

Pseudoscorpions (Pseudoscorpiones: Olpiidae) of the genus *Apolpium* from Venezuela, and the genera *Pachyolpium*, *Leptolpium* gen. nov. and *Serianus* from Curaçao, Aruba and Bonaire

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This study refers to the following species and subspecies of pseudoscorpions: *Apolpium rufeolum* (Balzan, 1891) from Venezuela; *Serianus gratus* Hoff, 1964, new to the fauna of Curaçao; *Pachyolpium arubense arubense* Beier, 1936, *Pachyolpium arubense variabilis* subsp. nov., and *Leptolpium prospaeum* gen. et spec. nov. from Curaçao, Aruba and Bonaire. A large number of new localities of *Pachyolpium arubense arubense* is reported.

Introduction

In this contribution representatives of the pseudoscorpion genera *Apolpium* Chamberlin, 1930, from Venezuela, *Pachyolpium* Beier, 1931, and *Leptolpium* gen. nov. from Curaçao, Aruba and Bonaire, and *Serianus* Chamberlain, 1930, from Curaçao, are discussed. As in my *Aphelolpium* study of this area (van den Tooren, 1995), the material is part of the collection of Dr P. Wagenaar Hummelinck, yielded during numerous zoological collecting trips made in the Caribbean. The material is deposited in the Department of Entomology of the National Museum of Natural History, Leiden.

Methods

Morphological descriptions and measurements follow those in my previous paper (van den Tooren, 1995: 70), except that the cheliceral length conforms to that illustrated by Harvey (1987: 59, fig. 2). Measurements are in mm; station numbers, ratios and counts with mean values in italics; number of specimens, slide numbers and aberrant data in parentheses. L = length, W = width, D = depth, T = tactile seta. Abbreviations used to indicate trichobothria on palpal fingers (Chamberlin, 1931: 138): movable finger (exterior surface): *t* = terminal, *st* = subterminal, *sb* = subbasal, *b* = basal; fixed finger (exterior surface): *et* = exterior terminal, *est* = exterior subterminal, *esb* = exterior subbasal, *eb* = exterior basal; fixed finger (interior surface): *it* = interior terminal, *ist* = interior subterminal, *isb* = interior subbasal, *ib* = interior basal. Abbreviation *sb* also used to indicate subbasal tactile seta on dorsum femur.

Family Olpiidae Banks, 1895
Subfamily Olpiinae Banks, 1895
Genus *Apolpium* Chamberlin, 1930

This genus is characterised by the following: chelicera with flagellum of 3 blades, *sb* on dorsum palpal femur, trichobothria *it* and *ist* clearly distal to *est*, trichobothrium *st* clearly distant from *sb* and *b*, patella of first leg clearly shorter than femur, and articulation freely mobile. Short venom ducts compared to those in the genus *Aphelolpium*.

Apolpium rufeolum Beier, 1959
 (figs. 1-3).

Olpium cordimanum var. *rufeolum* Balzan, 1891: 537 [Venezuela, Carácas].

Apolpium (?) *rufeolum*; Beier, 1932: 192; Roewer, 1937: 262.

Apolpium rufeolum; Harvey, 1991: 265.

Apolpium (?) *rufeolum*; Muchmore, 1993: 89.

The only known male conforms in many respects to Beier's description of *A. vastum* from Colombia (Beier, 1959). However on a number of points is considered that the present specimen might be referred to *rufeolum*: type locality (Carácas, Venezuela) the same as for the specimen described here, on the whole coloured more palish, all segments in same colour, body length 2.13 versus 2.3, L/W carapace 1.21 versus 1.4.

Material.— Venezuela, Carácas, v.1950: 1 ♂ (1323) and 1 tritonymph (324).

Diagnosis: *Apolpium rufeolum* can be separated from *A. cordimanum* (Balzan, 1891) by its much smaller size and smaller L/W of palpal patella; from *A. minutum* Beier, 1931, by its somewhat larger size, slightly clearer pedicellated palpal femur, stouter palpal femur and patella, longer movable finger and greater distance between trichobothrium *est* and *ist* (1.15 × same distance in type male from Costa Rica); and from *A. parvum* Hoff, 1945, by its smaller size and by the length of the longest blade of cheliceral flagellum, not having lobe-like denticles along distal half of anterior margin, but clearly pinnate in distal third of anterior margin.

Description (amended): ♂ (figs. 1a, 2a-b, 3a-b).

Carapace, chelicerae and legs yellow ochre, body paler in colour, pedipalps more orange, apical teeth of chelicerae ash-grey, dark orange near tip.

Body L 2.13.

Carapace: smooth, anterior margin with 6 setae, 2 of which submedial in position, posterior margin with about 6 setae, on the surface about 40 setae and 10 slit-like lyri-fissures; eyes: 2 pairs, well developed, anterior eyes about 1 ocular diameter from anterior carapacial margin and about 1/4 ocular diameter from posterior eyes; L 0.62, greatest W 0.52, ocular W 0.39, L/W 1.21.

Abdomen: chaetotaxy, tergites I-X: 4: 8: 8: 10: 12: 12: 12: 10: 10: T4T; sternites IV-IX: 5: 12: 12: 10: 10: 10.

Chelicera (fig. 1a-b): 0.24/0.13, L/W 1.90; movable finger L 0.16; galea: slender, spine-like and straight, no rami, L 0.025; inner margin of fixed finger with 7 teeth, of

which most distal 2 are small denticles, continuous ones are flat retroconical non-sclerotic teeth; movable finger with prominent sharp subapical lobe; serrula exterior with 22 ligulate blades; serrula interior composed of about 15 blades, distal most blade with slender and weakly curved, spine-like elongation, convex margin of which very finely serrated, L 0.03, next 3 blades differentiated as (probably dentated) lobes, remainder consisting of vestigial blades forming a velum by basal fusion, but terminal part of each blade spine-like elongated and practically free, extreme elongation of most proximal blade not unlike a very weakly curved spine, L 0.04; flagellum of 3 spinelike setae, anterior-most one long and pinnate in distal third of anterior margin, other 2 about half as long; lamina exterior present; chaetotaxy: 5 setae on exterior surface of hand and 1 on movable finger.

Pedipalp (fig. 2a-b): trochanter 0.32/0.19, L/W 1.69; femur 0.65/0.175, L/W 3.7; patella 0.56/0.19, L/W 2.92; chela without pedicel 1.04/0.33, L/W 3.18; chela with pedicel 1.11/0.33, L/W 3.39; hand without pedicel 0.46/0.32, L/D 1.43; hand with

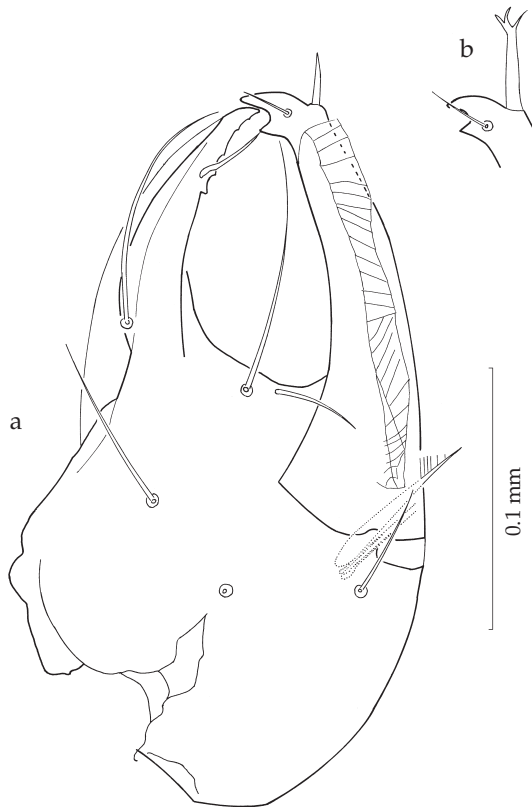


Fig. 1. *Apolpium rufeolum* Beier, ♂, 1323 (a) and *tritonymph*, 1324 (b) from Venezuela. a. Extero-lateral aspect of right chelicera (of serrula interior only spine-like elongation on terminal part of most distal and proximal blades sketched). b. Extero-lateral aspect of tip of left cheliceral movable finger, showing galea and subapical lobe.

pedicel 0.53/0.32, L/D 1.66; movable finger L 0.62, $1.35 \times$ L hand without pedicel, $1.17 \times$ L hand with pedicel. *sb* on dorsum palpal femur 0.15 from anterior key point of femoral base, palpal femur L 4.40 times distance from *sb* to exterior key point of femoral base (= distance *sb* on dorsum femur from femoral base). Fixed finger with 45 retroconical marginal teeth, of which basal 10 are more or less rounded; *et* 0.06 up to level of 5/6th marginal tooth from apical tooth, *it* up to level of 13th marginal tooth from apical tooth, *ist* up to level of 22nd/23rd marginal tooth to apical tooth; *est* up to level of 32nd marginal tooth from apical tooth; nodus ramosus 0.10 up to level of 8/9th marginal tooth from apical tooth; fixed finger L (arbitrarily considered equal to movable finger L), to $6.09 \times$ venom duct L.

Movable finger with 33 retroconical marginal teeth, larger and flatter than those in movable finger, with exception of most proximal ones; *t* 0.13 up to level of 11th marginal tooth from apical tooth; nodus ramosus 0.095 up to level of 9th marginal tooth from apical tooth; movable finger L $6.54 \times$ venom duct L.

First leg (fig. 3a): trochanter 0.17/0.135, L/D 1.25; femur 0.31/0.10, L/D 3.08; patella 0.16/0.09, L/D 1.89; femur L $1.96 \times$ patella L; tibia 0.225/0.065, L/D 3.47; tibia L $1.41 \times$ patella L; metatarsus 0.195/0.05, L/D 3.72; tarsus 0.15/0.03, L/D 4.72; arolium L about $1.4 \times$ L claws.

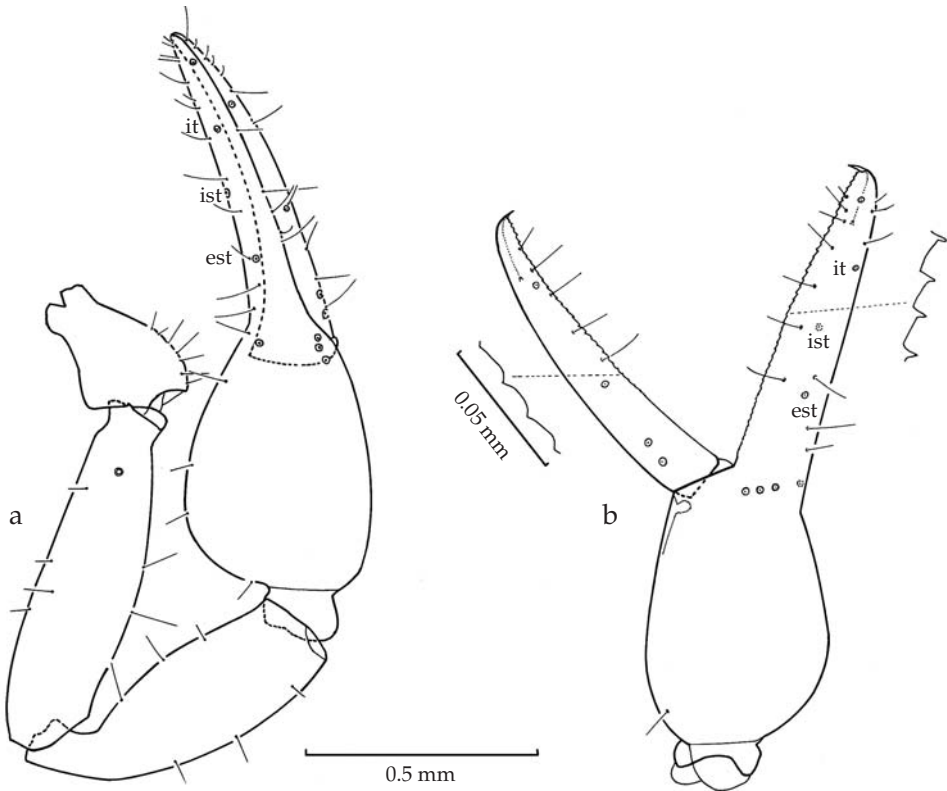


Fig. 2. *Apolpium rufecolum* Beier, ♂ (1323) from Venezuela. a. Dorsal aspect of right pedipalp. b. Extero-lateral aspect of left chela.

Fourth leg (fig. 3b): trochanter 0.24/0.16, L/D 1.45; femur 0.21/0.12, L/D 1.71; patella 0.51/0.25, L/D 2.07; femur + patella 0.615/0.25, L/D 2.48; tibia 0.40/0.10, L/D 4.07; metatarsus 0.26/0.07, L/D 3.79; tarsus 0.21/0.04, L/D 4.8; arolium L about 1.4 × L claws.

Chaetotaxy of metatarsus of fourth leg: exterior lateral T+2 (T proximal), dorsal 3, interior lateral 4 × 2, ventral 3.

Chaetotaxy of ♂ genital area: anterior lip of aperture with 6 setae on face, near anterior margin of posterior lip 6 setae, along posterior margin of posterior lip 6 setae, and on posterior operculum 6 setae.

Tritonymph (fig. 1b).

Carapace, chelicerae, pedipalps and legs yellow ochre, body scarcely coloured.

Body L 1.90.

Carapace: smooth; anterior margin with about 6 and posterior margin with 4 setae; eyes as in ♂ but less developed; L 0.49, greatest W 0.52, ocular W 0.33, L/D 0.96.

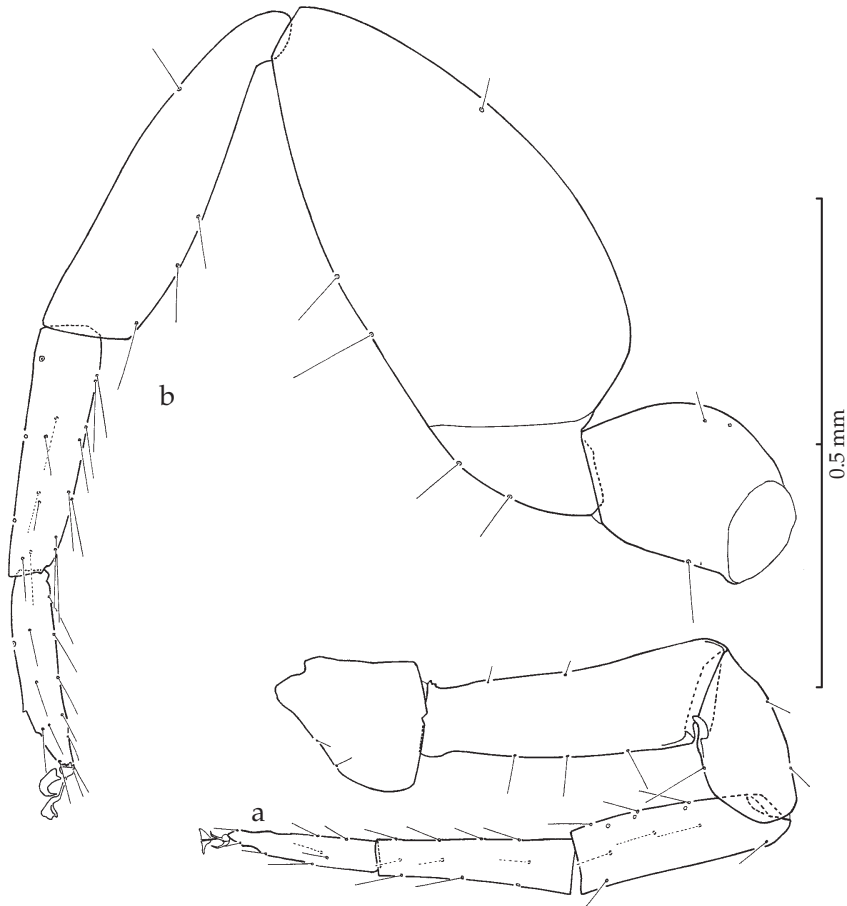


Fig. 3. *Apolpium rufecolum* Beier, ♂ (1323) from Venezuela. a. Anterior aspect of left leg I. b. Posterior aspect of left leg IV. Attention focused on chaetotaxy of metatarsus.

Abdomen: chaetotaxy, middle tergites with 10-12 setae, middle sternites with about 10 small setae.

Chelicera: 0.21/0.13, L/D 1.67; movable finger L 0.15; galea: slender with 3 small rami at tip, L 0.04; inner margin of fixed finger with 1 or 2 small denticles on apical tooth, continuous 3 are flat retroconical non-sclerotic teeth; movable finger with distinct sharp subapical lobe; serrula exterior with 19 ligulate blades, shape of serrula interior as in ♂; flagellum as in ♂, lamina exterior present; chaetotaxy as in ♂.

Pedipalp: trochanter 0.26/0.15, L/W 1.71; femur 0.51/0.15, L/W 3.47; patella 0.45/0.16, L/W 2.74; chela without pedicel 0.88/0.27, L/W 3.26; chela with pedicel 0.94/0.27, L/W 3.47; hand without pedicel 0.39/0.25, L/D 1.56; hand with pedicel 0.45/0.25, L/D 1.77; movable finger L 0.525, $1.34 \times$ L hand without pedicel, $1.18 \times$ L hand with pedicel. *sb* on dorsum palpal femur 0.13 from exterior key point of femoral base, palpal femur L $3.87 \times$ distance from *sb* to exterior key point of femoral base.

Fixed finger with 42 small retroconical marginal teeth, of which 9 basal ones are flattened; *et* up to level of 7th marginal tooth from apical tooth, *it* up to level of 15/16th marginal tooth from apical tooth, *ist* up to level of 24/25th marginal tooth from apical tooth, *est* up to level of 33rd marginal tooth from apical tooth, *eb* lacking; nodus ramosus up to level of 10th marginal tooth from apical tooth; fixed finger L (arbitrarily considered equal to movable finger L), to $5.47 \times$ venom duct L.

