a subapical tooth on the inner surface of the chelicerae.

Parasecia valida (Brennan, 1969)

Fonsecia (*Parasecia*) *valida* Brennan 1969: 663.

Parasecia valida: Brennan and Lukoschus 1971: 44; Brennan and Bronswijk 1975: 246; Goff 1992: 967.

(Figs. 23 and 24, Table 2)

Diagnosis

Palpgenu with a single branched seta; ventral setae of the palptibia branched; dorsal and lateral setae of the palptibia nude; adoral (*cs*) setae nude; C row with eight setae; D row with six setae; E row with two setae; H row with a pair of setae; 38 to 42 total opisthosomal setae; prodorsal sclerite longer than wide; base of ϵ distal to ω of the leg I and proximal on the leg II; one mastiseta on the tarsus of the leg III.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/NNB/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (*bs*) setae branched, adoral (*cs*) setae nude (Fig. 23A

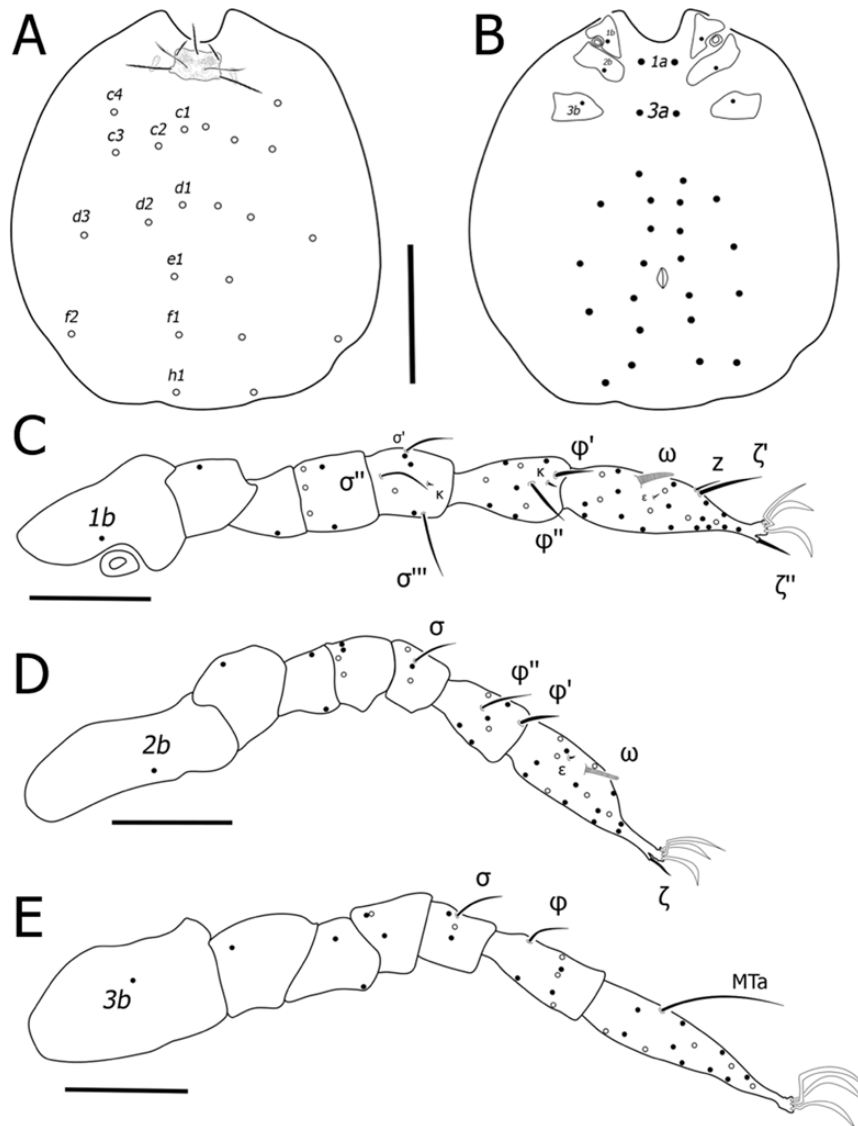


Fig. 20. Morphological details of *Parasecia soucouyanti* (Brennan and Yunker, 1966); A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: c_1 – c_4 , C row setae; d_1 – d_3 , D row setae; e_1 , E row setae; f_1 – f_2 , 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; ζ' , dorsal eupathid tarsus leg I; ζ'' , ζ , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , σ'' , and σ''' , solenidia on the genu of legs I, II, and III; κ , microsetae on genu and tibiae of leg I; ϕ , ϕ' , and ϕ'' , solenidia on tibiae legs I, II, and III; ϵ , famulus on tarsi of legs I and II; z , companion seta on tarsi of leg I; MTa, mastiseta on tarsus leg III. Scales: A and B 100 μ m; C–E 50 μ m.

and B). *Idiosoma*—eyes 2/2, anterior lens larger; prodorsal sclerite shape rectangular (Fig. 23C) longer than wide, with a pair of flagelliform trichobothria (*si*) with two-third covered with long and slender setules, and five branched normal setae (a pair of *ve* [= AL] seta; a pair of *se* [= PL] seta; and a single *vi* [= AM] seta); $si > se > vi > ve$; the lateral margins of the prodorsal sclerite concave, slightly sinuous anterior margin and slightly rounded posterior margin. Opisthosoma (Fig. 24A and B, Table 2) with 38–42 setae, dorsal opisthosomal C row with four pairs of setae, with the c_4 pair in an anterior position (= humeral setae), D row with three pairs of setae, E row with a pair of setae, F row with two pairs of setae and H row with a pair of setae, for a total of 20 to 22 dorsal opisthosomal setae, and 22 ventral opisthosomal setae (10–12 setae anterior and 6–12 setae posterior to the anus). Two

pairs of sternal setae ($1a$, $3a$) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta $1b$ branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 σ and a distal κ ; tibia 8B, 2 ϕ and a distal κ ; tarsus 21B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (z) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 24C). *Leg II*—coxal field seta $2b$ (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 ϕ ; tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 24D). *Leg III*—coxal field seta $3b$ (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ ; tibia 6B, ϕ ; tarsus 14B with one mastiseta (Fig. 24E).

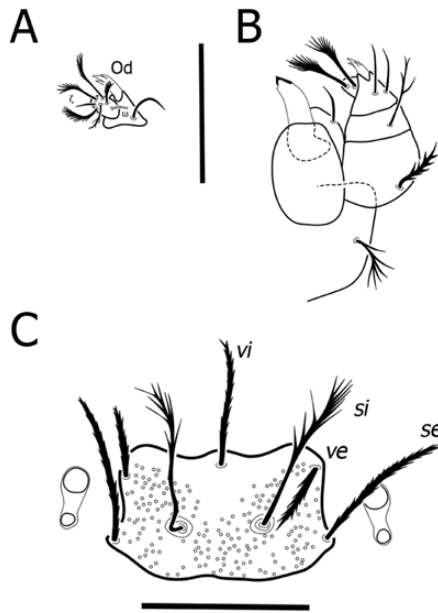


Fig. 21. Morphological details of *Parasecia thalurania* (Brennan, 1969); A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; *ve*, external vertical setae; *se*, external scapular setae; *vi*, internal vertical setae; *si*, internal scapular trichobothria. Scales: A–C 50 μ m.

Type depositary

RML (holotype and paratypes), USNM (paratypes), and NHMUK (paratypes).

Type and material examined

HOLOTYPE: larva (RML 49092), Caratateua, Bragança Municipality, Pará State, Brazil, 1-IV-1968, *Hylaeamys megacephalus*; **PARATYPES:** eight larvae (RML 49092), same data. **Material:** BRAZIL—1 larva (RML 49364), same locality, 15-III-1968, *Necromys lasiurus*; five larvae (RML 49370), same locality and host, 23-III-1968; one larva (RML 49372), Serra do Navio, Amapá State, 23-III-1968, *Monodelphis breviceaudata*, Thomas H. G. Aitken coll.

Note

Brennan (1969) reported 42 total opisthosomal setae, but did not comment that there could be a variation of the number of total opisthosomal setae in the type series. Here, we are reporting this variation (Table 2).