Movable finger with 29 marginal teeth, larger than those of fixed finger, of which distal 5 are retroconical, ones in continuous series flattened and basal ones extremely flattened; *t* up to level of 12/13th marginal tooth from apical tooth, *sb* lacking; nodus ramosus up to level of 8th marginal tooth from apical tooth; movable finger L $5.33 \times$ venom duct L.

First leg: femur 0.25/0.09, L/D 2.82; patella 0.13/0.08, L/D 1.57; femur L $1.905 \times$ patella L; tibia 0.18/0.06, L/D 3.2; tibia L $1.405 \times$ patella L; metatarsus 0.155/0.05, L/D 3.16; tarsus 0.15/0.04, L/D 4.07; arolium L about $1.5 \times$ L of claws.

Fourth leg: femur 0.18/0.10, L/D 1.85; patella 0.41/0.215, L/D 1.92; femur + patella 0.51/0.215, L/D 2.38; tibia 0.34/0.09, L/D 3.61; metatarsus 0.20/0.06, L/D 3.33; tarsus 0.18/0.04, L/D 4.2; arolium L about $1.4 \times$ L of claws.

Chaetotaxy of metatarsus of fourth leg: exterior lateral T+1 (T proximal), dorsal 2, interior lateral 3×2 , ventral 2.

Remarks: The size of the body and the presence of 3 rami at the tip of the galea suggests that this tritonymph is a nascent ♀, the more so as galeal rami in the present ♂ are absent.

Genus *Pachyolpium* Beier, 1931

Diagnosis (after Beier, 1931: 310; amended by Hoff, 1945b: 2; 1964: 26; redefined by Muchmore, 1986: 84): Carapace longer than wide with 4 well developed eyes. Tergites usually with maximum of 12 setae, rarely 14 setae. Chelicera with flagellum of 3 bladellike setae. Pedipalp fairly stout to stout. Tactile seta on proximal part of the dorsal surface of the femur. Venom ducts in chelal fingers moderately short: nodus ramosus in fixed finger proximal to *et*, in movable finger distal to *t*. Location of trichoboth-

ria *est* and *it* on fixed chelal finger never together near midpoint of finger, *est* at least a little proximal to *it*, *ist* located within about proximal third of finger, sometimes near base and only then associated with *eb*, *esb*, *isb* and *ib*. Patella of first leg much shorter than femur, with freely movable articulation between both parts.

The difference between the genera *Pachyolpium* and *Olpiolum*, both established by Beier in 1931, has always been very problematic. The major point of differentiation between the two genera, as given by Beier (1931, 1959) and amended by Hoff (1964), whether trichobothrium *ist* on fixed chelal finger is (*Pachyolpium*) or is not (*Olpiolum*) associated with trichobothria *eb*, *esb*, *isb* and *ib*, has led to much confusion. Mahnert & Schuster (1981), as well as Heurtault & Rebière (1983), doubt the usefulness of this character.

Finely Muchmore (1986) left it out in his redefinition of the genus *Olpiolum*, supposing that: "*Olpiolum* can be distinguished from all other genera of the Olpiini by the location of both trichobothria *est* and *it* near the middle of the fixed chelal finger, the very short venom ducts in the chelal fingers, the occurrence of only 6 setae on the middle tergites, and a single tactile seta on the palpal femur". In the specimens here assigned to *Pachyolpium* the position of trichobothrium *ist* in relation to *est* and *isb* is also rather variable.

Pachyolpium arubense Beier, 1936

Pachyolpium arubense Beier, 1936: 443-444, fig. 1 [Aruba]. Hoff, 1945b: 3 (in: "Key to the species of the genus *Pachyolpium*"); Muchmore, 1993: 90, nr. 33 (in: "Annotated list and bibliography of Pseudoscorpionida (Arachnida) reported from the Caribbean region. I. Trinidad, Venezuela and Colombia, and including Aruba, Bonaire, and Curaçao").

The species is closely related to *Pachyolpium furculiferum* (Balzan, 1891), but can be separated by following combination of characters (personal observation): smaller L/W of carapace (in ♂♂ 1.09-1.295 versus 1.32-1.40, in ♀♀ 1.025-1.26 versus 1.25-1.36), palpal femur and patella about subequal in L (versus femur L about 0.9 × patella L), and on the average a smaller number of blades on cheliceral serrula exterior (in ♂♂ 22.3 versus 24.3, in ♀♀ 22.5 versus 24).

The original description is based on 2 type specimens: 1 ♂ and 1 ♀, which are lodged at present in the Department of Entomology of the "National Museum of Natural History", Leiden, formerly in the "Collection Beier, Wien". For detailed study both alcohol specimens have been cleared, dissected and mounted on a microscopic slide.

Separation of this species into 2 subspecies, has led to the designation of Beier's original type ♀ as allotype ♀ of the new subspecies. This procedure is explained in the following classification:

Pachyolpium arubense Beier

Type ♂ (syntype) Type ♀ (syntype)

Pachyolpium arubense arubense Beier

Lectotype ♂ (= Beier's type ♂) Allotype ♀ (560) [= Neallotype ♀]

Pachyolpium arubense variabilis subspec. nov.

Holotype ♂ (849) Allotype ♀ (= Beier's type ♀ = paralectotype ♀)

Pachyolpium arubense arubense Beier, 1936
(figs. 4-9, 17-26 partly)

Material.— Lectotype: ♂ (= Beier's type ♂), **Aruba**, between Seroe Macuarina and Seroe Wara-wara, 26.vi.1930, under stones. H.J. Mac Gillavry leg. Topotypes: 2 ♂♂ (1698-1699), Aruba: 896, Seroe Wara-wara, 22.x.1967 (pl. 49a in: Wagenaar Hummelinck, P., 1981). Altitude: 70 m; hooibergite; spiny shrubs

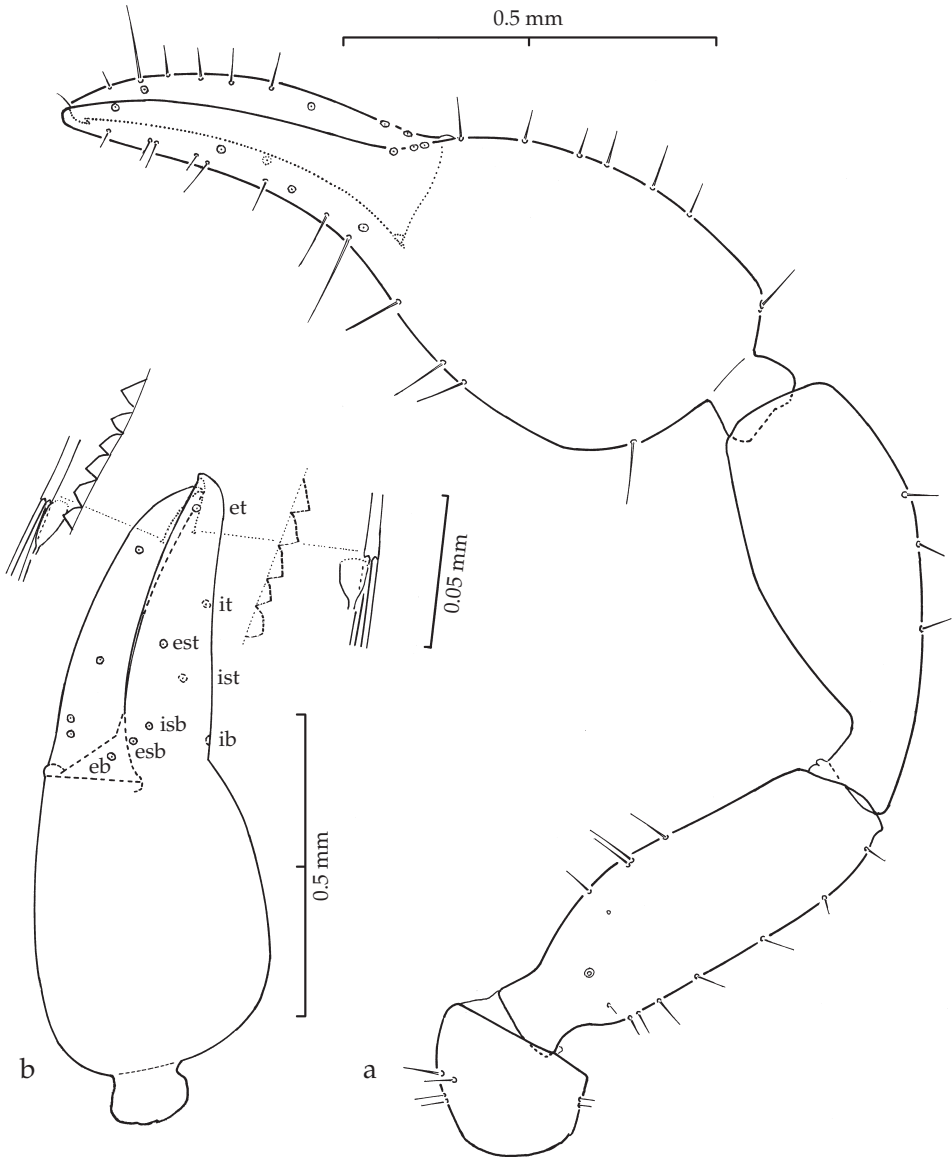


Fig. 4. *Pachyolpium arubense arubense* Beier, lectotype ♂ (= Beier's ♂ type specimen) from Aruba (a-b). a. Dorsal aspect of right pedipalp. b. Extero-lateral aspect of left chela (somewhat distorted).

and cacti; some plant debris, among rock debris. Allotype (new) [= Neallotype]: ♀ (560), Aruba, 278A, Boekoeti (Bucuti), island, S of Oranjestad, 17.i.1949. Altitude: 1-1.5 m, coral-shingle and sand; beach-vegetation with *Conocarpus*; dry and moistened leaf decay of *Conocarpus erecta*. Paratypes: **Aruba**: 246a, Rooi Prins, near spring, 28.viii.1949: 2 ♀♀ (844, 847); 262B, Spaansch Lagoen, W, 1.i.1949: 1 tritonymph (183); 273, Old goldmine Tibushi, near Westpunt, 9.xii.1936: 1 ♂ (1203); 275, Solito, W of Tanki Schipau, N of Oranjestad, 16.xii.1936: 2 ♂♂ (1199, 1201) and 2 ♀♀ (1198, 1200); 278, Bucuti reef near Oranjestad, 8.ii.1937: 2 ♂♂ (99, 1686) and 1 ♀ (100); 278A, same, 17.i.1949: 9 ♂♂ (199-200, 202-203, 212, 224, 227, 559, 561), 12 ♀♀ (198, 201, 205-206, 210-211, 216, 218, 223, 226, 235) and 14 tritonymphs (204, 208-209, 213, 220-222, 225, 228, 564-568); 362, Sabana BLancoe, W of Seroe Bientoe, 31.xii.1948: 1 ♂ (189); 896, same data as topotype: 1 tritonymph (1702); Oranjestad, 1948 (A.D. Ringma coll.): 2 deutonymphs (750-751). **Curaçao**: 205a, Rooi Mazalienja, N of Tafelberg, Santa Barbara, 13.iv.1949: 1 ♀ (629); 222a, Western part of Koenoeke Abau, 20.viii.1948: 1 deutonymph (781); 234, Northern top of Seroe Christoffel, 7.iii.1937: 1 tritonymph (1280); 234a, same, 24.x.1948: 2 ♂♂ (261, 608), 1 ♀ (610) and 2 tritonymphs (262, 612); 234b, same, 23.xii.1948: 3 ♂♂ (164, 166, 178), 1 tritonymph (172) and 6 deutonymphs (165, 169, 173-174, 176-177); 234c, same, 11.ii.1949: 1 ♀ (432); 234A, same, 11.ii.1949: 4 ♂♂ (469, 472-474), 3 ♀♀ (464-466) and 1 deutonymph (479); 235, Northwestern slope of Seroe Christoffel, 10.xi.1936: 1 ♂ (131); 235A, Northwestern slope of Seroe Christoffel, 23.xii.1948: 2 ♂♂ (242-243), 1 ♀ (241), 2 tritonymphs (246-247) and 1 deutonymph (249); 235B, same, 23.xii.1948: 3 ♀♀ (546-548), 1 tritonymph (551) and 1 deutonymph (552); 236, Rooi Sánchez, Knip, 11.xi.1936: 2 ♂♂ (150-151), 1 ♀ (152), 2 tritonymphs (153, 1459), 2 deutonymphs (154, 1460) and 1 protonymph (1461); 244, Playa Chik-itoe, S of St. Kruis Baai, 24.x.1936: 2 tritonymphs (1283, 1285); 323, Hofje Groot St. Joris, 9.iv.1949: 1 tritonymph (193); 328, Northern escarpment of Tafelberg, S. Barbara, 10.iv.1949: 1 ♀ (495); 329A, S of Tafelberg near Newport, 29.x.1948: 2 ♀♀ (639-640); 343, Southwest of police station Kleine Berg, 24.viii.1948: 4 ♂♂ (419-422), 1 ♀ (418) and 3 deutonymphs (423-425); 344, Baranca Martha Koosje, 24.viii.1948: 2 tritonymphs (267-268); 349, northern slope of Seroe Gracia, Knip, 17.viii.1948: 1 ♂ (590) and 1 protonymph (596); 349A, same, 23.xii.1948: 1 tritonymph (399); 351, Rooi Beroe near Pos Sjimarrón, Savonet, 23.xii.1948: 2 ♂♂ (823, 834), 1 ♀ (831), 1 tritonymph (836) and 1 deutonymph (839); 353, Top of Seroe Baha So, Spaansche Put, 16.ii.1949: 2 ♂♂ (644, 646) and 1 ♀ (645); Ruins near Seroe Baha So, Spaansche Put, 16.ii.1949: 1 ♀ (273) and 1 deutonymph (276); 560, Spaansche Put near Playa Frankie, 27.ii.1955: 1 ♀ (368); Before Cave of Hato, 5.iv.1949: 1 ♀ (585). **Klein Curaçao** (alc.): 322, S of Lighthouse, 1.x.1948: 3 ♂♂ (584, 637-638) and 2 ♀♀ (582-583). **Bonaire** (alc.): 184, Southwestern Lima, 14.xi.1936: 1 ♂ (1234); 194, Tanki Onima, 13.xi.1936: 4 ♂♂ (1205, 1208-1209, 1211), 3 tritonymphs (1210, 1212, 1572) and 2 deutonymphs (1213, 1569); 305, Northwestern Lima, 5.ix.1948: 1 ♂ (802); 310, Boca Onima, 19.ix.1948: 4 ♂♂ (22-23, 25, 27), 2 ♀♀ (18, 20), 1 tritonymph (33) and 1 deutonymph (32); 313, near Pos Dominica, S of Rincón, 15.ix.1948: 1 protonymph (509) (localities of all types fully described by Wagenaar Hummelinck, 1940: 22-42, 1953: 11-28, 1981: 61, 63, 67-69, 72-73, 77, 79-80).

Diagnosis: *Pachyolpium arubense arubense* differs from *Pachyolpium arubense variabilis* subspec. nov. by having a smaller size and less stouter palpal segments in both sexes (figs. 19-22), and in tritonymphs (fig. 24), deutonymphs (fig. 25), and protonymphs (fig. 26). But there is also a difference in the average number of setae on metatarsus IV in ♂ and ♀ (fig. 21).

Description: ♂. Description based on the lectotype, 2 topotypes and 15 paratypes from Aruba (figs. 4a-b, 5a-c, 7a-e, 8, 17a, 19 partly, 21 partly). The biometric data for the lectotype precede those of others.

Body and legs moderately pigmented, carapace tan-coloured, abdomen and legs yellow, pedipalps orange.

Body L 2.42/2.19-2.27-2.45.

Carapace L 0.67/0.60-0.66-0.72 (16), greatest W 0.62/0.51-0.54-0.58, L/W 1.08/1.09-1.29-1.295 (15); ocular W 0.49/0.43-0.45-0.49 (16); eyes 2 pairs, well developed;



Fig. 5. *Pachyolpium arubense arubense* Beier, paratype ♂, 561, from Aruba (a-c). a. ventral aspect of left pedipalp. b. Extero-lateral aspect of left chela. c. Extero-lateral aspect of tip of left chelal movable finger, showing lamina defensor.

anterior margin with 6/6 setae, posterior margin with 4/4 setae (15, 2 with 6).

Abdomen L 1.74/1.41-1.61-1.74, greatest W 1.05/0.86-0.94-0.105 (14), L/W 1.66/1.56-1.72-1.89 (14); chaetotaxy tergites I-X: 4/4-5.24-6: 8/5-7.24-9: 10/6-8.0-10: 10/8-9.76-12: 10/8-10.65-12: 10/8-10.65-12: 10/9-10.76-12: 10/9-10.94-12: 1T6T1/1T6T1-1T6.59T1-1T8T1: 1T8T1/1T4T1-1T6.14T1-1T8T1 (14); chaetotaxy sternites IV-X: 8/6-7.29-8: 8/8-9.35-11: 8/8-9.82-12: 8/8-9.59-12: 8/8-9.18-12: 8/8-9.0-10: ?/7-8.29-10 (14).

Chelicera (figs. 7a-e): 0.26/0.23-0.25-0.26/0.15/0.12-0.14-0.155, L/W 1.73/1.66-1.76-1.87, and 0.39/0.35-0.38-0.42 × carapace L; movable finger L 0.19/0.17-0.18-0.20; galea L 0.06/0.035-0.04-0.05, terminally with 3 small rami; inner margin of fixed finger with 7/6-7.25-8 teeth, of which most distal one a small denticle, situated on inner margin of apical tooth near tip, continuous ones flat retroconical teeth of which only distal 3 or 4 are sclerotic, each consisting of 2 transversely and very closely placed cusps; movable finger with small conical subapical lobe; apical tooth in both fingers sclerotic and about ash grey in colour; serrula exterior with 21/21-22.47-24 blades; flagellum consisting of 3 spine-like setae: anteriormost one long and pinnate in distal half of anterior margin, continuous two other ones about one-third shorter and usually pinnate in distal quarter of anterior margin.