Parasecia gilbertoi n. sp. Bassini-Silva, Jacinavicius and Barros-Battesti

(Figs. 25–27, Tables 2–6)

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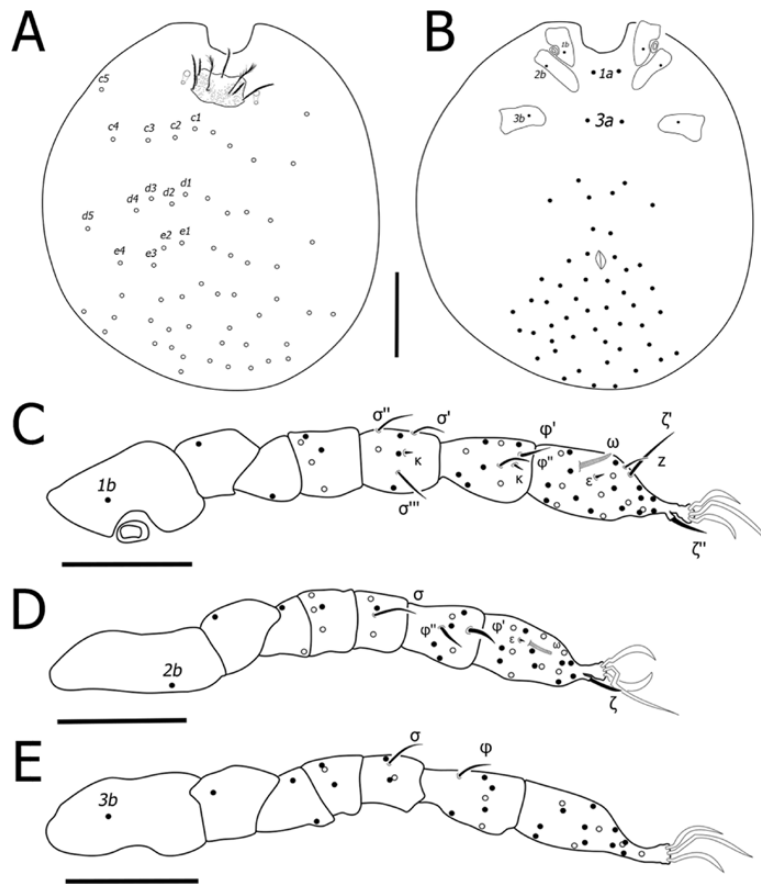


Fig. 22. Morphological details of *Parasecia thalurania* (Brennan, 1969); A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: *c1*–*c5*, C row setae; *d1*–*d5*, D row setae; *e1*–*e4*, E row setae; *1a*, anterior sternal setae; *3a*, posterior sternal setae; *1b*, coxal field I seta; *2b*, coxal field II seta; *3b*, coxal field III seta; ζ' , dorsal eupathid tarsus leg I; ζ , ζ'' , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , σ'' , and σ''' , solenidia on the genu of legs I, II, and III; κ , microsetae on genu and tibia of leg I; ϕ , ϕ' , and ϕ'' , solenidia on tibiae legs I, II, and III; ϵ , famulus on tarsi of legs I and II; *z*, companion seta on tarsi of leg I. Scales: A and B 100 μ m; C–E 50 μ m.

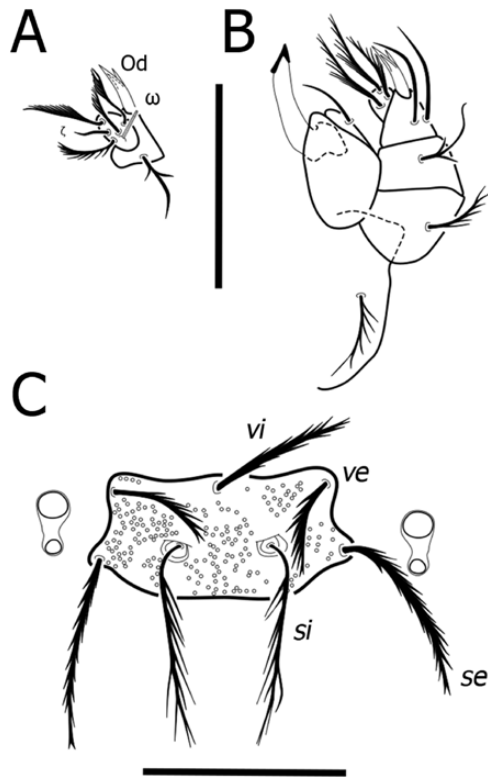


Fig. 23. Morphological details of *Parasecia valida* (Brennan, 1969); A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; ω , external vertical setae; se , external scapular setae; vi , internal vertical setae; si , internal scapular trichobothria. Scales: A–C 50 μ m.

Diagnosis

Palpgenu with a single branched seta; ventral setae of the palptibia branched; dorsal and lateral setae of the palptibia nude; adoral (cs) setae nude; C row with eight setae; D row with six setae; E row with two setae; H row with two or four setae (depending on the engorgement of the larva); 42 to 44 total opisthosomal setae; prodorsal sclerite wider than long; base of ϵ distal to ω of the leg I and proximal on the leg II; mastiseta on tarsus III absent.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/NNB/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (bs) setae branched, adoral (cs) setae nude (Figs. 25A and B and 27A). *Idiosoma*—eyes 2/2, anterior lens larger; prodorsal sclerite shape rectangular (Figs. 25C and 27B) wider than long, with a pair of flagelliform trichobothria (si) with two-third covered with long and slender setules, and five branched normal setae (a pair of ve (= AL) seta; a pair of se (= PL) seta; and a single vi (= AM) seta; $si > se > vi > ve$; the lateral margins of the prodorsal sclerite concave, sinuous anterior margin and slightly rounded posterior margin. Opisthosoma (Figs. 26A and B and 27D, Table 2) with 42 to 44 setae, dorsal opisthosomal C row with four pairs of setae, with the c_4 pair in an anterior position (= humeral setae), D row with three pairs of setae, E row with a pair of setae, F row with two pairs of setae and H row with one or two pairs of setae, for a total of 22 to 24 dorsal opisthosomal setae, and 20 ventral opisthosomal setae (8 setae anterior and 12 setae posterior to the anus). Two pairs of sternal setae ($1a$, $3a$) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta $1b$ branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 σ and a distal κ ; tibia 8B, 2 φ and a distal κ ; tarsus 22B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (z) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 26C and 27C). *Leg II*—coxal field seta $2b$ (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 φ ; tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 26D). *Leg III*—coxal field seta $3b$ (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ , tibia 6B, φ ; tarsus 15B (Fig. 26E and 27E and F).

Type data

HOLOTYPE: larva (IBSP 12326), Botanical Garden of Universidade Federal de Juiz de Fora (UFJF), Juiz de Fora Municipality, Minas Gerais State, Brazil (43°22'07"W, 21°46'30"S), 24-V-2013, *Xiphorhynchus fuscus*. **PARATYPES:** 10 larvae (IBSP 12326), same data.

Additional material

BRAZIL—one larva (IBSP 12328), same locality, 3-XII-2013, *Myiarachus ferox*, R. Maturano coll.; two larvae (IBSP 12330), same locality, 4-XII-2013, *Troglydites musculus*; two larvae (IBSP 12337), same locality and host, 24-II-2014; three larvae (IBSP 12344B), same locality and host, 25-II-2014; four larvae (IBSP 12345B), same data; three larvae (IBSP 12369), same locality, 17-IV-2014, *Xiphorhynchus fuscus*; two larvae (IBSP 12373), same locality, 28-V-2014, *Sittasomus griseicapillus*; two larvae (IBSP 12334), Sítio Vista Alegre, Juiz de Fora Municipality, Minas Gerais State (43°21'44"W, 21°43'50"S), 28-I-2014, *Lepidocolaptes squamatus*; one larva (IBSP 12374A), Fazenda Volta Grande, Santa Bárbara do Monte Verde Municipality, Minas Gerais State (43°42'07"W, 21°57'32"S), 25-IX-2014, *Myiozetetes similis*; two larvae (IBSP 13933), Estação Ecológica de Água Limpa, Cataguases Municipality, Minas Gerais State (42°43'12"W, 21°22'26"S), 10-I-2017, *Dendrocincla turdina*, M. Oliveira coll.; three larvae (IBSP 13937), same locality and host, 14-II-2017; two larvae (IBSP 13938), same locality and host, 15-III-2017; one larvae (IBSP 13943), same locality and host, 29-VI-2017; one larva (IBSP 13944), same locality and host, 18-VII-2017; one larva (IBSP 13946), same locality and host, 20-VII-2017; one larva (IBSP 13949), same locality and host, 19-II-2018; two larvae (IBSP 13934), same locality, 11-I-2017, *Xiphorhynchus fuscus*; two larvae (IBSP 13942), same locality and host, 28-VI-2017; one larva (IBSP 13945), same locality and host, 19-VII-2017; four larvae (IBSP 13947), same locality and host, 24-X-2017; two larvae (IBSP 13948), same locality and host, 15-II-2018; one larva (IBSP 13935), same locality, 12-I-2017, *Turdus leucomelas*; two larvae (IBSP 12208A), Paraty Municipality, Rio de Janeiro State (44°42'50"W, 23°13'21"S), 19-III-2015, *Dendrocincla turdina*, Moreira-Lima coll.; three larvae (IBSP 13783), Bela Vista Municipality, Mato Grosso do Sul State (56°32'42"W, 22°05'52"S), 26-I-2018, *Lepidocolaptes angustirostris*, L. C. Peinado and C. Faxina coll.; one larva (IBSP 13784), same locality and date, *Hemitriviccus margaritaceiventer*.