Chaetotaxy: 5 setae on exterior surface of hand and 1 on movable finger.

Pedipalp (figs. 4a-b, 5a-c): maxilla 0.39/0.35-0.39-0.42 (15)/0.245/0.20-0.23-0.26 (14), L/W 1.59/1.41-1.67-1.85 (14); trochanter ?/0.315-0.34-0.37 (16)/0.21/0.185-0.20-0.22, L/W ?/1.545-1.69-1.80 (16); femur 0.56/0.53-0.58-0.60/0.19/0.18-0.195-0.21, L/W 2.92/2.86-2.96-3.09; patella 0.60/0.59-0.62-0.66/0.24/0.20-0.23-0.25, L/W 2.56/2.55-2.63-2.80; chela without pedicel 1.00/0.91-0.97-1.02/0.38/0.30-0.3-30.36, L/W 2.65/2.63-2.90-3.18; chela with pedicel 1.065/0.98-1.03-1.09/W same, L/W 2.82/2.83-3.105-3.39; hand without pedicel 0.52/0.46-0.48-0.51/?/0.28-0.32-0.35, L/D ?/1.41-1.53-1.73; hand with pedicel 0.59/0.53-0.55-0.58, depth same, L/D ?/1.62-1.75-1.97; movable finger L 0.52/0.48-0.51-0.56, and 1.00/0.95-1.06-1.11 × L hand without pedicel. *sb* on dorsum of palpal finger 0.12/0.12-0.14-0.17 from exterior key point of femoral base; palpal femur L 4.71/3.46-4.19-4.67 × distance from subbasal tactile seta to exterior key point of femoral base. Fixed finger with 40/37-40.0-0.45 (16, 1 with 28) marginal teeth. Movable finger with 42/38-40.125-43 (16, 1 with 29) marginal teeth. Both chelal fingers with marginal teeth ranging from small conical and symmetrical to retroconical, to long and flat teeth with poorly developed cusps at proximal end of row in fixed finger and to wider and lower teeth at proximal end of row in movable finger. Venom apparatuses of fixed and movable chelal fingers (figs. 4b, 5b) distinguished by the presence of a usually difficult to observe third secondary duct, situated between two other secondary ducts and interior margin of finger, and by atrial development just caudad of nodus ramosus.

Well-developed lamina defensor (fig. 5c) arises just posterior to terminal tooth in both chelal fingers.

Fixed finger with *eb*, *esb* and *isb* closely together in one row at base, *ib* subdorsal and about midway level of *esb* and *isb*, *ist* and *est* within basal half of finger, but clearly proximad of *it*; *it* up to level of 17/18th/15/16th-20.74-23th marginal tooth from apical tooth; *et* up to level of 2/3rd/3/4th-5.03-6th marginal tooth from apical tooth; nodus ramosus up to level of 8th/8th-9.29-12/13th marginal tooth from apical tooth; fixed finger L (arbitrarily considered equal to movable finger L) to 5.59/4.72-5.34-5.98 × venom duct L.

Movable finger with *b* about 2 areolar diameters proximal to *sb*, both within about basal fifth of finger; *st* about three-fifth of finger length from tip; *t* up to level of 15/16th/9th-12.88-15th marginal tooth from apical tooth; nodus ramosus up to level of 9th/8/9th-9.94-11/12th marginal tooth from apical tooth; movable finger L 5.10/4.37-5.22-6.39 × venom duct L.

First leg: trochanter (15) 0.16/0.13-0.15-0.16/0.12/0.12-0.13-0.14, L/D 1.26/1.02

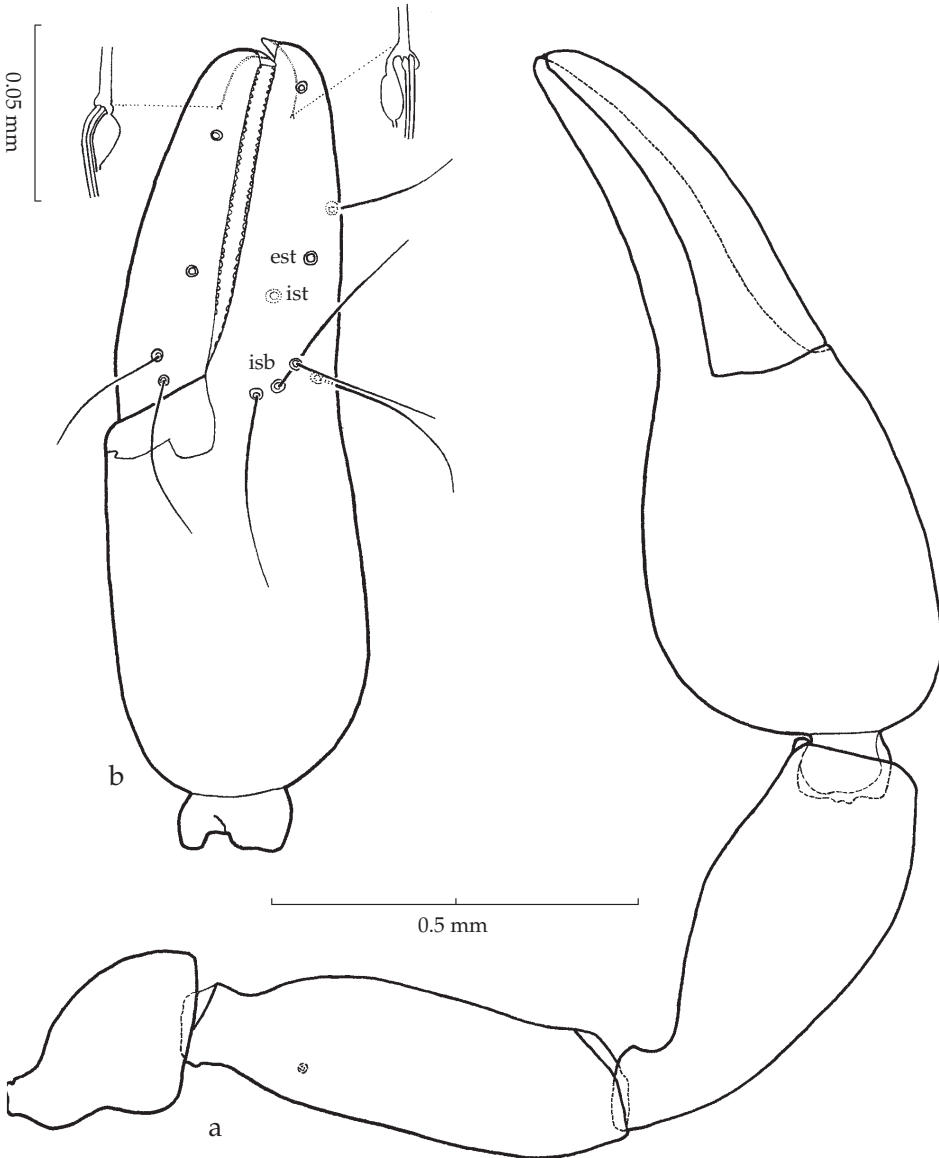


Fig. 6. *Pachyolpium arubense arubense* Beier, allotype ♀ [= neallotype], from Aruba (a-b). a. Ventral aspect of left pedipalp. b. Extero-lateral aspect of left chela.

1.18-1.25; femur 0.27/0.25-0.28-0.29/0.10/0.09-0.10-0.11, L/D 2.66/2.50-2.70-2.88; patella 0.15/0.14-0.15-0.16/0.09/0.09-0.095-0.10, L/D 1.57/1.50-1.60-1.68; femur L 1.83/1.75-1.81-1.88 × patella L; tibia 0.23/0.22-0.23-0.24/0.07/0.07-0.07-0.08, L/D 3.26/2.97-3.27-3.55; tibia L 1.54/1.45-1.525-1.59 × patella L; metatarsus 0.16/0.14-0.15-0.165/0.04/0.05, L/D 3.60/2.79-3.24-3.70; tarsus 0.13/0.11-0.13-0.14/0.03/0.035-0.04-0.04, L/D 3.81/3.09-3.505-3.86; claws well developed but rather small; arolium with stalk greatly elongated and cup almost entirely beyond tip of claws.

Fourth leg (fig. 17a): trochanter (14) 0.25/0.21-0.23-0.26/0.14/0.135-0.155-0.19, L/D 1.75/1.20-1.53-1.75; femur (15) 0.19/0.19-0.20-0.21/0.12/0.11-0.13-0.14, L/D 1.57/1.46-1.57-1.78; patella (16) 0.50/0.48-0.51-0.54/0.26/0.26-0.29-0.31, L/D 1.95/1.57-1.785-1.92; femur + patella (15) 0.58/0.57-0.60-0.64/0.26/0.26-0.29-0.31, L/D 2.26/1.86-2.09-2.25; tibia (16) 0.43/0.41-0.435-0.48/0.12/0.12-0.13-0.14, L/D 3.67/3.07-3.38-3.66; metatarsus (16) 0.23/0.21-0.22-0.24/0.07/0.07-0.07-0.08, L/D 3.29/2.96-3.06-3.19; tarsus (16) 0.18/0.16-0.18-0.19/0.05/0.045-0.05-0.06, L/D 3.80/3.18-3.55-3.83. Tarsal claws and arolium similar to those in first leg but much stouter.

Chaetotaxy of metatarsus of fourth leg: exterior lateral: T+2/T+2 (T close to proximal end), dorsal: 3/3, interior lateral: 3×2/3×2, ventral: 3/3.

Chaetotaxy of ♂ genital area (fig. 8): (1-0-1)/1-0-1 on anterior operculum (14), 1 with (2-0-2); (2-0-2)/(2-0-2) on anterior margin of anterior lip of aperture (15); (4-0-5)/(3-0-5) and (4-0-4)-(4.44-0-4.69)-(5-0-5) on posterior margin of anterior lip of aperture (16); (2-0-2)/(2-0-2)-(2.0-0-2.19)-(2-0-3) on posterior margin of posterior lip of aperture (16); (3-0-3)/(2-0-3) and 3-0-2-(3.0-0-3.125)-(4-0-4) on posterior operculum (16).

Female. Description based on new allotype [= neallotype] (560) and 16 paratypes from Aruba (figs 6a-b, 7f, g, 18a, 17, 20 partly, 21 partly).

♀ similar to ♂, except for different genitalia and on average larger body, slightly stouter segments of pedipalps, and chelicerae with longer galea.

Body L 2.36-2.555-2.84.

Carapace: 0.64-0.70-0.76/greatest W 0.55-0.59-0.66 (13), L/W 1.07-1.17-1.26 (13); ocular W 0.41-0.47-0.54 (15); eyes 2 pairs, well developed, anterior margin of carapace with 6 setae, posterior margin of carapace with 4-4.81-6 setae (16).

Abdomen: 1.72-1.86-1.99, greatest W 0.895-1.065-1.21 (16), L/W 1.59-1.76-1.99 (16); chaetotaxy of tergites I-X: 4-5.59-6: 6-7.18-8: 8-8.59-10: 8-10.59-12: 10-11.53-12: 10-11.65-12: 10-11.88-14: 9-11.71-14: 1T4T1-1T6.4T1-1T9T1 (15): 1T4T1-1T6.4T1-1T7T1 (15); chaetotaxy of sternites IV-X: 6-7.87-12 (15): 8-10.69-13 (16): 8-10.5-12 (16): 8-9.79-12 (14): 8-9.69-12 (13): 8-9.46-10 (13): 8-8.5-9 (4).

Chelicera (fig. 7f): 0.26-0.28-0.29/0.14-0.16-0.17, L/W 1.65-1.74-1.87, and 0.38-0.40-0.42 × carapace L; apical tooth in both fingers sclerotic and about ash grey in colour; movable finger L 0.19-0.20-0.22; galea L 0.05-0.06-0.07, terminally with 3 curved rami; distal half of inner margin of fixed finger with 7-8.08-9 teeth (13), of which distal one a small denticle, situated on inner margin of apical tooth near tip, continuous ones flat retroconical teeth, distal 3 sclerotic and each of these teeth of 2 transversely and very closely placed cusps; movable finger with small conical subapical lobe; serrula exterior with 22-22.6-24 blades; flagellum of 3 spine-like setae: anteriormost one longest and pinnate in distal half of anterior margin, continuous

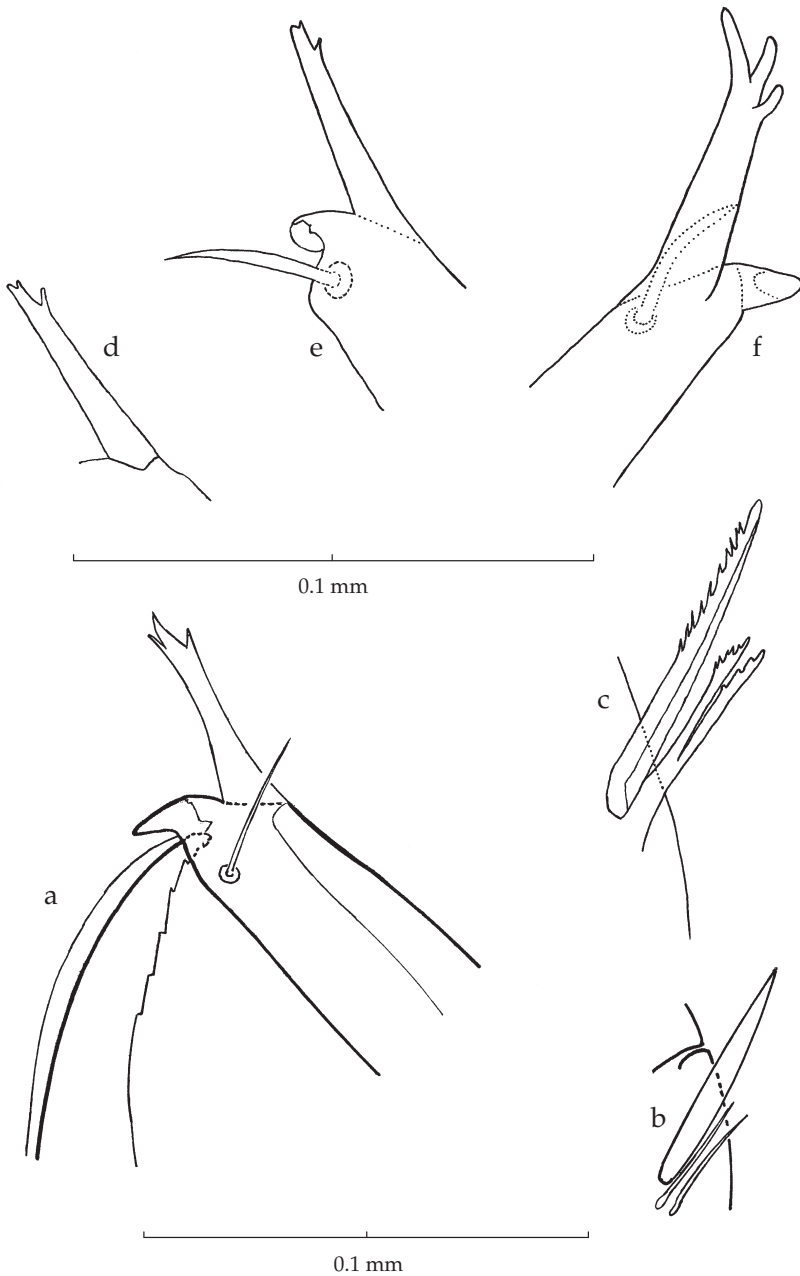


Fig. 7. *Pachyolpium arubense arubense* Beier, lectotype ♂ (= Beier's ♂ type specimen) (a-b), paratype ♂, 561 (c-e) and allotype ♀ (= neallotype), 560 (f) from Aruba. a. Outer aspect of fixed and movable finger + galea of right chelicera. b. Outer aspect of flagellum of right chelicera (owing to obscure perceptibility pinnation along anterior margin of spine-like setae omitted). c. Inner aspect of flagellum of right chelicera. d. Inner aspect of galea of left chelicera. e. Inner aspect of galea of left chelicera (tooth broken off). f. Inner aspect of galea of right chelicera.

ones respectively 2/7th and 3/7th shorter, both with a few denticulations in distal quarter of anterior margin.

Chaetotaxy: 5 setae on exterior surface of hand and 1 on movable finger.

Pedipalp (figs. 6a-b): maxilla (15) 0.39-0.43-0.44/0.21-0.24-0.27, L/W 1.55-1.84-2.11; trochanter 0.32-0.36-0.39 15)/0.19-0.21-0.22, L/W 1.60-1.72-1.79 (15); femur 0.56-0.60-0.66/0.18-0.20-0.21, L/W 2.94-3.04-3.185; patella 0.59-0.63-0.68/0.23-0.25-0.27, L/W 2.43-2.54-2.69; chela without pedicel 0.99-1.04-1.08/0.36-0.39-0.415, L/W 2.53-2.69-2.85; chela with pedicel 1.07-1.12-1.19/W same, L/W 2.73-2.87-3.07; hand without pedicel 0.49-0.53-0.58/0.34-0.37-0.42 (16), L/D 1.31-1.41-1.51 (16); hand with pedicel 0.57-0.61-0.67/D same (16), L/D 1.51-1.63-1.76 (16); movable finger L 0.53-0.56-0.59, and 0.98-1.05-1.10 × L hand without pedicel.

sb on dorsum palpal femur 0.12-0.14-0.17 from exterior key point of femoral base; L palpal femur 3.62-4.20-5.01 × distance from *sb* to exterior key point of femoral base.

Fixed finger with 40-41.4-43 marginal teeth. Movable finger same (16). Shape marginal teeth of chelal fingers like that of ♂. Position of tactile setae and nodi ramosi in both chelal fingers similar to that in ♂.