Type depository

The holotype and paratypes are deposited at the IBSP collection.

Entomology

The specific epithet is in honors to the Professor Dr. Gilberto Jose de Moraes for his many contributions to acarology worldwide.

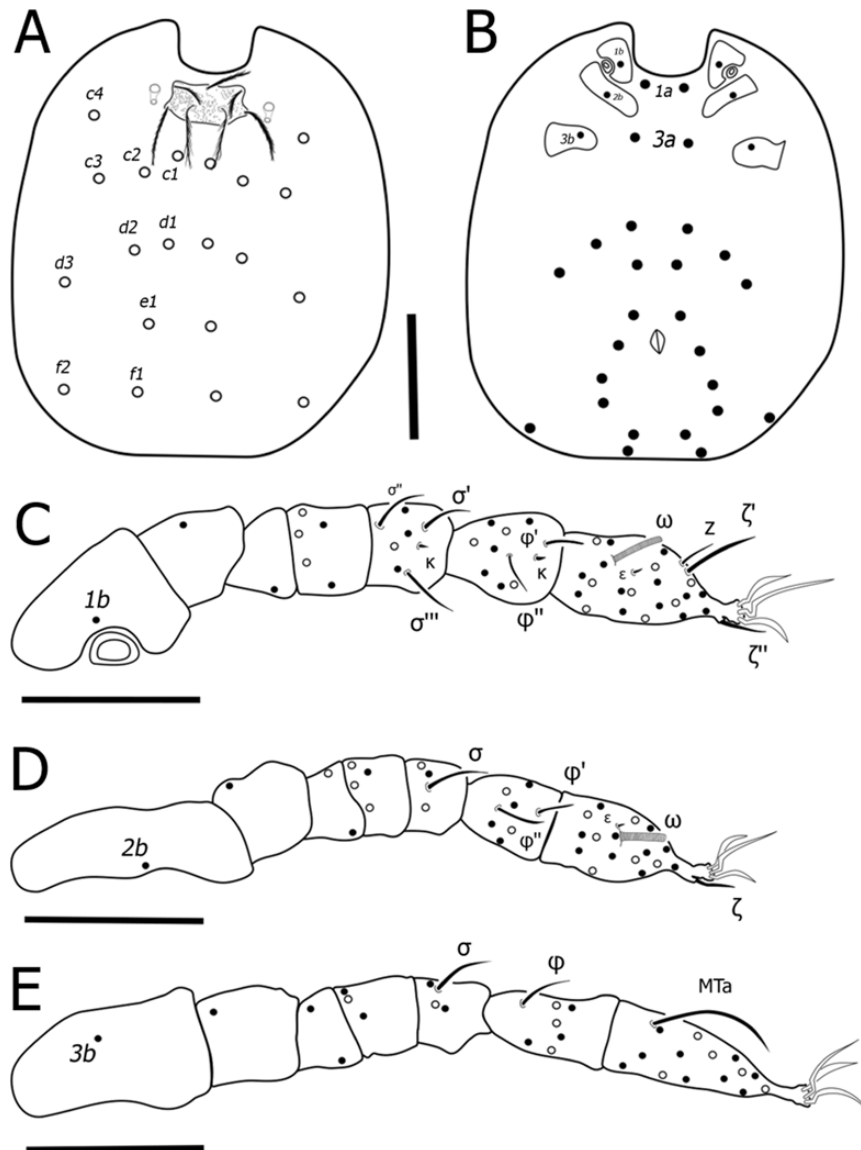


Fig. 24. Morphological details of *Parasecia valida* (Brennan, 1969); A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: *c1–c4*, C row setae; *d1–d3*, D row setae; *e1*, E row setae; *f1–f2*, F row; *1a*, anterior sternal setae; *3a*, posterior sternal setae; *1b*, coxal field I seta; *2b*, coxal field II seta; *3b*, coxal field III seta; ζ' , ζ , subterminal eupathid tarsus leg I; ζ' , ζ , dorsal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , σ'' , and σ''' , solenidia on the genu of legs I, II and III; κ , microsetae on genu and tibia of leg I; φ , φ' , and φ'' , solenidia on tibiae legs I, II and III; ϵ , famulus on tarsi of legs I and II; z , companion seta on tarsi of leg I; MTa, mastiseta on tarsus leg III. Scales: A and B 100 μm ; C–E 50 μm .

New Combinations

Nahuacarus Bassini-Silva, Jacinavicius and Welbourn
gen. n.

(Zoobank LSID: urn:lsid:zoobank.org:act:74313EA2-F35D-47F2-8F3E-D96540842461)

Type species: *Parasecia bulbocalcar* Goff 1992

Diagnosis

Larva. Palptarsus with six setae (four branched and two nude), with ω , without ζ ; odontus trifurcate; cheliceral blade with tricuspid cap; eyes 2/2 on ocular plate and separate from the prodorsal sclerite; trapezoidal prodorsal sclerite, with a pair of flageliform trichobothria (*si*), *se* setae on the prodorsal sclerite; femora of legs I–III each divided into a basifemur and telofemur; coxal fields unisetose and

without striation; empodium present and onychotriches absent; genu of the leg I with two solenidia; genu of the leg II with one solenidion; genu of the leg III without solenidia; tarsus of the leg I and II with subterminal eupathid (ζ); dorsal eupathid (ζ'); and its companion seta (z) absent from tarsus leg I.

Remarks

This new genus is proposed for species previously placed in *Parasecia* that do not fit the genus. *Nahuacarus* n. gen. is similar to *Phalcophila* Brennan and Reed, 1973, *Crypticula* Webb and Loomis, 1970 and *Loomisia* Brennan and Reed, 1972 in having six normal setae and ω on palptarsus (ζ absent). *Nahuacarus* n. gen. differs from these genera in the absence of the dorsal eupathid (ζ') and companion seta (z) in the tarsus of leg I. In addition, it differs from *Phalcophila* in having 2 σ in the genu of leg I (vs 3 σ). Also, the new genus is

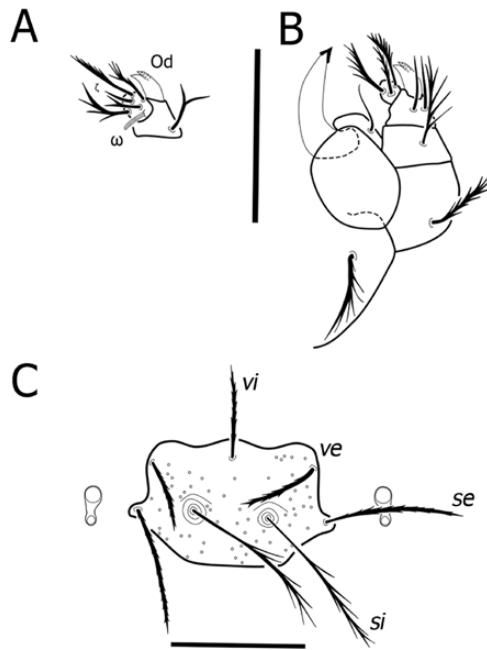


Fig. 25. Morphological details of *Parasecia gilbertoi* n. sp. Bassini-Silva, Jacinavicius and Barros-Battesti; A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; ve, external vertical setae; se, external scapular setae; vi, internal vertical setae; si, internal scapular trichobothria. Scales: A–C 50 μ m.

similar to *Loomisia* and *Crypticula* in having two σ I, but differs from *Crypticula* in having subterminal eupathid on tarsus of leg I (vs absent in *Crypticula*) and no σ in the genu of the leg III (vs present in *Crypticula*), and differs from *Loomisia*, in having flagelliform trichobothridial setae (vs expanded in *Loomisia*).

Entomology

The new genus is named in honor of the largest indigenous group of people in Mexico, ‘Nahua’ combined with the word ‘mite’ in the new Latin word, ‘acarus’.

Nahuacarus bulbocalcar (Goff, 1992) new combination

Parasecia bulbocalcar Goff 1992: 965 (Figs. 28 and 29, Table 2)

Diagnosis

Palpgenu with a single branched seta; ventral setae of the palptibia branched; dorsal and lateral setae of the palptibia nude; palptarsus with four branched and two nude setae; adoral (cs) setae nude; C row with eight setae; E row with six setae; H row with 18 to 20 irregularly placed setae; 106 to 112 opisthosomal setae; prodorsal sclerite longer than wide; ω on the tarsus of the leg II with a distal bulb; base of ϵ on tarsi legs I and II distal to ω ; mastisetia on tarsus III absent.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/NNB/4B2N ω ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (bs) setae branched, adoral (cs) setae nude (Fig. 28A and B). *Idiosoma*—eyes 2/2, each pair set in an ocular plate

separate from the prodorsal sclerite, anterior lens larger; trapezoidal prodorsal sclerite (Fig. 28C) longer than wide, with a pair of flagelliform trichobothria (*si*) with long and slender setules its entire length (except the base), and five branched normal setae (a pair of *ve* [= AL] seta; a pair of *se* [= PL] seta; and a single *vi* [= AM] seta); *si* > *se* > *vi* > *ve*; the lateral margins of the prodorsal sclerite concave, sinuous anterior margin and almost straight posterior margin. Opisthosoma (Fig. 29A and B, Table 2) with 106 to 112 setae, dorsal opisthosomal C row with four pairs of setae, with the c_4 pair in an anterior position (= humeral setae), D row with three pairs of setae, E row with three pairs of setae, F row with four pairs of setae and H row with 18 to 20 irregularly placed setae, for a total of 46 to 48 dorsal opisthosomal setae, and 60 to 66 ventral opisthosomal setae (30 to 34 setae anterior and 30 to 34 setae posterior to the anus). Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 2 σ and a distal κ ; tibia 8B, 2 φ and a distal κ ; tarsus 23B with ω , ϵ and a subterminal eupathid (ζ'), base of ϵ distal to ω (Fig. 29C). *Leg II*—coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 φ ; tarsus 16B with ω (with a distal bulb), ϵ and a subterminal eupathid (ζ), base of ϵ distal to ω (Fig. 29D). *Leg III*—coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, tibia 6B, φ ; tarsus 15B (Fig. 29E).

Distribution

Mexico (Goff 1992).

Hosts

Mammals: *Sturnira ludovici* (Chiroptera: Phyllostomidae) (Goff 1992).

Note

In the original description, *N. bulbocalcar* was described without σ of the leg II. After examining the types, the species has a σ in the genu of leg II, which is being described here.

Type depository

USNM (holotype and paratypes), BPBM (paratypes), and UNAM (paratypes).

Type examined

HOLOTYPE: larva, San Pablo Hidalgo, Tlaltizapan Municipality, Morelos State, Mexico, 11-V-1988, *Sturnira ludouuzci*; **PARATYPES:** 10 larvae, same data; three larvae, same locality and host, 20-III-1989, A. Losoya coll.

Lorillatum Nadchatram, 1963

Lorillatum lasiurus (Goff and Gettinger, 1991) new combination
Parasecia lasiurus Goff and Gettinger 1991: 401; Goff 1992: 967 (Figs. 30 and 31, Table 2)

Diagnosis

Palpgenu with a single branched seta; all three palptibial setae nude; adoral setae (cs) nude; C row with eight setae; E row with four setae; H row without setae; 32 opisthosomal setae; prodorsal sclerite

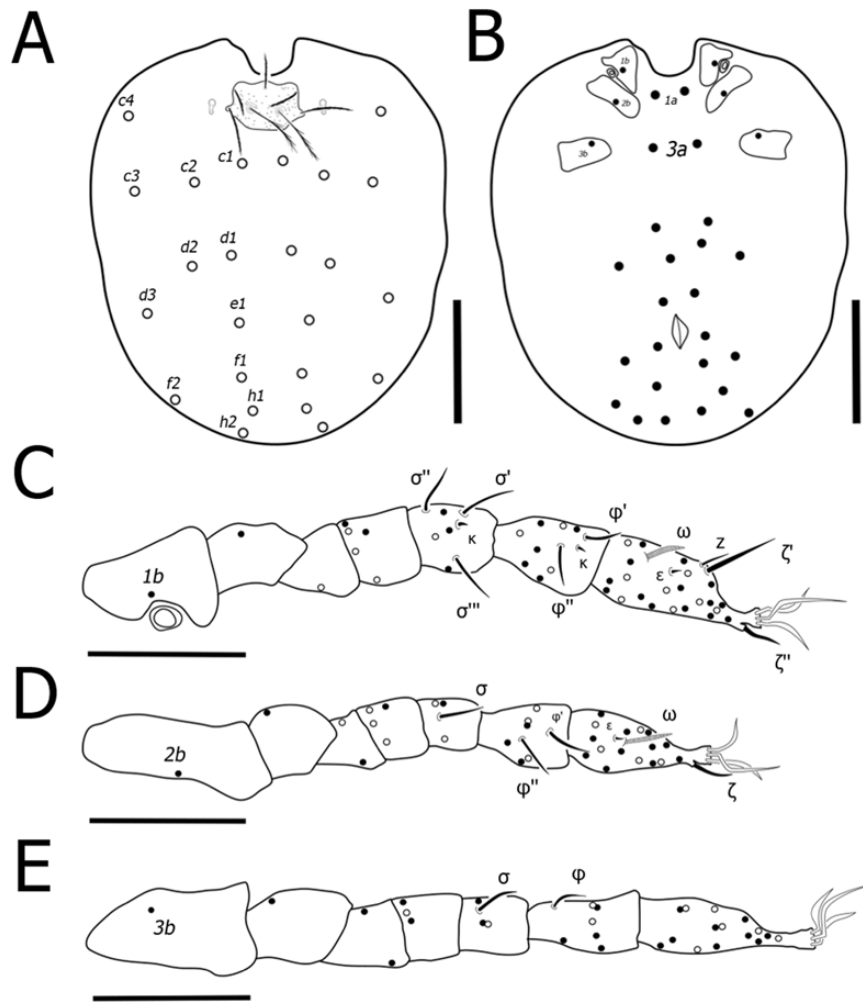


Fig. 26. Morphological details of *Parasecia gilbertoi* n. sp. Bassini-Silva, Jacinavicius and Barros-Battesti; A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: *c1–c4*, C row setae; *d1–d3*, D row setae; *e1*, E row setae; *f1–f2*, F row setae; *h1–h2*, 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; ζ' , dorsal eupathid tarsus leg I; ζ'' , ζ , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , σ'' , and σ''' , solenidia on the genu of legs I, II and III; κ , microsetae on genu and tibia of leg I; ϕ , ϕ' , and ϕ'' , solenidia on tibiae legs I, II and III; ϵ , famulus on tarsi of legs I and II; z , companion seta on tarsi of leg I. Scales: A and B 100 μm ; C–E 50 μm .

longer than wide; base of ϵ distal to ω of leg I and proximal on leg II; one mastiseta on the tarsus of the leg III.

Redescription

Gnathosoma—fPp = B/B/NNN/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (bs) setae branched, adoral (cs) setae nude (Fig. 30A and B). *Idiosoma*—eyes 2/2, each pair set in an ocular plate separate from the prodorsal sclerite, anterior lens larger; prodorsal sclerite shape rectangular (Fig. 30C) longer than wide, with a pair of flagelliform trichobothria (*si*) with the distal two-thirds densely covered with long and slender setules, and five branched normal setae (a pair of *ve* [= AL] seta; a pair of *se* [= PL] seta; and a single *vi* [= AM] seta); *si* > *se* > *vi* > *ve*; the lateral margins straight, sinuous anterior margin and rounded posterior margin. Opisthosoma (Fig. 31A and B, Table 2) with 32 setae, dorsal opisthosomal C row with four pairs of setae, with the *c*₄ pair in an anterior position (= humeral setae), D row with three pairs of setae, E row with two pairs of setae, F row with one pair of setae, without H row, for a total of

20 dorsal opisthosomal setae, and 12 ventral opisthosomal setae (six setae anterior and six setae posterior to the anus). Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 2 σ and a distal κ ; tibia 8B, 2 ϕ and a distal κ ; tarsus 21B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (*z*) and a subterminal eupathid (ζ''), base of ϵ distal to ω (Fig. 31C). *Leg II*—coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 ϕ ; tarsus 16B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 31D). *Leg III*—coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ , tibia 6B, ϕ ; tarsus 14B with one mastiseta (Fig. 31E).

Distribution

BRAZIL (Goff and Gettinger 1991).