Fixed finger *et* up to level of 3/4th-4.85-6/7th marginal tooth from apical tooth; *it* up to level of 19th-21.59-23/24th marginal tooth from apical tooth; nodus ramosus up to level of 7/8th-8.88-10th marginal tooth from apical tooth; fixed finger L (arbitrarily considered equal to movable finger L), to 5.28-5.66-6.05 × venom duct L.

Movable finger *t* up to level of 12/13th-13.82-15th marginal tooth from apical tooth; nodus ramosus up to level of 8/9-9.82-12th marginal tooth from apical tooth; movable finger L 4.99-5.38-5.88 × venom duct L.

First leg: trochanter 0.14-0.16-0.18 (15)/0.125-0.13-0.14 (16), L/D 1.13-1.23-1.30 (14); femur 0.27-0.29-0.315/0.10-0.105-0.11, L/D 2.675-2.77-2.86; patella 0.155-0.16-0.17/0.09-0.10-0.11, L/D 1.59-1.66-1.77; femur L 1.72-1.78-1.83 × patella L; tibia 0.23-0.25-0.27/0.07-0.07-0.08, L/D 3.01-3.35-3.55; tibia L 1.43-1.51-1.56 × patella L; metatarsus 0.15-0.16-0.175/0.05; L/D 2.98-3.24-3.47; tarsus 0.12-0.135-0.15/0.04, L/D 3.07-3.47-3.80; tarsal claws and arolium as in ♂.

Fourth leg (fig. 18a): trochanter 0.23-0.26-0.28 (11)/0.14-0.16-0.18 (15), L/D 1.485-1.62-1.83 (11); femur 0.19-0.21-0.22/0.12-0.13-0.14, L/D 1.52-1.63-1.74; patella 0.50-0.525-0.56/0.25-0.27-0.285, L/D 1.93-1.965-2.07; femur + patella (16) 0.58-0.62-0.65/0.25-0.26-0.285, L/D 2.27-2.31-2.46; tibia 0.41-0.44-0.48/0.11-0.12-0.14, L/D 3.38-3.58-3.92 (16); metatarsus 0.21-0.23-0.26/0.07-0.07-0.08, L/D 3.03-3.21-3.55; tarsus (16) 0.175-0.19-0.205/0.05-0.05-0.06, L/D 3.46-3.58-3.85; tarsal claws and arolium as in ♂.

Chaetotaxy of metatarsus of fourth leg: exterior lateral: T+2 (T close to proximal end), 1 with 3; dorsal: 3 (16), 1 with 4; interior lateral: 3 × 2 (16), 1 with 1 × 2 (distal) + 4×1; ventral: 3 (15), 2 with 2.

Chaetotaxy and internal structure of ♀ genital area (fig. 19): anterior operculum with 6 (9), 1 with 5, 1 with 7 setae. Posterior operculum (12) with 6 setae. Cribriform plates often barely perceptible, apparently are present: 1 large cluster of medial plates and 2 smaller lateral plates.

Tritonymph. Description based on 16 specimens from Aruba and 16 specimens from Curaçao (figs. 22c, 23c, 24 partly).

Body L (31) 1.69-1.92-2.10.

Chelicera: serrula exterior with 18-20.0-21 blades; flagellum of 3 spine-like setae: anteriormost one long, pinnate in distal quarter of anterior margin, continuous ones about 1/3 shorter.

Pedipalp (fig. 22c, chela): trochanter 0.255-0.27-0.29 (31)/0.15-0.16-0.18, L/W 1.60-1.69-1.78 (31); femur 0.39-0.43-0.46/0.14-0.15-0.16, L/W ratio 2.73-2.84-3.01; patella 0.40-0.44-0.47/0.18-0.19-0.21, L/W 2.15-2.275-2.385; chela without pedicel 0.71-0.75-0.80/0.23-0.28-0.35, L/W 2.52-2.65-2.87; chela with pedicel (31) 0.76-0.81-0.86/W same, L/W 2.69-2.88-3.07; hand without pedicel (31) 0.345-0.37-0.39/0.25-0.28-0.31, L/D 1.21-1.28-1.45; hand with pedicel (31) 0.40-0.425-0.45/D same, L/D 1.39-1.54-1.68; movable finger L 0.315-0.40-50.43, 0.89-1.09-1.16 × L hand without pedicel. *sb* on dorsum palpal femur 0.10-0.11-0.15 from exterior key point of femoral base; palpal femur L 2.95-3.81-4.45 × distance from *sb* to exterior key point of femoral base.

Fixed finger (31) with 31-33.87-38 marginal teeth; *et* up to level of 4/5th-5.94-6/7th marginal tooth from apical tooth; *it* (31) up to level of 18th-20.05-22nd marginal tooth from apical tooth; *est* (31) up to level of 21/22th-25.02-28/29th marginal tooth from apical tooth; *ist* (31) up to level of 25/26th-28.60-31st marginal tooth from apical tooth; *isb* absent; nodus ramosus up to level of 7th-8.44-10th marginal tooth from apical tooth.

Movable finger with 29-33.25-36 marginal teeth; *t* up to level of 12th-14.48-17/18th marginal tooth from apical tooth; *st* up to level of 25/26th-28.31-32nd marginal tooth from apical tooth; *b* absent; nodus ramosus up to level of 7th-8.95-10th marginal tooth from apical tooth.

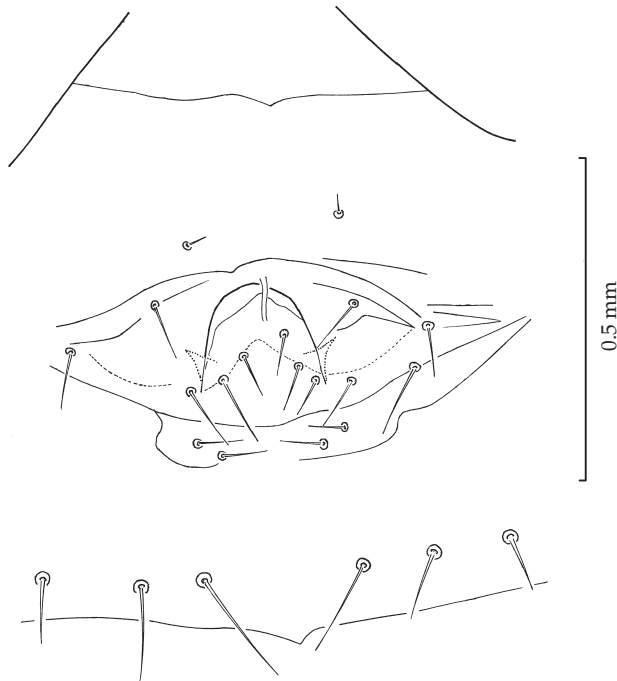


Fig. 8. *Pachyolpium arubense arubense* Beier, paratype ♂, 189, from Aruba. Chaetotaxy of genital complex.

First leg: femur 0.18-0.21-0.25/0.08-0.085-0.12, L/D 1.99-2.44-2.68; patella 0.11-0.12-0.13/0.08-0.08-0.09, L/D 1.34-1.53-1.62; femur L 1.57-1.705-1.82 × patella L.

Fourth leg: femur + patella 0.39-0.46-0.49/0.19-0.21-0.24, L/D 1.875-2.175-2.39; metatarsus 0.15-0.17-0.18/0.05-0.06-0.07, L/D 2.46-2.74-3.0.

Chaetotaxy of metatarsus of fourth leg (fig. 23c): exterior lateral: T+1 (28) and T+1+1 (4) (T close to proximal end); dorsal: 2 (32); interior lateral: 2 × 2 (31) and 1+(1 × 2) (1); ventral: 2 (32).

Deutonymph. Description based on 2 specimens from Aruba and 17 specimens from Curaçao (figs. 22b, 23b, 25 partly).

Body L 1.375-1.49-1.63.

Chelicera: serrula exterior with 16-16.9-18 blades; flagellum of 3 spine-like setae: anteriormost one long, about distal half of anterior margin pinnate, continuous ones about half as long.

Pedipalp (fig. 22b, chela): trochanter 0.19-0.21-0.23 (17)/0.11-0.12-0.13 W, L/W

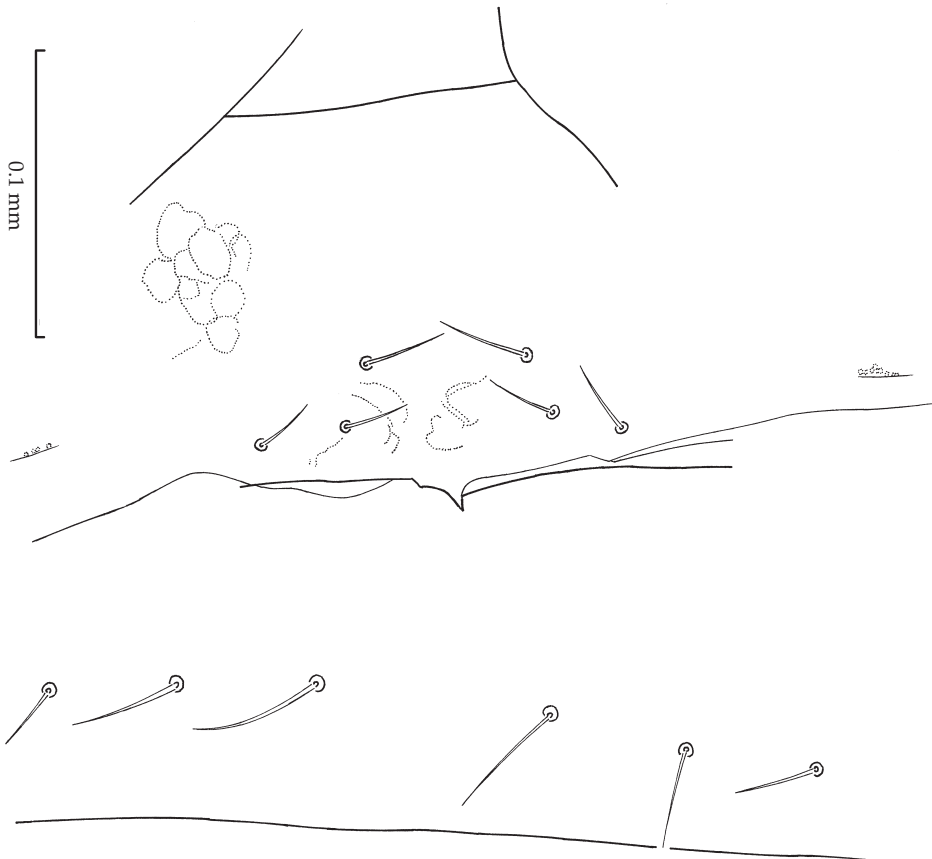


Fig. 9. *Pachyolpium arubense arubense* Beier, paratype ♀, 198, from Aruba. Chaetotaxy of genital area, with reference to cribriform plates (moved).

1.68-1.78-1.95 (17); femur 0.29-0.32-0.34/0.10-0.11-0.12 (18), L/W 2.66-2.81-3.055 (18); patella 0.28-0.31-0.34/0.13-0.14-0.15 (18), L/W 2.1-2.23-2.35 (18); chela without pedicel: 0.51-0.55-0.59/0.18-0.20-0.22 (18), L/W 2.50-2.77-2.92 (18); chela with pedicel: 0.55-0.595-0.64/W same (18), L/W 2.68-2.99-3.19 (18); hand without pedicel 0.23-0.26-0.28/0.19-0.20-0.23 (17), L/D 1.16-1.26-1.38 (17); hand with pedicel 0.27-0.30-0.32/D same (17), L/D 1.38-1.46-1.57 (17); movable finger L 0.27-0.31-0.34, and 1.10-1.20-1.34 × L hand without pedicel. *sb* on dorsum palpal femur 0.07-0.09-0.12 from exterior key point of femoral base; palpal femur L 2.84-3.55-4.02 × distance from *sb* to exterior key point of femoral base.

Fixed finger with 26-28.37-31 marginal teeth; *et* up to level of 6/7th-7.87-9/10th marginal tooth from apical tooth; *it* up to level of 18/19th-19.9-22/23th marginal tooth from apical tooth; *est* up to level of 22nd-24.0-26th marginal tooth from apical tooth;

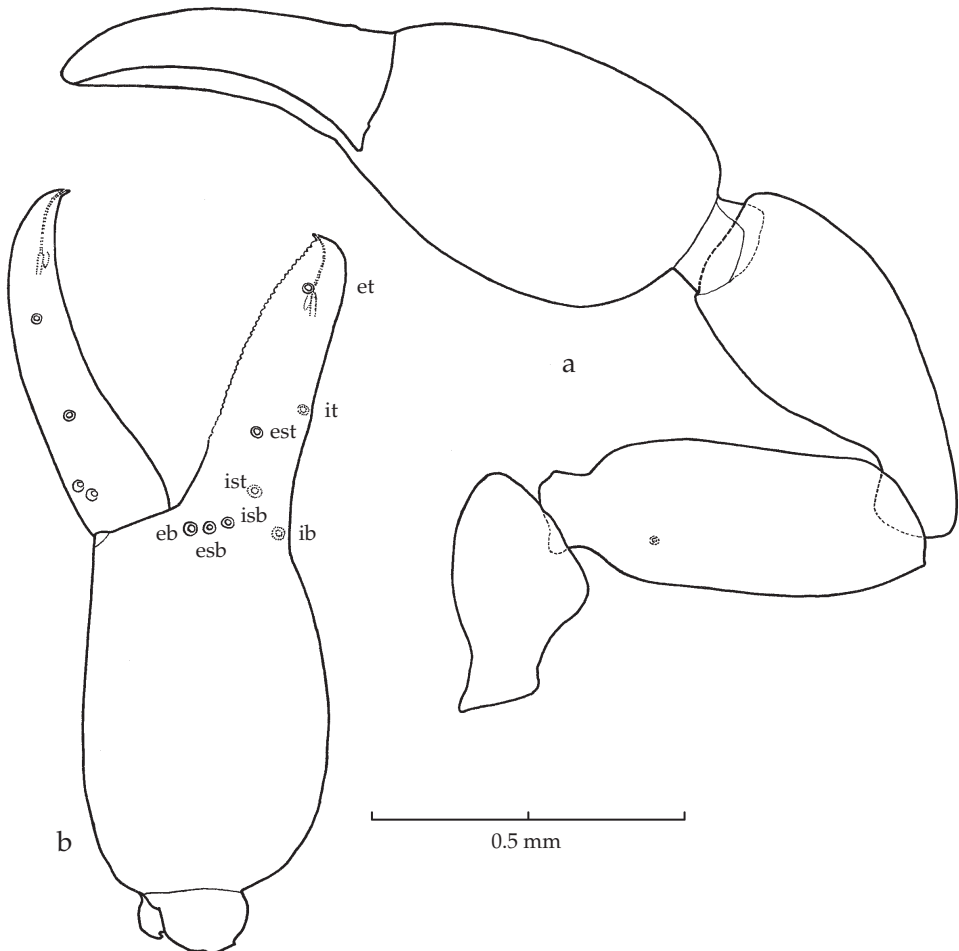


Fig. 10. *Pachyolpium arubense variabilis* subsp. nov., holotype ♂, 849, from Aruba (a-b). a. Ventral aspect of left pedipalp. b. Extero-lateral aspect of left pedipalp.

ist up to level of 24th-25.605-27/28th marginal tooth from apical tooth; *esb* and *isb* absent; nodus ramosus up to level of 8th-8.58-10th marginal tooth from apical tooth.

Movable finger with 22-25.95-29 marginal teeth; *st* up to level of 14th-16.63-22th marginal tooth from apical tooth; *t* and *b* absent; nodus ramosus up to level of 8th-8.42-9/10th marginal tooth from apical tooth.

First leg: femur 0.14-0.16-0.17/0.06-0.07-0.08, L/D 2.0-2.34-2.58; patella 0.08-0.09-

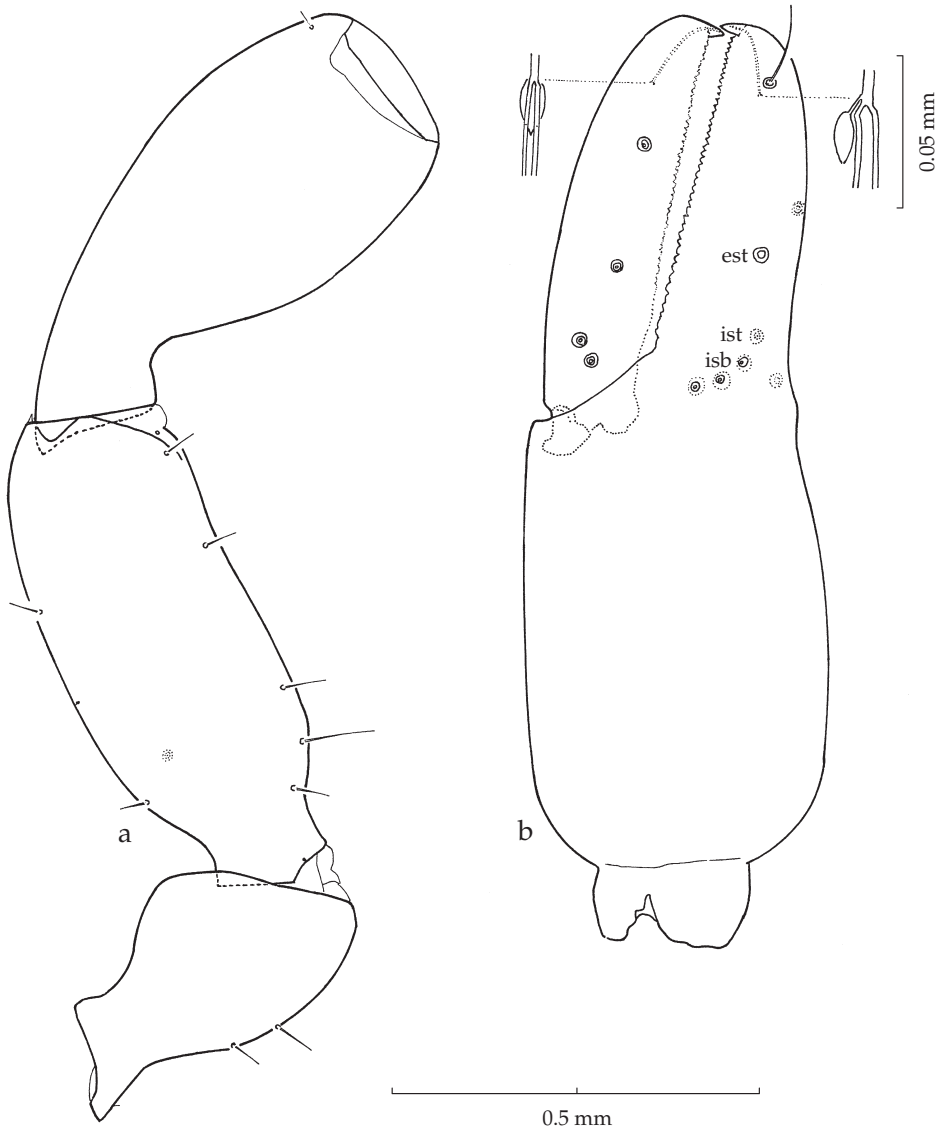


Fig. 11. *Pachyolpium arubense variabilis* subspec. nov., allotype ♀ (= Beier's ♀ type specimen) from Aruba (a-b). a. Ventral aspect of trochanter, femur and patella of right pedipalp. b. Extero-lateral aspect of left chela.

0.11/0.06-0.065-0.08, L/D ratio 1.22-1.42-1.68; femur L 1.61-1.70-1.87 × patella L.

Fourth leg: femur + patella 0.27-0.345-0.37/0.13-0.15-0.17, L/D 2.05-2.30-2.58; metatarsus 0.11-0.13-0.14/0.04-0.05-0.06, L/D 2.37-2.575-2.86.

Chaetotaxy of metatarsus of fourth leg (fig. 23b): exterior lateral: T+1 (tactile seta T close to proximal end), dorsal: 1, interior lateral: 2 × 2, ventral: 1.

Protonymph. Description based on 2 specimens from Curaçao (figs. 22a, 23a, 26 partly). Ratios and counts expressed as ranges.

Body L 0.93/1.00.

Chelicera: serrula exterior with 15/15 blades; flagellum of 3 spine-like setae, anteriormost longest: about 1.6/1.7 as long as continuous ones.

Pedipalp (fig. 22a, chela): trochanter 0.16/0.16/0.09/0.09, L/W 1.68/1.70; femur 0.23/0.24/0.08/0.085, L/W 1.68/2.81; patella 0.21/0.22/0.10/0.10, L/W 2.10/2.14; chela without pedicel 0.41/0.43/0.13/0.13, L/W 3.12/3.25; chela with pedicel:

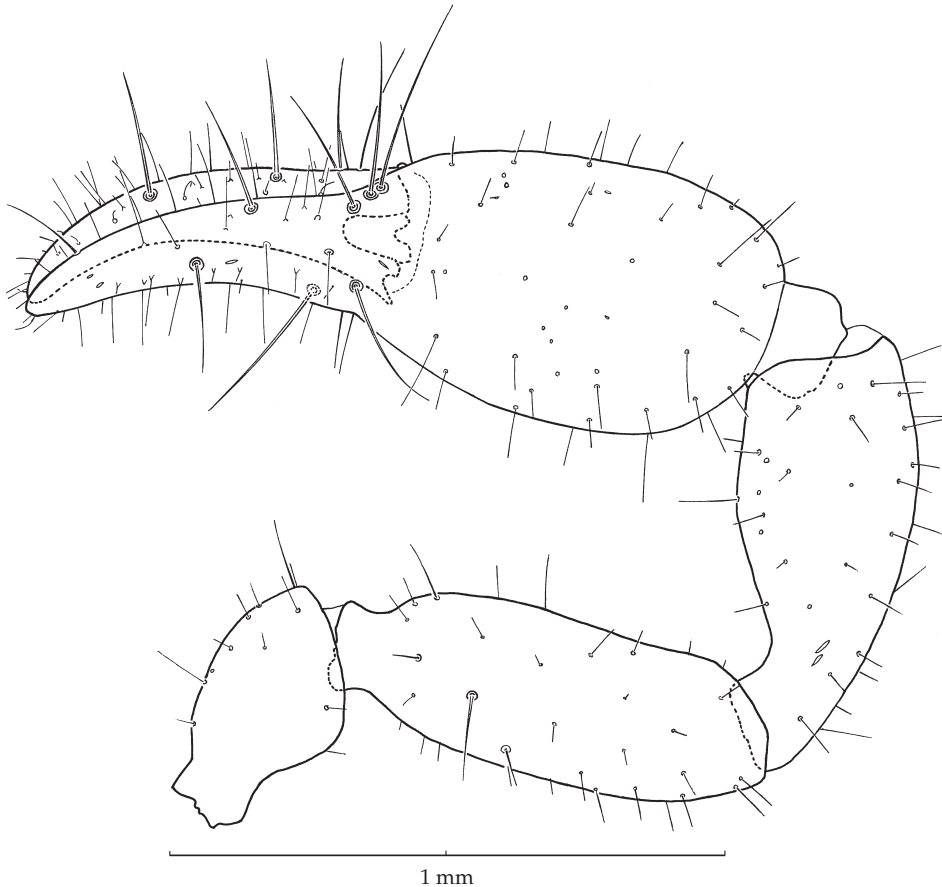


Fig. 12. *Pachyolpium arubense variabilis* subsp. nov., paratype ♀, 555, from Aruba. Dorsal aspect of right pedipalp.

0.435/0.455/W same, L/W 3.32/3.43; hand without pedicel 0.19/0.19/0.14/-0.15, L/D 1.29/1.32; hand with pedicel 0.21/0.22/D same, L/D 1.48/1.52; movable finger L 0.22/0.23, and 1.20/1.22 × L hand without pedicel. *sb* on dorsum palpal femur 0.07/0.07 from exterior key point of femoral base; palpal femur L 3.19/3.20 × distance from *sb* to exterior key point of femoral base.

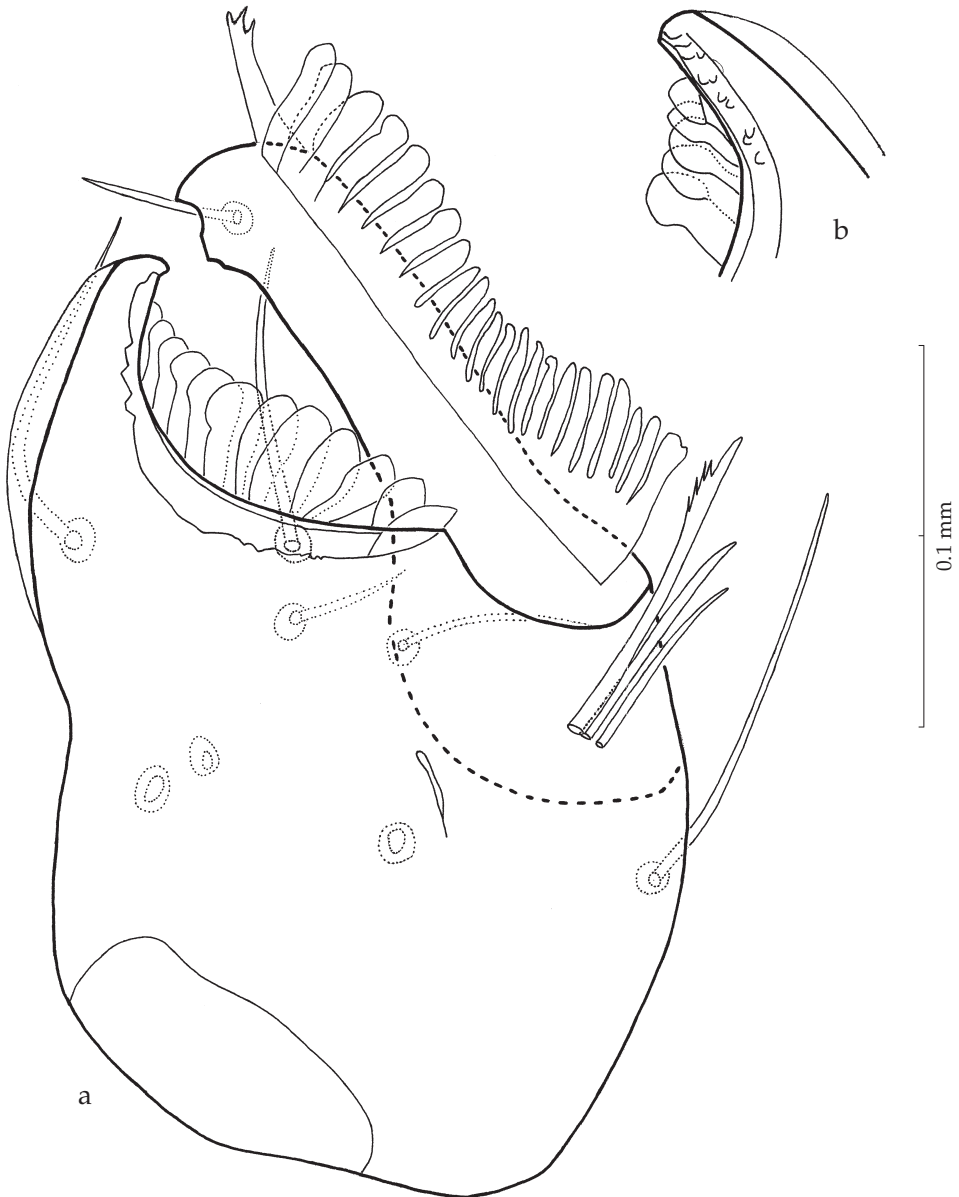


Fig. 13. *Pachyolpium arubense variabilis* subspec. nov., paratype ♂, 330, from Bonaire (a-b). a. Inner aspect of left chelicera. b. Outer aspect of tip of fixed finger of left chelicera.

Fixed finger with 20/21 marginal teeth, ranging from small conical teeth at distal end to long and very flat teeth at proximal end of row; *est* up to level of 12th/12/13th marginal tooth from apical tooth; *ist* and *eb* near base of finger; *et*, *it*, *esb*, *isb* and *ib* absent; nodus ramosus up to level of 7/8th/8/9th marginal tooth from apical tooth.

Movable finger with 16/18 marginal teeth in distal 1/2-2/3 of finger, shape same

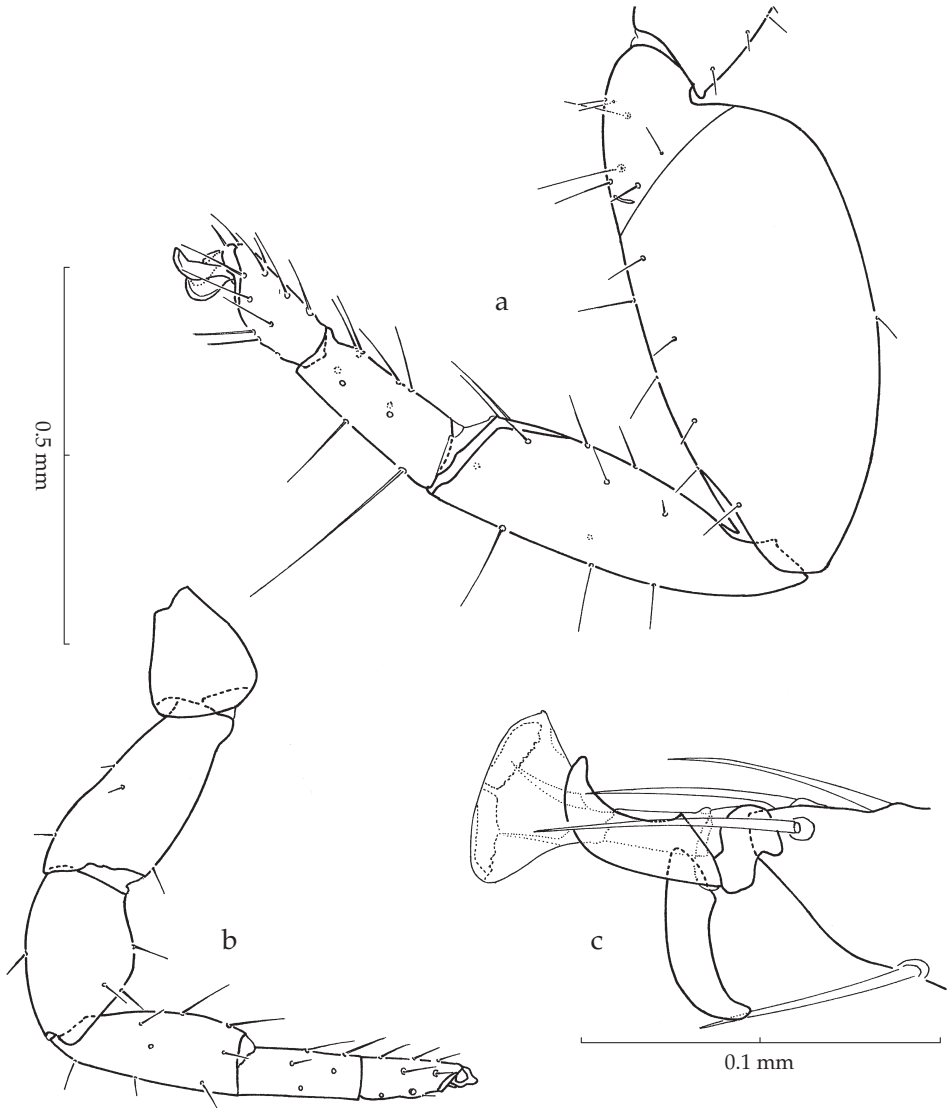


Fig. 14. *Pachyolpium arubense variabilis* subsp. nov., allotype ♀ (= Beier's ♀ type specimen) from Aruba (a-c). a. Anterior aspect of left leg IV (arolium lost). b. Anterior aspect of right leg I (arolium and claws lost). c. Anterior aspect of praetarsus of left leg II, showing unguitraction plate, claws and arolium.

as in fixed finger; "t" up to level of 15th/15/16th marginal tooth from apical tooth; "st", "sb" and "b" and *b* absent; nodus ramosus up to level of 6/7th/7th marginal tooth from apical tooth.

First leg femur 0.12/0.12/0.05/0.55, L/D 2.17/2.2; patella 0.07/0.07/0.05/0.05, L/D 1.345/1.35; femur L 1.57/1.65 × patella L.

Fourth leg: femur + patella 0.25/0.26/0.10/0.105, L/D 2.44/2.48; metatarsus 0.105/0.11/0.04/0.04, L/D 2.50/2.56.

Chaetotaxy of metatarsus of fourth leg (fig. 23a): exterior lateral: T+1/T+1 (T close to proximal end), dorsal 1/1, interior lateral: 2/2, ventral: 1/1.

Pachyolpium arubense variabilis subspec. nov.
(figs. 10-16, 17-26 partly)

Material.— Holotype: ♂ (849), **Aruba**: 246a, Rooi Prins, near spring, 26.viii.1949. Altitude: 20 m; chiefly chists; some shrubs and small trees; under stones with some leaf-decay of *Bontia daphnoides*. Allotype: (= Beier's type ♀ = paralectotype ♀). **Aruba**: between Seroe Macuarina and Seroe Wara



Fig. 15. *Pachyolpium arubense variabilis* subspec. nov., paratype ♂, 556, from Aruba. Chaetotaxy of genital complex.