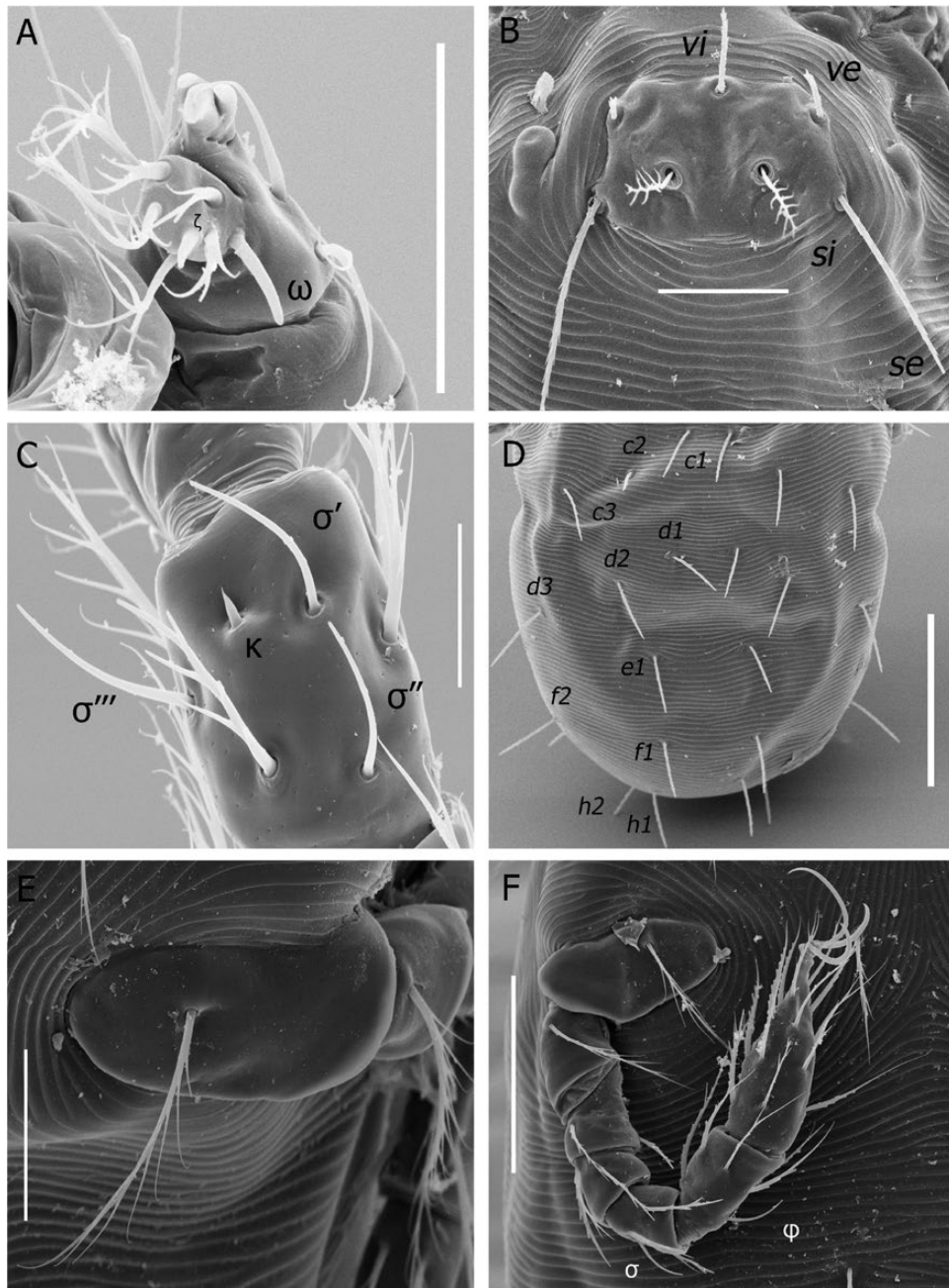


Fig. 27. Details on SEM of *Parasecia gilbertoi* n. sp. Bassini-Silva, Jacinavicius and Barros-Battesti; A, tarsus and tibia of the palp; B, prodorsal sclerite; C, genu of leg I; D, dorsal opisthosomal setae; E, coxa unisetose of leg III; F, leg III. Symbols and Abbreviations: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; ve , external vertical setae; se , external scapular setae; vi , internal vertical setae; si , internal scapular trichobothria; σ' , σ'' , and σ''' , solenidia on the genu of legs I; κ , microsetae on genu of leg I; $c1-c4$, C row setae; $d1-d3$, D row setae; $e1$, E row setae; $f1-f2$, F row setae; $h1-h2$, H row setae; σ , solenidia on the genu of leg III; ϕ , solenidia on tibiae leg III. Scales: A and E 20 μ m, B 30 μ m, C 10 μ m, D 100 μ m, and F 50 μ m.

Hosts

Mammals: *Necomys lasiurus* (= *Bolomys lasiurus*), *Oxymycterus* sp. (Rodentia: Cricetidae) (Goff and Gettinger 1991).

Type depository

USNM (holotype).

Type examined

HOLOTYPE. Brasilia, Federal District, Brazil, 29-I-1984, *Necomys lasiurus*, D. Gettinger coll.

Note

Goff and Gettinger (1991) deposited the holotype and eight paratypes labeled *Parasecia lasiurus* in the USNM collection. Examination of the types revealed the holotype is *L. lasiurus* n. comb. but all paratypes are *Trombewingia brasiliensis* Goff and Gettinger, 1991. Coincidentally *T. brasiliensis* was also described in the same paper with *L. lasiurus* n. comb. and it appears there was an error in labeling the slides.

Lorillatum orphana (Brennan, 1971) new combination

Parasecia orphana Brennan 1971: 212; Goff 1992: 967. (Figs. 32 and 33, Table 2)

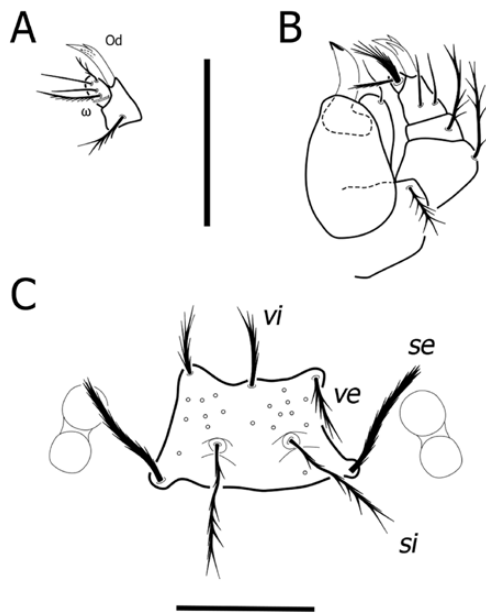


Fig. 28. Morphological details of *Nahuacarus bulbocalcar* (Goff, 1992); A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; Od, odontus; *ve*, external vertical setae; *se*, external scapular setae; *vi*, internal vertical setae; *si*, internal scapular trichobothria. Scales: A–C 50 μ m.

Diagnosis

Palpgenu with a single branched seta; ventral setae of the palptibia branched; dorsal and lateral setae of the palptibia nude; adoral (*cs*) setae nude; C row with eight setae; E row with two setae; H row without setae; 34 total opisthosomal setae; prodorsal sclerite longer than wide; base of ϵ distal to ω of leg I and proximal on leg II; one mastiseta on tarsus of the leg III.

Redescription

Larvae. *Gnathosoma*—fPp = B/B/NNB/7B ω ζ ; odontus trifurcate; cheliceral blade with tricuspid cap; gnathobase punctate, subcapitular (*bs*) setae branched, adoral (*cs*) setae nude (Fig. 32A and B). *Idiosoma*—eyes 2/2, each pair set in an ocular plate separate from the prodorsal sclerite, anterior lens larger; prodorsal sclerite shape rectangular (Fig. 32C) longer than wide, with a pair of flagelliform trichobothria (*si*) with half covered with short and slender setules, and five branched normal setae (a pair of *ve* (= AL) seta; a pair of *se* (= PL) seta; and a single *vi* (= AM) seta); *si* > *se* > *vi* > *ve*; the lateral margins of the prodorsal sclerite concave, slightly sinuous anterior margin and rounded posterior margin. Opisthosoma (Fig. 33A and B, Table 2) with 34 setae, dorsal opisthosomal C row with four pairs of setae, with the *c*₄ pair in an anterior position (= humeral setae), D row with three pairs of setae, E row with a pair of setae, F row with two pairs of setae, without H row, for a total of 20 dorsal opisthosomal setae, and 14 ventral opisthosomal setae (eight setae anterior and six setae posterior to the anus). Two pairs of sternal setae (*1a*, *3a*) between coxal fields I and III. *Legs*—femur of the 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 with few punctuations; *Leg I*—coxal field seta *1b* branched (1B); *elcI* not observed; trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 2 σ and a distal κ ; tibia 8B, 2 φ and a distal κ ; tarsus 21B with ω , ϵ , dorsal eupathid (ζ') with a companion seta (*z*) and a subterminal eupathid (ζ''), base of ϵ distal to ω

(Fig. 33C). *Leg II*—coxal field seta *2b* (1B); trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, σ ; tibia 6B, 2 φ ; tarsus 15B with ω , ϵ and a subterminal eupathid (ζ), base of ϵ proximal to ω (Fig. 33D). *Leg III*—coxal field seta *3b* (1B); trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, σ ; tibia 6B, φ ; tarsus 14B with one mastiseta (Fig. 33E).