Wara (near Station 896), 26.vi.1930, under stones, H.J. Mac Gillavry leg. Paratypes: **Aruba**: 246a, Rooi Prins, near spring, 26.viii.1949: 2 ♂♂ (843, 845); 253, Terrace-border near Boca Grandi, N of Culebra, 5.i.1937: 1 tritonymph (1233); 260A, Rooi near Baranca Alto, 29.xii.1936: 2 ♂♂ (136-137); 262B, W of Spaansch Lagoen, 1.i.1949: 1 deutonymph (181); 268B, Southern slope of Hooiberg, 5.xii.1936: 1 tritonymph (1202), 1 deutonymph (1366) and 1 protonymph (1367); 278A, Boekoeti (Bucuti), island, S of Oranjestad, 17.i.1949: 2 ♂♂ (556, 558), 4 ♀♀ (214, 219, 554-555), 1 tritonymph (557) and 1 deutonymph (562); 359, Hofje Fonteijn, 30.xii.1948: 4 tritonymphs (372, 374, 381, 383). **Curaçao**: 222a, Western part of Koenoeke Abau, 20.viii.1948: 4 ♂♂ (776-779) and 1 ♀ (775); 328, Northern escarpment of Tafelberg, S. Barbara, 10.iv.1949: 1 tritonymph (642); 349, Northern slope of Seroe Gracia, Knip, 17.viii.1948: 1 protonymph (595); 351, Rooi Beroe, near Pos Sjimarrón, Savonet, 23.xii.1948: 2 ♂♂ (830, 835); 1045, Salinja Santa Maria, NW corner, 29.viii.1949: 1 tritonymph (829). **Bonaire** (alc.): 180a, Cay, entrance of Lac, 1.ix.1948: 1 ♂ (636); 190, Escarpment near Fonteijn, 25.iii.1937: 1 ♂ (1197); 190a, same, 11.ix.1948: 1 ♂ (770), 2 ♀♀ (762-763), 2 tritonymphs (764-769) and 1 deutonymph (768); 191, Fonteijn, ruins, 30.iii.1937: 2 ♂♂ (1241-1242); 192, Fonteijn, tunnel of spring, 31.xi.1936: 3 ♂♂ (93-95) and 1 ♀ (96); 193, Fonteijn, Hofje, 30.iii.1937: 1 ♂ (1243); 193A, same, 11.ix.1948: 5 ♂♂ (330-331, 337, 342, 352), 1 ♀ (340), 8 tritonymphs (328, 332, 336, 344, 347, 349, 351, 360), 3 deutonymphs (348, 350, 363) and 1 protonymph

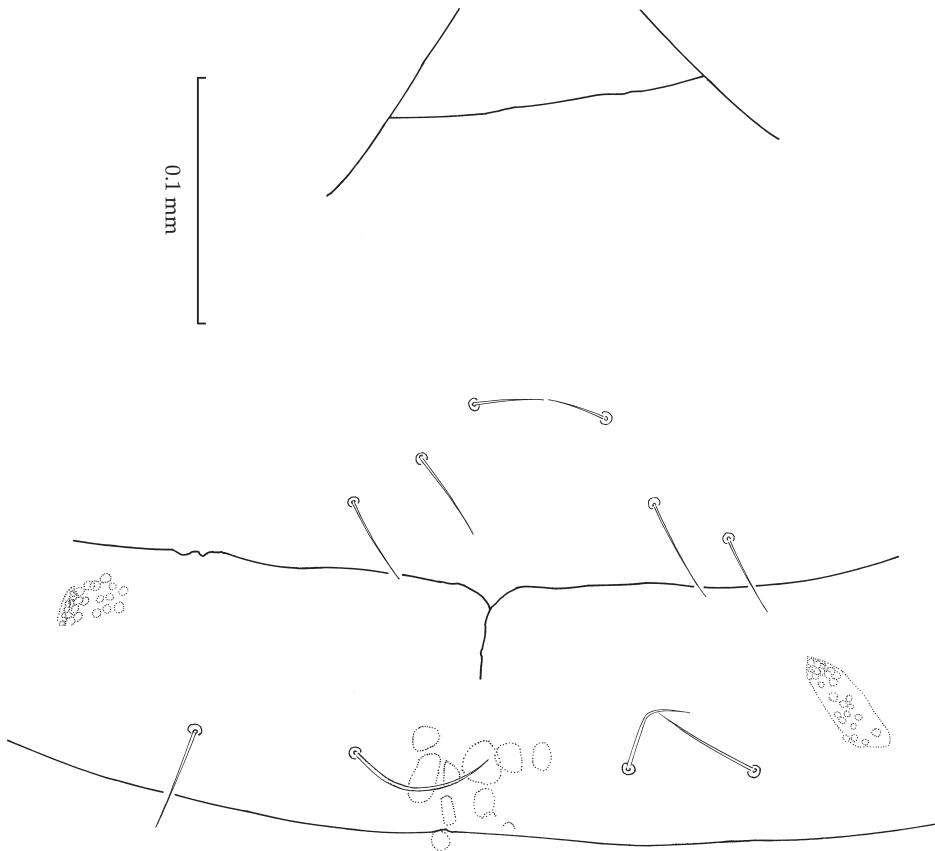


Fig. 16. *Pachyolpium arubense variabilis* subsp. nov., paratype ♀, 219, from Aruba. Chaetotaxy of genital area, with reference to cribriform plates.

(365); 194, Tanki Onima, 13.xi.1936: 2 ♂♂ (1206-1207) and 1 protonymph (1214); 198, Pos Bronswinkel, 27.iii.1937: 3 ♂♂ (78, 85-86) and 5 ♀♀ (79-81, 83-84); 304, Punt Vierkant, Sabana, 5.ix.1948: 3 ♂♂ (789-791), 3 tritonymphs (788, 792, 794) and 1 deutonymph (796); 310, Boca Onima, 19.ix.1948: 3 ♂♂ (19, 21, 24) and 1 ♀ (17) (localities of all types fully described by Wagenaar Hummelinck, 1940: 28-30, 36-37, 39-40; 1953: 11-19, 72; 1981: 60-61, 63, 68, 72-73, 79-80).

Diagnosis: *Pachyolpium arubense variabilis* subsp. nov. can easily be separated from *Pachyolpium arubense arubense* by its larger size and considerably stouter palpal and pedal segments in both sexes (figs. 19-20), as well as in tritonymph (fig. 24), deutonymph (fig. 25) and protonymph (fig. 26). In addition there is a demonstrable difference in the average number of setae on metatarsus IV in ♂ and ♀ (fig. 21).

Description: ♂. Description based on the holotype and 6 paratypes from Aruba (figs. 10a-b, 13a-b, 15, 17b, 19 partly, 21 partly).

Body and legs moderately pigmented, carapace rust red, abdomen and legs pale yellow, pedipalps reddish orange.

Body L 2.41-2.58-2.78.

Carapace: 0.70-0.73-0.83/greatest W 0.61-0.67-0.73, ocular width 0.48-0.50-0.52, L/W 1.0-1.16-1.24; eyes: 2 pairs, well developed; anterior margin with 6 setae (6), posterior margin with 4 setae.

Abdomen: 1.71-1.83-1.97/greatest W 0.96-1.02-1.06 (6), L/W 1.66-1.82-1.90; chaetotaxy tergites I-X: 4: 4-4.29-6: 6-7.71-8: 8: 8-8.57-10: 8-9.43-10: 8-9.57-10: 8-9.57-12: 1T6T1-1T6.29T1-1T8T1: 1T4T1-1T5.71T1-1T6T1; chaetotaxy sternites IV-X: 4-6.0-10: 8-9.57-12: 8-9.43-10: 8-9.71-11: 8-9.29-10: 7-8.29-10: 6-7.5-10 (6).

Chelicera (figs. 13a-b): 0.27-0.27-0.28/0.17-0.17-0.18, L/W 1.49-1.57-1.65, and 0.33-0.37-0.385 × carapace L; movable finger L 0.17-0.19-0.20; galea: L 0.04-0.04-0.05, with 2

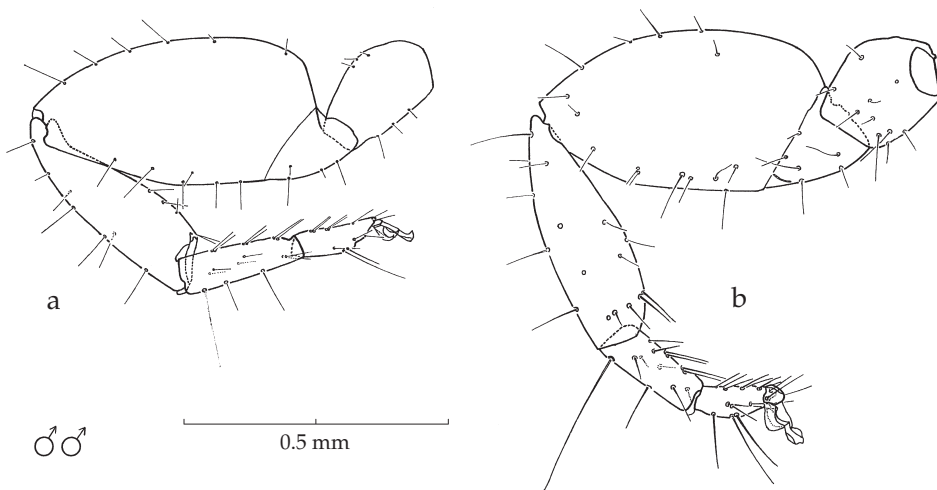


Fig. 17. *Pachyolpium arubense arubense* Beier, paratype ♂, 99, from Aruba (a). a. Posterior aspect of left leg IV. *Pachyolpium arubense variabilis* subsp. nov., paratype ♂, 330, from Bonaire (b). b. Anterior aspect of right leg IV.

short terminal rami and 1 small lateral ramus near distal one-fifth of main stalk; inner margin of fixed finger with 6-6.8-7 teeth (5) of which most distal one is a small denticle, situated on inner margin of apical tooth near tip; continuous ones flat retroconical teeth of which only distal 3-5 are sclerotic, each consisting of 2 transversely and very closed placed cusps; movable finger with distinct conical subapical lobe; apical tooth in both fingers sclerotic and about ash grey in colour; serrula exterior with 21-21.86-24 blades; serrula interior with about 12 blades (1), forming a velum by basal fusion (unfortunate-

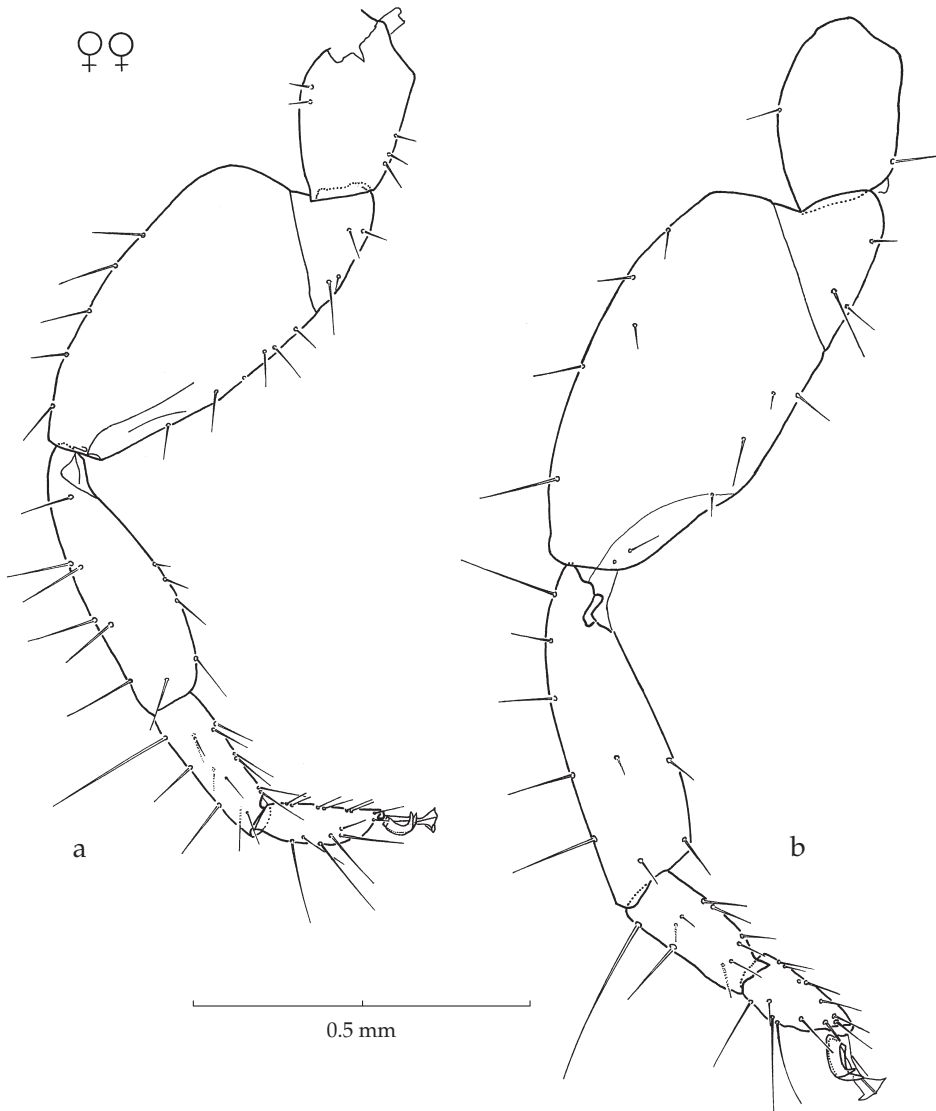


Fig. 18. *Pachyolpium arubense arubense* Beier, paratype ♀, 198, from Aruba (a). a. Posterior aspect of left leg IV. *Pachyolpium arubense variabilis* subsp. nov., paratype ♀, 219, from Aruba (b). b. Posterior aspect of left leg IV.

ly an accurate count was not possible); flagellum of 3 spine-like setae: anteriormost one long and pinnate in distal quarter of anterior margin, continuous 2 other ones about 1/3 shorter, of which first one with a few small spiny denticles in distal quarter of anterior margin. Chaetotaxy: 5 setae on exterior surface of hand and 1 on movable finger.

Pedipalp (figs. 10a-b): maxilla 0.39-0.43-0.47 (6)/0.23-0.25-0.27, L/W 1.59-1.71-1.89 (6); trochanter: 0.35-0.38-0.40/0.21-0.22-0.23, L/W 1.54-1.74-1.88; femur 0.59-0.61-0.64/0.23-0.24-0.25, L/W 2.46-2.54-2.65; patella 0.60-0.63-0.67/0.26-0.28-0.29, L/W 2.23-2.30-2.42; chela without pedicel 1.03-1.07-1.11/0.35-0.37-0.40 (6), L/W 2.70-2.83-2.96; chela with pedicel 1.08-1.14-1.18/W same, L/D 2.78-2.99-3.135; hand without pedicel 0.54-0.58-0.62/0.33-0.38-0.40, L/D 1.39-1.54-1.72; hand with pedicel 0.61-0.66-0.72 (6)/D same, L/D 1.67-1.76-1.86 (6); movable finger L 0.49-0.54-0.59, and 0.84-

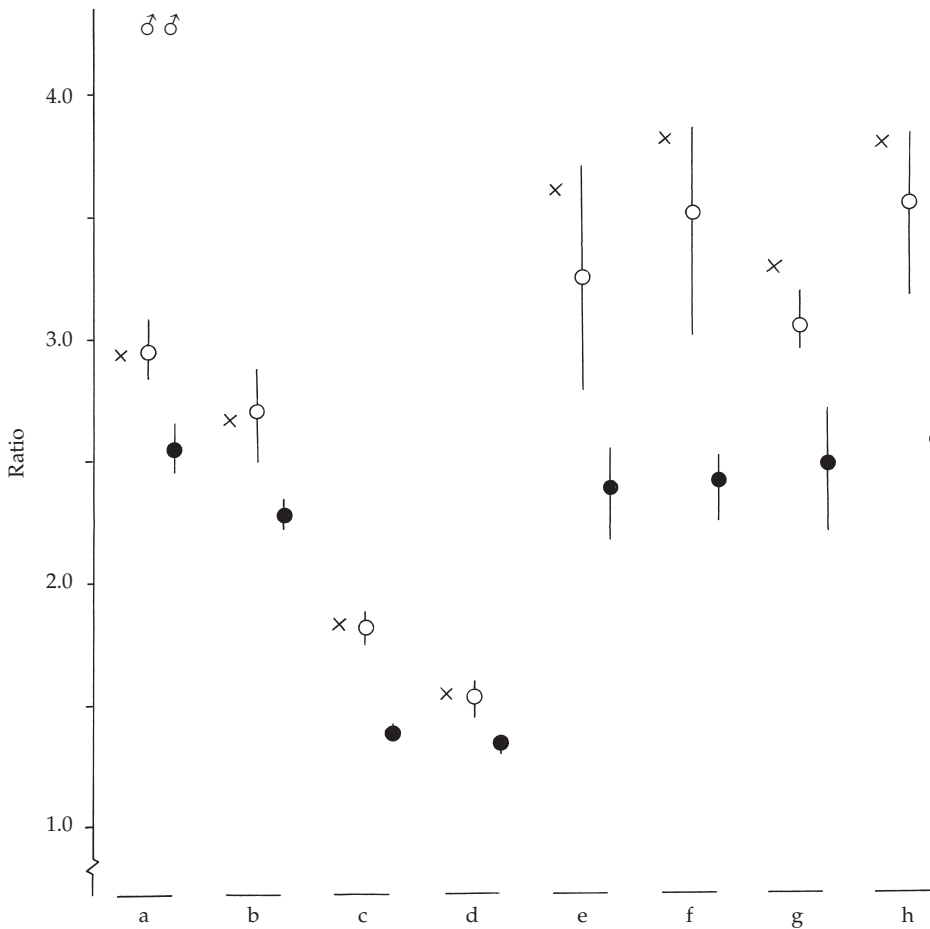


Fig. 19. *Pachyolpium arubense arubense* Beier from Aruba (n = 17). ○ = mean value. x = ratio in Beier's type ♂. *Pachyolpium arubense variabilis* subsp. nov. from Aruba (n = 7). ● = mean value. Ratios in males (L = length, W = width, D = depth). Pedipalp: a. Femur L/W. Leg I: b. Femur L/D; c. Femur L/Patella L; d. Tibia L/Patella L; e. Metatarsus L/D; f. Tarsus L/D. Leg IV: g. Metatarsus L/D; h. Tarsus L/D.