Distribution

BRAZIL (Brennan 1971).

Host

Proechimys guyanensis (Rodentia: Echimyidae) (Brennan 1971).

Type depository

RML (holotype and paratypes), NHMUK (paratypes), and FMNH (paratypes).

Types examined

HOLOTYPE: larva (RML 50351), Guamá Ecological Research Area, Belém, Pará State, Brazil, 11-IX-1968, *Proechimys guyanensis*; **PARATYPES:** four larvae (RML 50351), same data, Thomas H. G. Aitken coll.

Note

All the paratypes examined present a pattern for dorsal and ventral opisthosomal setae; except for the holotype that has only one less seta, probably a mutation. Here, we regarded the species with 14 ventral opisthosomal setae.

Remarks

Both species placed here in *Lorillatum*, *Lorillatum lasiurus*, and *Lorillatum orphana* share the same characteristics with this genus, such as 1) palptarsus with 7B ω ζ ; 2) a trifurcate odontus; 3) rectangular prodorsal sclerite; and 4) two σ on genu of the legs I. When compared with *Parasecia*, only one character stands out differently (the number of σ in the genu of Leg I). After examining all the types and materials herein in this study, that for now, we came to the conclusion that this character is sufficiently possible to separate these two genera. So, at this moment we are putting these two species in *Lorillatum*. Also, we are following the same concept that was applied to transfer *Parasecia neuquenensis* Goff and Gettinger, 1995 to the genus *Paratrombicula* (Stekolnikov and González-Acuña, 2012).

Key to species of *Parasecia* Loomis, 1966

Note:

Specimens of *Parasecia argentinensis* were not available for study so the position of this species in the key was based on the original description by Goff and Gettinger (1995).

1. Tarsus leg III with at least one mastiseta.....2
Tarsus leg III without mastiseta.....7
2. (1)Tarsus leg III with one mastiseta.....3
Tarsus leg III with two mastiseta.....*Parasecia psittaci* (Figs. 17 and 18)
3. (2)Opisthosomal C row with 10 to 12 setae.....4
Opisthosomal C row with six setae.....6
4. (3)Adoral (*cs*) setae nude; ϵ II distal to ω II.....*Parasecia fernadae*

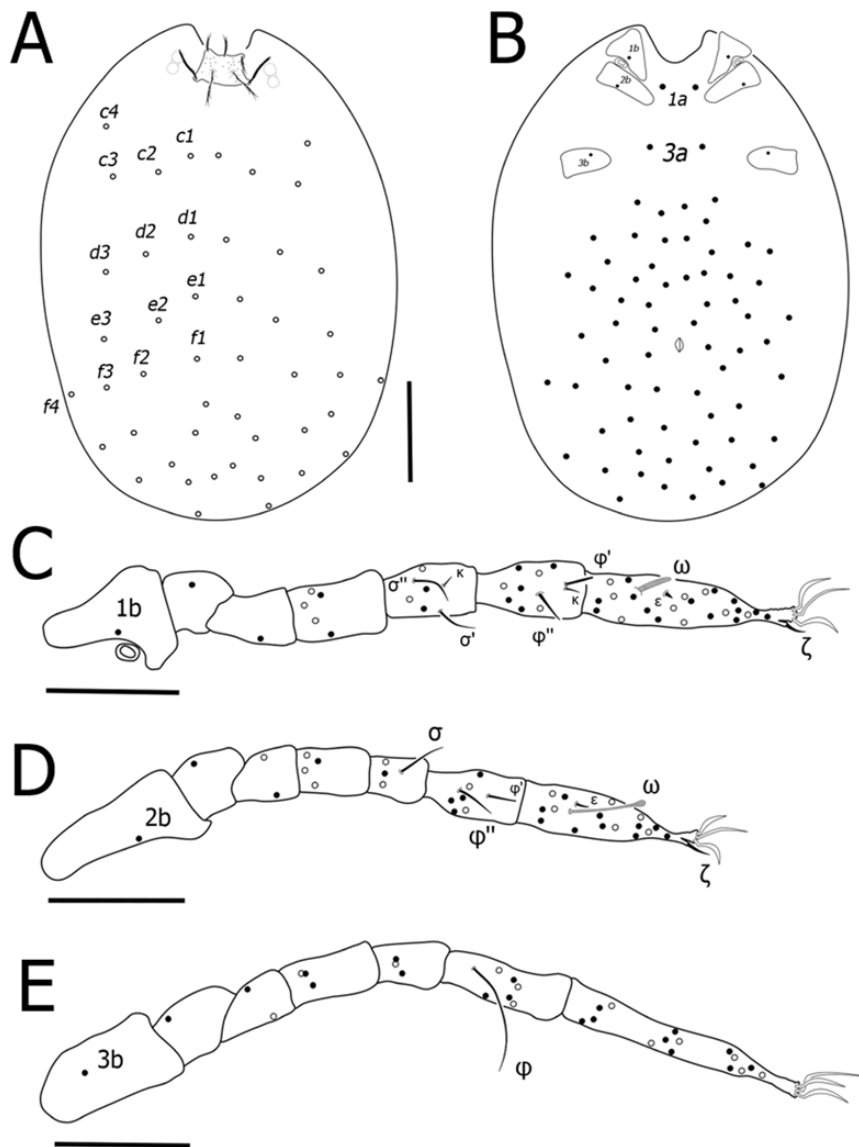


Fig. 29. Morphological details of *Nahuacarus bulbocalcar* (Goff, 1992); A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: c1–c4, C row setae; d1–d3, D row setae; e1–e3, E row setae; f1–f4, F row; 1a, anterior sternal setae; 1b, coxal field I seta; 2b, coxal field II seta; 3b, coxal field III seta; ζ, subterminal eupathid tarsus legs I and II; ω, solenidion tarsus legs I and II; σ, σ', solenidia on the genu of legs I and II; κ, microsetae on genu and tibia of leg I; φ, φ', and φ'', solenidia on tibiae legs I, II, and III; ε, famulus on tarsi of legs I and II. Scales: A and B 100 μm; C–E 50 μm.

- Adoral (cs) setae branched; ε II proximal to ω II.....5
- 5. (4) Lateral seta of the palptibia branched; with 80 to 84 total opisthosomal setae.....*Parasecia chara* (Figs. 5 and 6)
- Lateral seta of the palptibia nude, with 50 to 54 total opisthosomal setae.....*Parasecia argentinensis*
- 6. (3) Dorsal seta of the palptibia nude.....*Parasecia valida* (Figs. 23 and 24)
- Dorsal seta of the palptibia branched.....*Parasecia soucouyanti* (Figs. 19 and 20)
- 7. (1) Opisthosomal C row with 10 setae.....8
- Opisthosomal C row with eight setae.....9
- 8. (7) Cheliceral blade without subapical inner tooth, ε I proximal to ω I and with 70 to 72 total opisthosomal setae.....*Parasecia aitkeni* (Figs. 1 and 2)
- Cheliceral blade with subapical inner tooth, ε I distal to ω I and more than 100 total opisthosomal setae.....*Parasecia thalwrania* (Figs. 21 and 22)
- 9. (7) Palpgenual seta nude.....*Parasecia gurneyi* (Figs. 9 and 10)
- Palpgenual seta branched.....10
- 10. (9) Ventral palptibial seta nude.....11
- Ventral palptibial seta branched.....13
- 11. (10) Palptarsal ω twice the length of the palptarsus.....*Parasecia longicalcar* (Figs. 11 and 12)

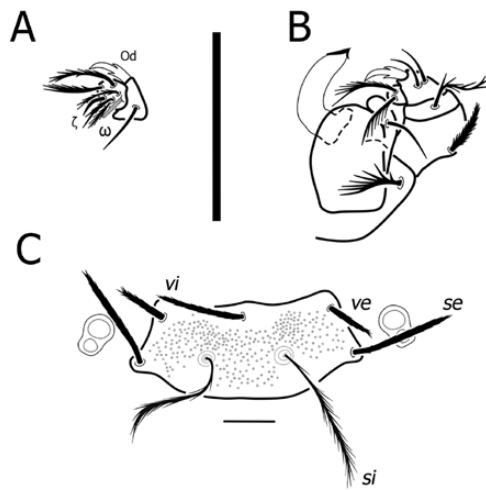


Fig. 30. Morphological details of *Lorillatum lasiurus* (Goff and Gettinger, 1991); A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite; Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; *ve*, external vertical setae; *se*, external scapular setae; *vi*, internal vertical setae; *si*, internal scapular trichobothria. Scales: A–C 50 μ m.