0.93-0.97 × L hand without pedicel. *sb* on dorsum palpal femur 0.13-0.17-0.23 from exterior key point of femoral base; palpal femur L 2.78-3.82-4.93 × distance from *sb* to exterior key point of femoral base. Fixed finger with 37-41.5-45 marginal teeth. Movable finger with 37-40.86-44 marginal teeth. Marginal teeth of each finger much as in ♂ of nominate subspecies. This also applies to venom apparatus and lamina defensor. Fixed finger with *eb*, *esb* and *isb* in a nearly straight line and close together at base, *ib* subdorsal and about at level of *eb*, *ist* associated with *eb*, *esb*, *isb* and *ib*, i.e. at about same distance from *isb* and *ib*, *it* near middle finger, *est* clearly proximad of *it*, *et* about level of nodus ramosus; distance of *it* up to level of 21st-25.14-28/29th marginal tooth from apical tooth; *et* up to level of 5/6th-7.79-10th marginal tooth from apical tooth; nodus ramosus up to level of 8th-8.43-11/12th marginal tooth from api-

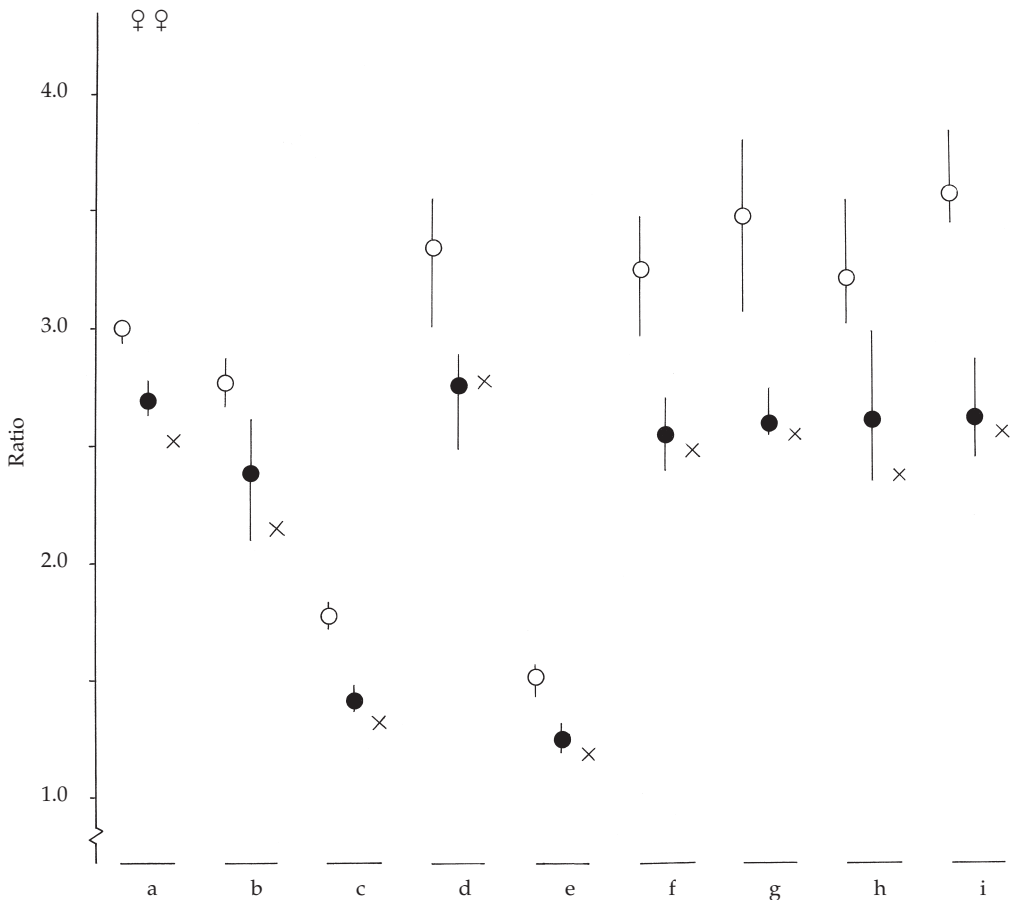


Fig. 20. *Pachyolpium arubense arubense* Beier from Aruba (n = 17). ○ = mean value. *Pachyolpium arubense variabilis* subsp. nov. from Aruba (n = 4). ● = mean value. x = ratio in Beier's type ♀ (= allotype ♀). Ratios in females (L = length, W = width, D = depth). *Pedipalp*: a. Femur L/W. *Leg I*: b. Femur L/D; c. Femur/Patella L; d. Tibia L/D; e. Tibia L/Patella L; f. Metatarsus L/D; g. Tarsus L/D. *Leg IV*: h. Metatarsus L/D; i. Tarsus L/D.

cal tooth; fixed finger L $5.26-6.10-6.99 \times$ venom duct L, fixed finger L (arbitrarily considered equal to movable finger L), to $5.26-6.10-6.99 \times$ venom duct L.

Movable finger with *b* about 1 or even less than 1 areolar diameter proximal to *sb*, both within basal fifth of finger; *st* about 2/3 of finger L from tip; *t* about 1/3 of finger L from tip, and up to level of 21st-22.71-25th marginal tooth from apical tooth; nodus ramosus about midway between *t* and fingertip, and up to level of 10th-11.7-13th tooth from apical tooth; movable finger L $4.57-5.23-6.85 \times$ venom duct L.

First leg: trochanter $0.145-0.15-0.16/0.12-0.13-0.13$, L/D $1.13-1.17-1.22$; femur $0.26-0.26-0.28/0.11-0.12-0.12$, L/D $2.22-2.27-2.34$; patella $0.18-0.19-0.20/0.12-0.12-0.13$, L/D $1.48-1.57-1.65$; femur L $1.35-1.38-1.42 \times$ patella L; tibia $0.23-0.24-0.25/0.08-0.09-0.09$, L/D $2.66-2.77-2.98$; tibia L $1.20-1.24-1.27 \times$ patella L; metatarsus $0.12-0.14-0.16/0.06$, L/D $2.17-2.38-2.54$; tarsus $0.11-0.12-0.13/0.05$, L/D $2.25-2.41-2.52$; tarsal claws and arolium as in ♂ of nominate subspecies.

Fourth leg (fig. 17b): trochanter (6) $0.23-0.25-0.27/0.15-0.155-0.16$, L/D $1.51-62-1.70$; femur $0.22-0.23-0.24/0.14-0.15-0.16$, L/D $1.37-1.54-1.72$; patella $0.52-0.55-0.57/0.26-$

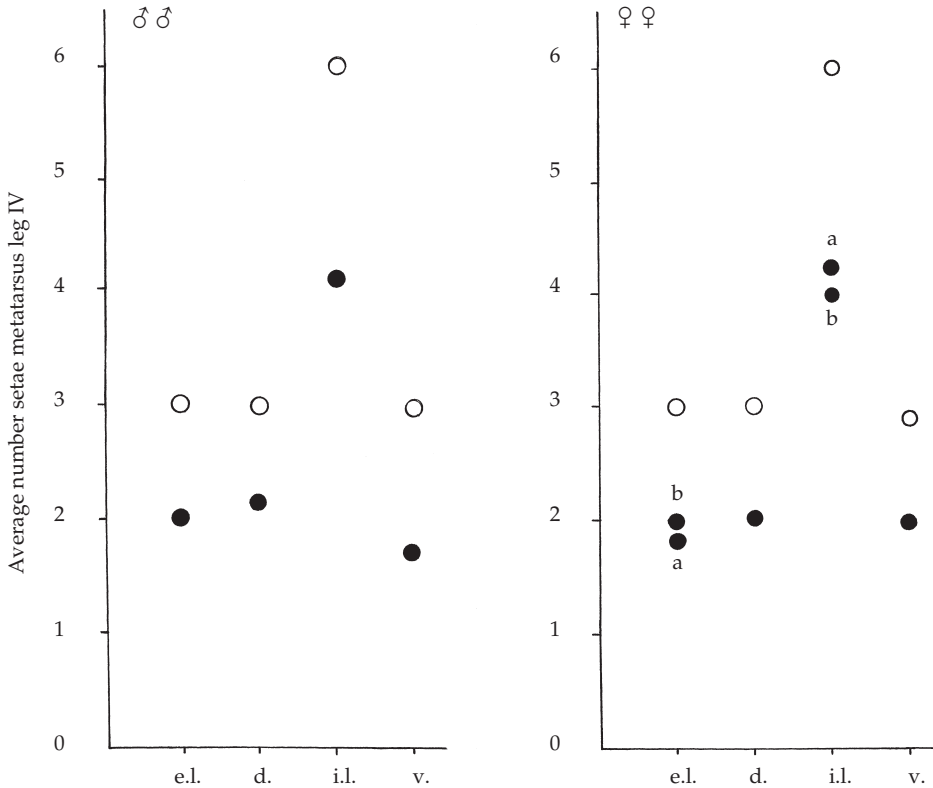


Fig. 21. Average number of setae on metatarsus of leg IV in 18 males, incl. Beier's type ♂, and 17 females of *Pachyolpium arubense arubense* Beier (○), and in 7 males and 4 females (a), excl. Beier's original type ♀ of the species (b), of *Pachyolpium arubense variabilis* subspec. nov. (●) from Aruba. e.l. = exterior lateral (number of setae, incl. 1 tactile seta situated near proximal end); d. = dorsal; i.l. = interior lateral; v. = ventral.

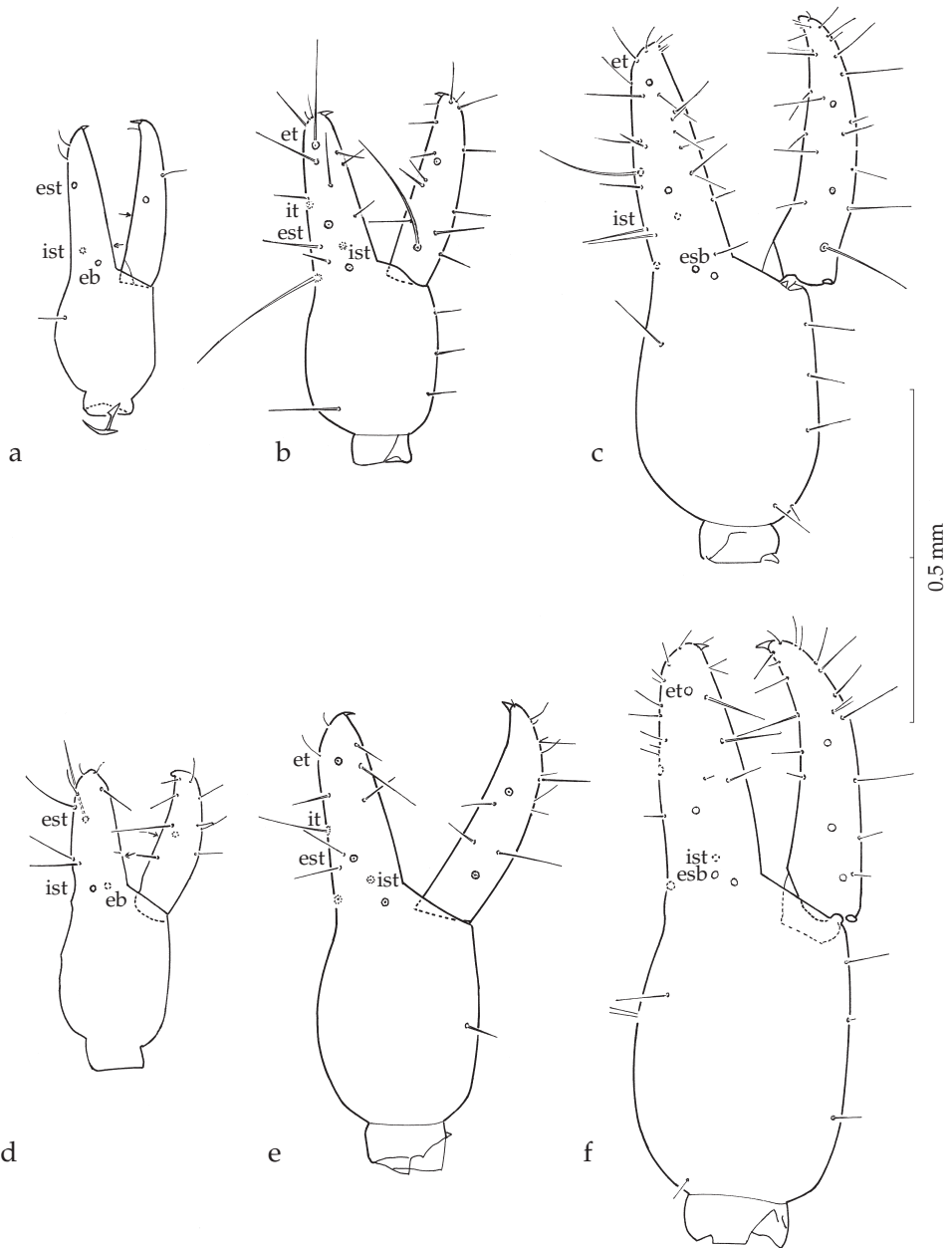


Fig. 22. *Pachyolpium arubense arubense* Beier, nymphs from Curaçao (a-b) and Aruba (c). Extero-lateral aspect of chela in *protonymph*, 596 (a), in *deutonymph*, 552 (b), and in *tritonymph*, 564 (c). *Pachyolpium arubense variabilis* subsp. nov., nymphs from Aruba (d-f). Intero-lateral aspect of chela in *protonymph*, 1367 (d), and extero-lateral aspect of chela in *deutonymph*, 181 (e), and in *tritonymph*, 372 (f). Arrows indicate position of last proximal marginal tooth in chelal fixed and movable finger of both protonymphs (a and d).

0.29-0.32, L/D 1.79-1.92-2.08; femur + patella 0.63-0.65-0.66/0.26-0.29-0.31, L/D 2.08-2.27-2.335; tibia 0.45-0.46-0.49/0.13-0.14-0.15, L/D 3.05-3.37-3.67; metatarsus 0.20-0.21-0.23/0.08-0.085-0.09, L/D 2.21-2.48-2.71; tarsus 0.16-0.17-0.18/0.06-0.07-0.07, L/D 2.425-2.58-2.69; tarsal claws and arolium as in ♂ of nominate subspecies.

Chaetotaxy of metatarsus of fourth leg: exterior lateral: T+1 (T close to proximal end); dorsal: 2 (6), 1 with 3; interior lateral: 2 × 2 (6), 1 with 1 (prox.) + 2 × 2; ventral: 2 (5), 2 with 1.

Chaetotaxy of ♂ genital area (fig. 15): (0-0-0)-(0.570-0.57)-(1-0-1) on anterior operculum; (2-0-2)-(2.57-0-2.43) -(4-0-3) on anterior margin of anterior lip of aperture; (2-0-2)-(2.57-0-2.43)-(4-0-4) on posterior margin of anterior lip of aperture; (2-0-2) on posterior operculum.

Female. Description based on the allotype and 4 paratypes from Aruba (figs. 11a-b, 8b, 12, 14a-c, 16, 20 partly, 21 partly). The biometric data for the allotype precede.

Colour about similar to that of ♂; body, chelicerae, pedipalps and legs on the whole much stouter than in ♂, and also stouter than in ♀ of nominate subspecies.

Body L 3.10/3.21-3.38-3.53.

Carapace: 0.78/0.79-0.845-0.90/greatest W 0.64/0.65-0.76-0.87, L/W 1.22/1.025-1.11-1.19, ocular width 0.54/0.56-0.57-0.595; eyes: 2 pairs, well developed; anterior margin with 6/6 setae, posterior margin of carapace with 4/2-2.5-4 setae.

Abdomen: 2.385/2.42-2.535-2.64/greatest W 1.42/1.17-1.35-1.56, L/W 1.68/1.69-1.87-2.07; chaetotaxy of tergites I-X: 4/4: 5/4-5.5-7: 8/7-7.75-8: 8/8-10-12: 8/9-10.25-12: 10/10-10.75-12: 12/10-11.0-12: 1T6T1/1T6T1-1T6.75T1-1T8T1: 1T6T1/1T6T1-1T6.5T1-1T7T1; chaetotaxy of sternites IV-X: 8/6-7.0-8: 8/8-8.75-11: 10/8-10.5-12: 10/8-10.0-12: 12/8-10.5-12: 10/8-9.0-10: 6/8 (1).

Chelicera: 0.33/0.315-0.33-0.34/0.21/0.19-0.20-0.21, L/W 1.56/1.53-1.62-1.68, and 0.42/0.38-0.39 0.40 × carapace L; movable finger L 0.235/0.22-0.225-0.23; galea L ?/0.07-0.08-0.08, with 2 slender, curved terminal rami and 1 stouter, gently curved lateral ramus near distal 1/3 of main stalk; inner margin of fixed finger with ?/6-7.0-8 teeth (3), of which most distal one is small denticle, situated on inner margin of apical tooth near tip, continuous ones flat retroconical teeth of which only distal 4 sclerotic, each consisting of 2 transverse and very closely placed cusps; movable finger with prominent conical subapical lobe; apical tooth in both fingers ash grey in colour; serrula exterior with 25/21-22.4-24 blades; flagellum of 3 spine-like setae: anteriormost one long and pinnate in distal quarter of anterior margin, continuous 2 other ones about 3/7 shorter; chaetotaxy: 5 setae on exterior surface of hand and 1 on movable finger.