Palptarsal ω has the same length or less than the palptarsus
.....12

12.(11)Opisthosomal E row with six setae; 48 to 54 total idiosomal opisthosomal setae.....*Parasecia fundata* (Figs. 7 and 8)

Opisthosomal E row with two setae; 38 total opisthosomal setae.....*Parasecia manueli* (Figs. 13 and 14)

13.(10)Thirty-four total opisthosomal setae, *ve* setae much smaller than *vi* setae.....*Parasecia molini* (Figs. 15 and 16)

Forty or more than 40 total opisthosomal setae, *ve* setae slightly smaller or equal in size with *vi* setae.....14

14.(13)Opisthosomal H row with two or four setae, 42 to 44 total opisthosomal setae, prodorsal sclerite wider than long
.....*Parasecia gilbertoi* sp. n. (Figs. 25–27)

Opisthosomal without H rows, 40 total opisthosomal setae and prodorsal sclerite longer than wide.....*Parasecia campestris* (Figs. 3 and 4)

Discussion

The types of 17 species previously assigned to *Parasecia* were examined. The types of *P. argentinensis* could not be located and may be lost. The type of *Trombicula psittaci* was in very poor condition so we supplemented the redescription with additional material.

Goff (1992) addressed many of the morphological issues that had accumulated in *Parasecia* over the years. In the current review, we corrected several additional morphological problems that have been incorrectly reported. These include the presence of a palptarsal ζ , a trifurcate odontus, the number of setae on palptarsus, and the dorsal ζ with *z* on tarsus leg I.

The number of dorsal and ventral opisthosoma setae has been widely used in chigger descriptions, but how these setae are identified varies. While the actual number of setae can vary within a species, we noticed that in many species the C, D, E rows can be identified and reliably counted. The arrangement of setae in the posterior dorsal opisthosomal was variable (Table 2) and the amount of larval engorgement can obscure the actual number of setae in the F and H rows, due to the fact that many of these setae can be in the ventral position.

Parasecia campestris was originally described as a subspecies of *P. gurneyi* but after examination of both types and comparison with other related species, we concluded these two taxa are different species. *Parasecia gurneyi* has a nude dorsal seta on the palptarsus, a character not shared with *P. campestris* or any other species in the genus.

The original description of *P. kansansensis* separated it from *P. gurneyi* in having only one pair of eyes, bifurcate odontus, and six normal setae in palptarsus. Reexamination of the type material revealed two pairs of eyes, a trifurcate odontus, and seven normal setae on the palptarsus. Because of the nude seta on the palptarsus and shared characteristics with *P. gurneyi*, we synonymized *P. kansansensis* with *P. gurneyi*, in this study.

After reviewing and examining most *Parasecia* types, we concluded *P. bulbocalcar* should not be placed in *Parasecia*. The species *bulbocalcar* has a trapezoidal prodorsal sclerite, six normal setae on the palptarsus (two nude and four branched), and tarsus leg I without a dorsal ζ or its associated companion seta (*z*) while all species in *Parasecia* have rectangular prodorsal sclerite, seven normal setae on palptarsus and a dorsal ζ with a *z* seta on tarsus leg I. These characteristics support the creation of a new genus, *Nahuacarus* n. gen., to accommodate this species.

Goff (1992) included *lasiurus* Goff and Gettinger 1991 and *orphana* Brennan 1971 in *Parasecia*, but after review of these species we concluded that these two species are similar to *Lorillatum* in having a rectangular prodorsal sclerite, a palptarsus with $7B\omega\zeta$, and a trifurcate odontus and two σ on tarsus legs I. Then, we are proposing these two new combinations.

In this revision, we recognize 15 species in *Parasecia* all from the Americas (Table 1). Two species are found only on North America, *P. gurneyi* is widespread with records from Canada, Mexico, and United States, and *P. campestris* only known from the state of Kansas in the United States. Most of the *Parasecia* species are from the northern tropical region of South America and southern Central America. *Parasecia manueli* is widespread with records from five South American countries (Brazil, Colombia, Peru, Surinam, and Venezuela) and three Central American countries, Cuba, Panama, and Trinidad and Tobago. The Cuba record for this species suggests this species may have a wider distribution than the current records indicates. *Parasecia aitkeni* and *P. longicalcar* are each reported from five and six countries, respectively. *Parasecia aitkeni* from Bolivia, Brazil, Surinam, Venezuela, and Trinidad and Tobago. While, *Parasecia longicalcar* has been identified from Guyana, Surinam, Venezuela, Mexico, Panama, and Trinidad and Tobago. *Parasecia fundata* and *P. valida* were each found in two countries, while *P. psittaci* and *P. soucouyanti* from three countries. The remaining species were only reported from a single country. Only two South American species were found outside the northern tropical region one was *P. molini* from Chile and the other was *P. argentinensis* from Argentina.

For South America, Brazil and Venezuela have the most reported species of *Parasecia* with seven and five respectively. They are followed by Surinam with four species, and Peru with two

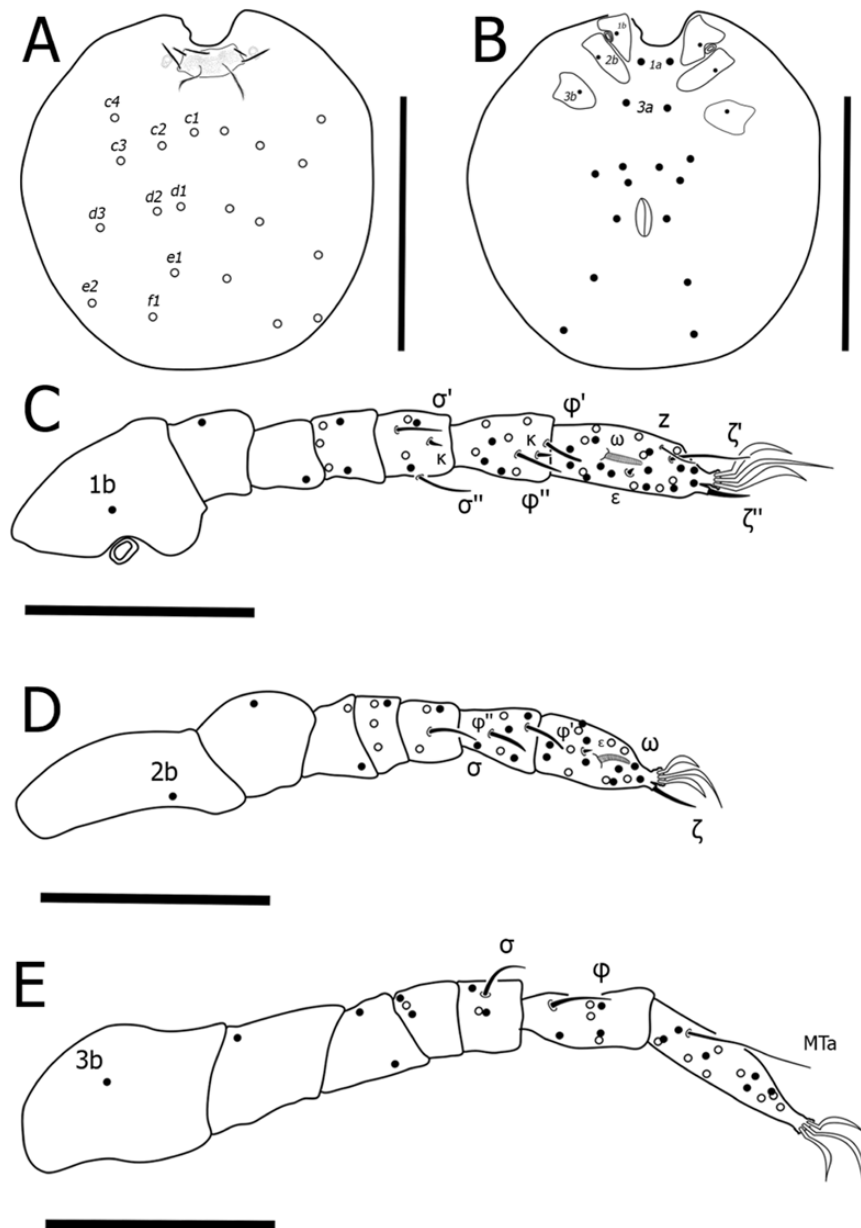


Fig. 31. Morphological details of *Lorillatum lasiurus* (Goff and Gettinger, 1991); A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: *c1–c4*, C row setae; *d1–d3*, D row setae; *e1–e2*, E row setae; *f1*, 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; ζ' , dorsal eupathid tarsus leg I; ζ'' , ζ , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , and σ'' , solenidia on the genu of legs I, II, and III; κ , microsetae on genu and tibia of leg I; φ , φ' , and φ'' , solenidia on tibiae legs I, II, and III; ϵ , famulus on tarsi of legs I and II; *z*, companion seta on tarsi of leg I; MTa, mastiseta on tarsus leg III. Scales: A and B 100 μ m; C–E 50 μ m.

species (Table 1). The remaining countries (Argentina, Bolivia, Chile, Colombia, Guyana, and French Guyana) reported only a single species. *Parasecia* has not been reported from Ecuador, Paraguay or Uruguay.

In addition to these records, new records of locality and hosts for the species *P. chara*, *P. longicalcar*, *P. manueli* and *P. thalurania* were added. These new records come from material deposited in the USNM, which had never before been published.

The more than 135 hosts recorded for the 15 *Parasecia* species in this study includes all terrestrial vertebrates except amphibians. Of these records only *P. molini* appears to parasitize solely

reptiles, while *P. thalurania* and *P. gilbertoi* n. sp. parasitizes only birds. *Parasecia aitkeni*, *P. argentinensis*, *P. chara*, *P. fernandae*, *P. soucouyanti*, and *P. valida* were only found parasitizing mammals. *Parasecia fundata* and *P. psittaci* have been collected from birds and mammals. *Parasecia psittaci* was the only species recovered from human skin. Four species, *P. campestris*, *P. gurneyi*, *P. longicalcar*, and *P. manueli*, parasitized reptiles, birds, and mammals. Of these, nearly 90% of *P. longicalcar* were from mammals, with reptiles and birds as minor hosts. Two species, *P. manueli* and *P. gurneyi* accounted for 46% of all the recorded hosts. In *P. manueli*, 70% of the hosts were mammals with 24% birds and only 5% reptiles.

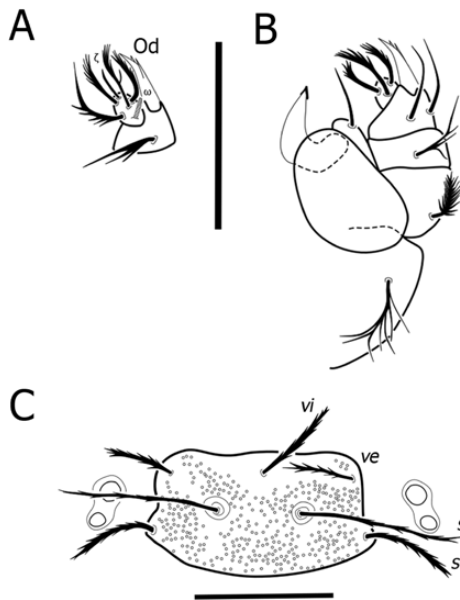


Fig. 32. Morphological details of *Lorillatum orphana* (Brennan, 1971); A, ventral view of palptarsus; B, dorsal view of gnathosoma; C, prodorsal sclerite. Symbols: ω , solenidion of palptarsus; ζ , subterminal eupathid of palptarsus; Od, odontus; ve, external vertical setae; se, external scapular setae; vi, internal vertical setae; si, internal scapular trichobothria. Scales: A–C 50 μ m.

Whereas in *P. gurneyi*, 54% of the hosts were mammals and 38% reptiles and only 8% birds. Overall mammals appeared to be the preferred with 65% followed by birds with 19% and reptiles with 16% of the hosts.

Supplementary Data

Supplementary data are available at *Journal of Medical Entomology* online.

Acknowledgments

To the Editor and Reviewers who contributed with valuable suggestions and ideas to improve this article. To Gabrielle Ribeiro de Andrade and Maria Cristina Ferreira do Rosário for technical contribution (CNPq no. 377343/2015-3 and 377342/2015-7, respectively), Debra Creel, Andrew Ulsamer (SEL-USDA), and Armando Rosario-Lebron (APHIS-USDA) for their help with references and technical support. To the Personnel of the Estação Ecológica de Água Limpa, Minas Gerais, Brazil for assistance during collections. To Dr. D. González-Acuña (University of Concepción, Chile) for making your type collection available for review. The Smithsonian Natural History Museum and National Agricultural Library (NAL-USDA), SEL-USDA for support and assistance with specimens and references. This work was financed by the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq no. 454907/2014-1 and 440639/2015-8 to D.M.B.-B.; 377976/2014-8 to F.C.J.; CNPq no. 307016/2015-3 to E.F.), Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP no. 2010/51875-9 to D.M.B.-B.; 2017/01416-7 and 2018/24667-8 to R.B.-S.). This study was

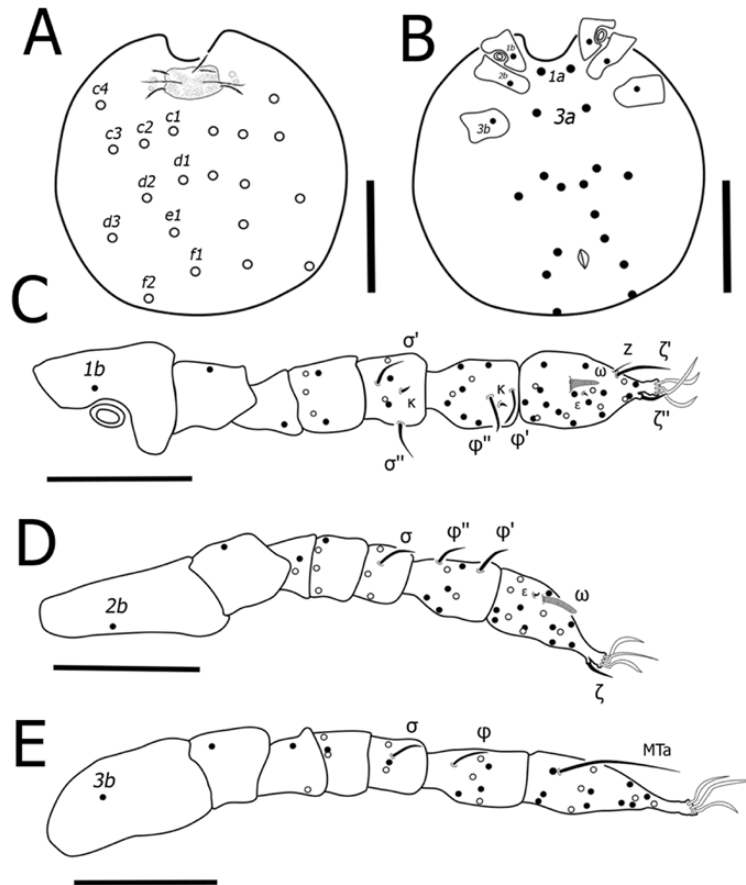


Fig. 33. Morphological details of *Lorillatum orphana* (Brennan, 1971); A, dorsal view of idiosoma; B, ventral view of idiosoma; C, Leg I; D, Leg II; E, Leg III. Solid circles, ventral setae; open circles, dorsal setae. Symbols: c1–c4, C row setae; d1–d3, D row setae; e1, E row setae; f1–f2, F row; 1a, anterior sternal setae; 3a, posterior sternal setae; 1b, coxal field I seta; 2b, coxal field II seta; 3b, coxal field III seta; ζ' , dorsal eupathid tarsus leg I; ζ'' , ζ , subterminal eupathid tarsus legs I and II, respectively; ω , solenidion tarsus legs I and II; σ , σ' , and σ'' , solenidia on the genu of legs I, II, and III; κ , microsetae on genu and tibia of leg I; ϕ , ϕ' , and ϕ'' , solenidia on tibiae legs I, II, and III; ϵ , famulus on tarsi of legs I and II; z, companion seta on tarsi of leg I; MTa, mastiseta on tarsus leg III. Scales: A and B 100 μ m; C–E 50 μ m.

financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior—Brasil (CAPES)—Finance Code 001.

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