Pedipalp (figs. 11a-b, 12): maxilla (3) ?/0.51-0.53-0.57/?/0.30-0.31-0.32, L/W ?/1.69-1.71-1.77; trochanter 0.46/0.44-0.475-0.505 (3)/0.26/0.24-0.25-0.27, L/W 1.78/1.85-1.89-1.92 (3); femur 0.71/0.69-0.75-0.81/0.28/0.26-0.28-0.29, L/W 2.51/2.63-2.69-2.78; patella 0.725/0.72-0.755-0.80/0.32/0.31-0.32-0.33, L/W 2.24/2.31-2.39-2.44; chela without pedicel (3) 1.18/1.25-1.27-1.32/?/0.43-0.45-0.47, L/W ?/2.65-2.83-2.94; chela with pedicel (3) 1.30/1.345-1.38-1.44/W same, L/W ?/2.84-3.05-3.20; hand without pedicel 0.68/0.725-0.73-0.79/0.47/0.39-0.415-0.44 (2), L/D 1.45/1.32-1.43-1.54 (2); hand with pedicel ?/0.78-0.84-0.91/D same (2), L/D ?/1.51-1.64-1.77 (2); movable finger L 0.60/0.63-0.655-0.70, 0.89/0.86-0.925-0.97 × L hand without pedicel. *sb* on dorsum pal-

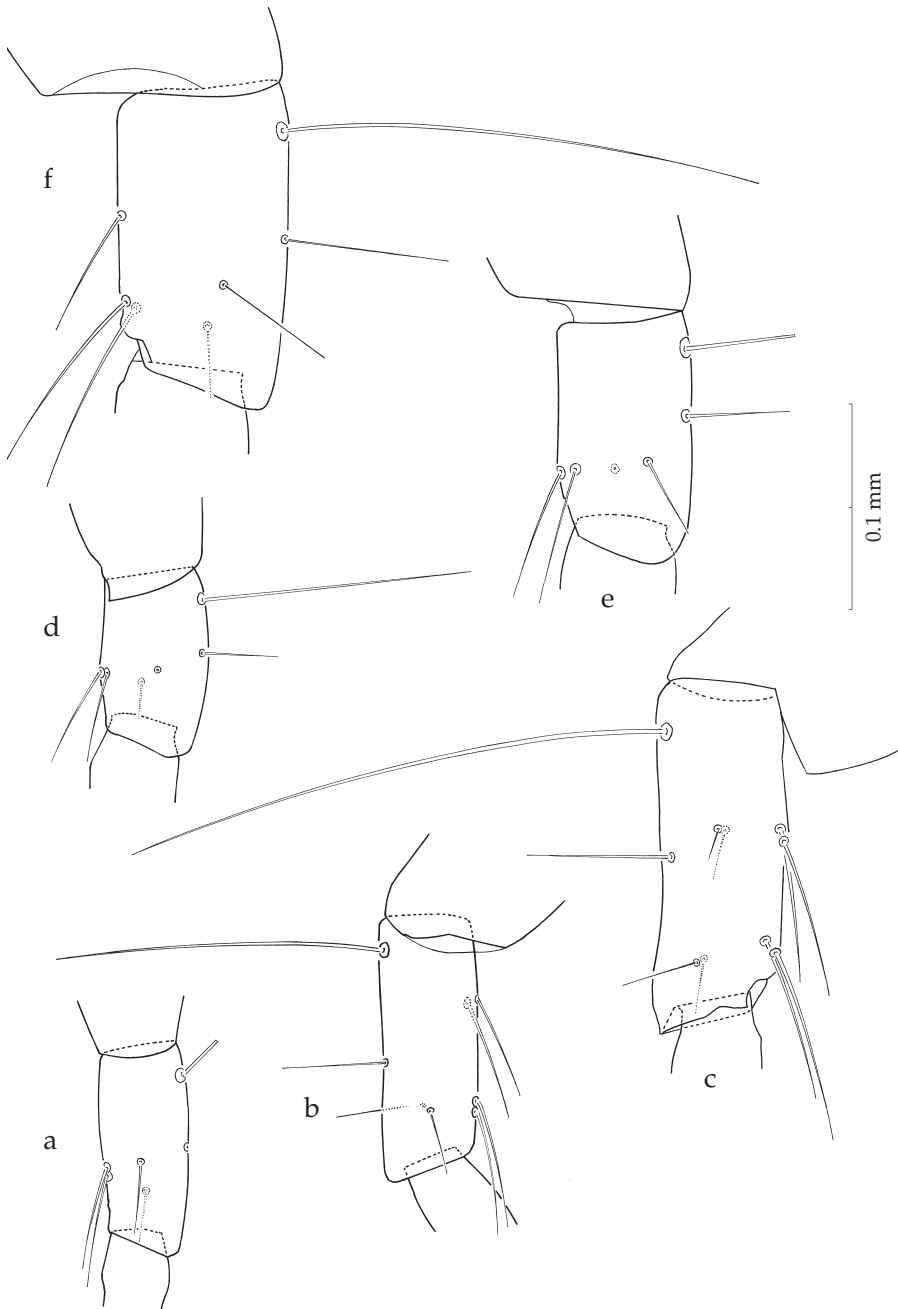


Fig. 23. *Pachyolpium arubense arubense* Beier, nymphs from Curaçao (a-b) and Aruba (c). Chaetotaxy of metatarsus of leg IV in protonymph, 596 (a: left leg, anterior aspect), in deutonymph, 552 (b: left leg, posterior aspect), and in tritonymph, 564 (c: right leg, anterior aspect). *Pachyolpium arubense variabilis* subsp. nov., nymphs from Aruba (d-f). Chaetotaxy of metatarsus of leg IV, anterior aspect, in protonymph, 1367 (d), in deutonymph, 181 (e), and in tritonymph, 372 (f). a-f: same scale.

pal femur 0.20/0.215-0.25-0.26 from exterior key point of femoral base; palpal femur L 3.62/2.83-3.08-3.50 × distance from *sb* to exterior key point of femoral base.

Fixed finger with 42/43-47.0-52 marginal teeth. Shape of teeth like in ♂. Also position of trichobothria and nodus ramosus much like in ♂, although *ist* in fixed finger is even still more associated with *eb*, *esb*, *isb* and *ib* than in ♂. *it* up to level of 24th/25/26th-27.63-29th marginal tooth from apical tooth; *et* up to level of 6/7th/7th-8.63-10th marginal tooth from apical tooth; nodus ramosus up to level of 9th/7/8th-9.125-11th marginal tooth from apical tooth; fixed finger L (arbitrarily considered equal to movable finger L) to 6.16/5.68-6.62-7.56 × venom duct L.

Movable finger with 42/45-46.75-50 marginal teeth. Shape as in ♂. Also position of trichobothria and nodus ramosus similar to that in ♂. *t* up to level of ± 20th/22/23rd-24.125-27th marginal tooth from apical tooth; nodus ramosus up to level of ± 12th/10th-11.13-12/13th marginal tooth from apical tooth; movable finger L 5.08/5.53-6.54-6.99 × venom duct L.

First leg (fig. 14b): trochanter 0.17/0.18-0.19-0.22/0.15/0.14-0.145-0.15, L/D 1.10/1.25-1.31-1.47; femur 0.29/0.31-0.32-0.34/0.14/0.13-0.14-0.15, L/D 2.15/2.10-2.29-2.56; patella 0.225/0.21-0.23-0.245/0.14/0.14-0.145-0.16, L/D 1.57/1.39-1.56-1.75; femur L 1.31/1.37-1.41-1.48 × patella L; tibia 0.265/0.27-0.28-0.29/0.095/0.10-0.10-0.11, L/D 2.78/2.49-2.75-2.89; tibia L 1.18/1.19-1.24-1.31 × patella L; metatarsus 0.16/0.17-0.175-0.18/0.06/0.07, L/D 2.48/2.405-2.55-2.70; tarsus 0.14/0.145-0.15-0.16/0.055/0.06, L/D 2.56/2.55-2.595-2.74; tarsal claws and arolium as in ♂.

Fourth leg (fig. 14a): trochanter 0.315/0.30 (3)/0.20/0.17-0.175-0.18, L/D 1.59/1.65-1.72-1.87 (3); femur 0.23/0.27-0.28-0.30/0.16/0.16-0.17-0.175, L/D 1.42/1.54-1.715-1.91; patella 0.54/0.64-0.67-0.70/0.295/0.31-0.31-0.32, L/D 1.81/2.02-2.155-2.26; femur + patella 0.64/0.76-0.80-0.84/0.295/0.31-0.31-0.32, L/D 2.18/2.38-2.56-2.71; tibia 0.54/0.53-0.57-0.60/0.155/0.155-0.16-0.17, L/D 3.49/3.35-3.57-3.85; metatarsus 0.23/0.23-0.25-0.27/0.10/0.09-0.10-0.10, L/D 2.37/2.36-2.61-2.98; tarsus 0.20/0.20-0.20-0.21/0.08/0.07-0.08-0.08, L/D 2.57/2.46-2.62-2.875; tarsal claws and arolium as in ♂.

Chaetotaxy of metatarsus of fourth leg: exterior lateral: T+1/T+1 (3), 1 with T+0 (T close to proximal end); dorsal: 2/2; interior lateral: 2 × 2, 1 with 2+1+2, 1 with 1 (prox.) +1+2; ventral: 2/2.

Chaetotaxy and internal structure of ♀ genital area (fig. 18): anterior operculum with 6/6 setae, and posterior operculum with 6/4-5.0-6 setae; cribriform plates often barely observable, apparently: 1 medial cluster of at least 3 rather large circular plates together with a few smaller ones, and lateral on each side a little smaller oval plate.

Tritonymph. Description based on 7 specimens from Aruba and 2 specimens from Curaçao (figs. 22f, 23f, 24 partly).

Body L 2.18-2.44-2.82.

Chelicera: serrula exterior with 16-18.22-20 blades; flagellum of 3 spine-like setae: anteriormost one long, pinnate in distal quarter of anterior margin, continuous ones about 2/7 shorter.

Pedipalp (fig. 22f, chela): trochanter 0.28-0.31-0.345/0.16-0.18-0.21, L/W 1.59-1.69-1.76; femur 0.40-0.46-0.48/0.16-0.19-0.22, L/W 2.17-2.34-2.585; patella 0.39-0.46-0.50/0.18-0.23-0.25, L/W 1.80-2.03-2.14; chela without pedicel 0.75-0.84-0.92/0.25-0.31-

0.35, L/W 2.56-2.66-2.94; chela with pedicel 0.80-0.88-0.975/W same, L/W 2.76-2.87-3.17; hand without pedicel 0.39-0.44-0.49/0.28-0.31-0.33, L/D 1.33-1.43-1.53; hand with pedicel: 0.45-0.51-0.57/D same, L/D 1.55-1.66-1.82; movable finger L 0.385-0.43-0.47, 0.92-0.96-1.0 × L hand without pedicel. *sb* on dorsum palpal femur 0.12-0.14-0.15 from exterior key point of femoral base; palpal femur L 2.99-3.22-3.77 × distance from *sb* to exterior key point of femoral base.

Fixed finger (8) with 30-33.0-35 marginal teeth. *ist* obviously associated with *esb* and *eb*; *ist* about 1 areolar diameter distal to *esb*, and up to level of 32nd (1) or 35th (1) marginal tooth from apical tooth, or even beyond level of most proximal marginal tooth (5); *est* up to level of 26/27th-28.44-29/30th marginal tooth from apical tooth (8); *it* up to level of 19/20th-21.375-23rd marginal tooth from apical tooth (8); *ist* absent; nodus ramosus up to level of 8/9th-10.06-11/12th marginal tooth (8).

Movable finger (8) with 30-32.0-34 marginal teeth; *t* up to level of 20th-20.69-22nd marginal tooth from apical tooth (8); *st* up to level of 30th-32.2-34th marginal tooth from apical tooth (5), or beyond level of most proximal marginal tooth (3); *b* absent; nodus ramosus up to level of 11th-11.875-13th marginal tooth from apical tooth.

First leg: femur 0.18-0.20-0.23/0.09-0.10-0.12, L/D 1.61-2.0-2.25; patella 0.13-0.14-0.16/0.09-0.10-0.11, L/D 1.28-1.40-1.53; femur L 1.32-1.39-1.48 × patella L.

Fourth leg (8): femur + patella 0.41-0.53-0.60/0.19-0.23-0.27, L/D ratio 2.14-2.32-2.45; metatarsus: 0.14-0.16-0.17/0.07-0.08-0.09, L/D 1.835-1.94-2.0.

Chaetotaxy of metatarsus of fourth leg (fig. 23f): exterior lateral: T+1 (T close to proximal end); dorsal: 1 (5), 2 (3); interior lateral: 1 × 1 + 1 × 2 (1 × 2 close to distal end) (5), 2 × 2 (3); ventral: 1 (7), 2 (1).

Deutonymph. Description based on 3 specimens from Aruba (figs. 22e, 23e, 25 partly). Body L: 1.87-2.08-2.28.

Chelicera: serrula exterior with 16-16.3-17 blades; flagellum of 3 spine-like setae, anterior one long, with 2 or 3 small spines along distal quarter of anterior margin, continuous ones about 2/7 shorter.

Pedipalp (fig. 22e, chela): trochanter 0.22-0.24-0.25/0.135-0.14-0.15, L/W 1.65-1.70-

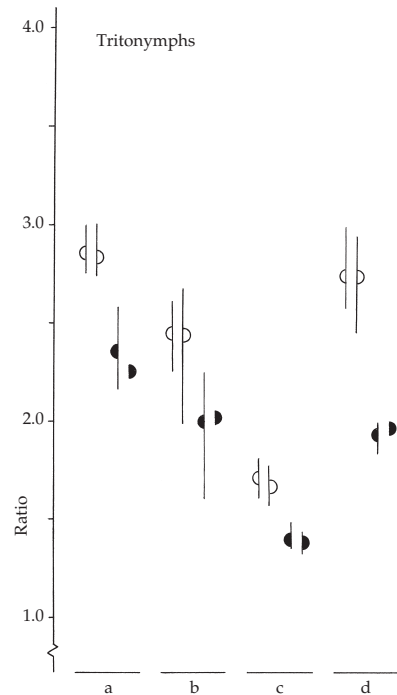


Fig. 24. Ratios in tritonymphs. *Pachyolpium arubense arubense* Beier from Aruba (n = 16) and Curaçao (n = 16). ∞ = mean value in specimens from Aruba; ? = mean value in specimens from Curaçao. *Pachyolpium arubense variabilis* subsp. nov. from Aruba (n = 7) and Curaçao (n = 2). w = mean value in specimens from Aruba; x = mean value in specimens from Curaçao. Pedipalp: a = Femur L/W. Leg I: b = Femur L/D; c = Femur L/Patella L. Leg IV: d = Metatarsus L/D.

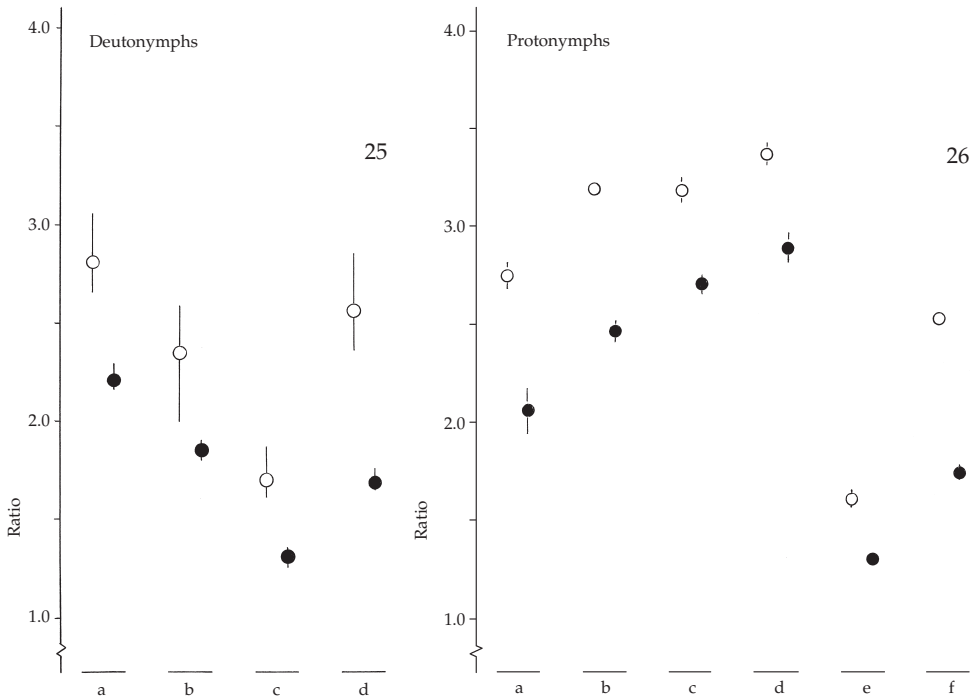


Fig. 25. Ratios in deutonymphs. *Pachyolpium arubense arubense* Beier from Aruba (n = 2) and Curaçao (n = 17). Data from both islands summarized. ○ = mean value. *Pachyolpium arubense variabilis* subsp. nov. from Aruba (n = 3). ● = mean value. *Pedipalp*: a = Femur L/W. *Leg I*: b = Femur L/D; c = Femur L/Patella L. *Leg IV*: d = Metatarsus L/D.

Fig. 26. Ratios in protonymphs. *Pachyolpium arubense arubense* Beier from Curaçao (n = 2). ○ = mean value. *Pachyolpium arubense variabilis* subsp. nov. from Aruba (n = 1) and Curaçao (n = 1). Data from both islands summarized. ● = mean value. *Pedipalp*: a = Femur L/W; b = Femur L/distance *sb* on dorsum femur from base; c = Chela (- ped.) L/W; d = Chela (+ ped.) L/W. *Leg I*: e = Femur L/Patella L. *Leg IV*: f = Metatarsus L/D.

1.80; femur 0.32-0.34-0.36/0.14-0.15-0.16, L/W 2.17-2.22-2.29; patella 0.32-0.35-0.37/0.17-0.18-0.185, L/W 1.92-1.95-2.0; chela without pedicel 0.59-0.64-0.68/0.22-0.23-0.24, L/W 2.70-2.75-2.84; chela with pedicel 0.65-0.695-0.73/W same, L/W 2.92-2.99-3.09; hand without pedicel 0.31-0.32-0.33/0.22-0.24-0.25, L/D 1.31-1.34-1.37; hand with pedicel 0.36-0.38-0.40/D same, L/D 1.59-1.60-1.63; movable finger L 0.29-0.33-0.35, 0.95-1.03-1.08 × L hand without pedicel. *sb* on dorsum palpal femur 0.11 from exterior key point of femoral base; palpal femur L 2.79-3.09-3.40 × distance from *sb* to exterior key point of femoral base.

Fixed finger with 28-28.7-29 marginal teeth; *et* up to level of 9/10th-9.83-10th marginal tooth from apical tooth; *it* up to level of 20/21th-22.0-23/24th marginal tooth from apical tooth; *est* up to level of 22/23rd-25.83-28th marginal tooth from apical tooth; *ist* up to level of 28/29th marginal tooth from apical tooth (1), beyond level of

most proximal tooth, i.e. close to base (2); *esb* and *isb* absent; nodus ramosus up to level of 7/8th-8.83-9/10th marginal tooth from apical tooth.

Movable finger with 25-25.3-26 marginal teeth; "*t*" up to level of 16/17th-19.17-21st marginal tooth from apical tooth; "*st*", "*sb*" and "*b*" absent; nodus ramosus up to level of 6/7th-9.5-11th marginal tooth from apical tooth.

First leg: femur 0.14-0.15-0.16/0.07-0.08-0.08, L/D 1.80-1.86-1.90; patella 0.10-0.11-0.12/0.08, L/D 1.33-1.39-1.485; femur L 1.26-1.31-1.36 × patella L.

Fourth leg: femur + patella 0.35-0.38-0.41 (2)/0.16-0.17-0.19, L/D 2.15-2.18-2.21 (2), metatarsus 0.105-0.11-0.11/0.06-0.06-0.065, L/D 1.66-1.69-1.76.

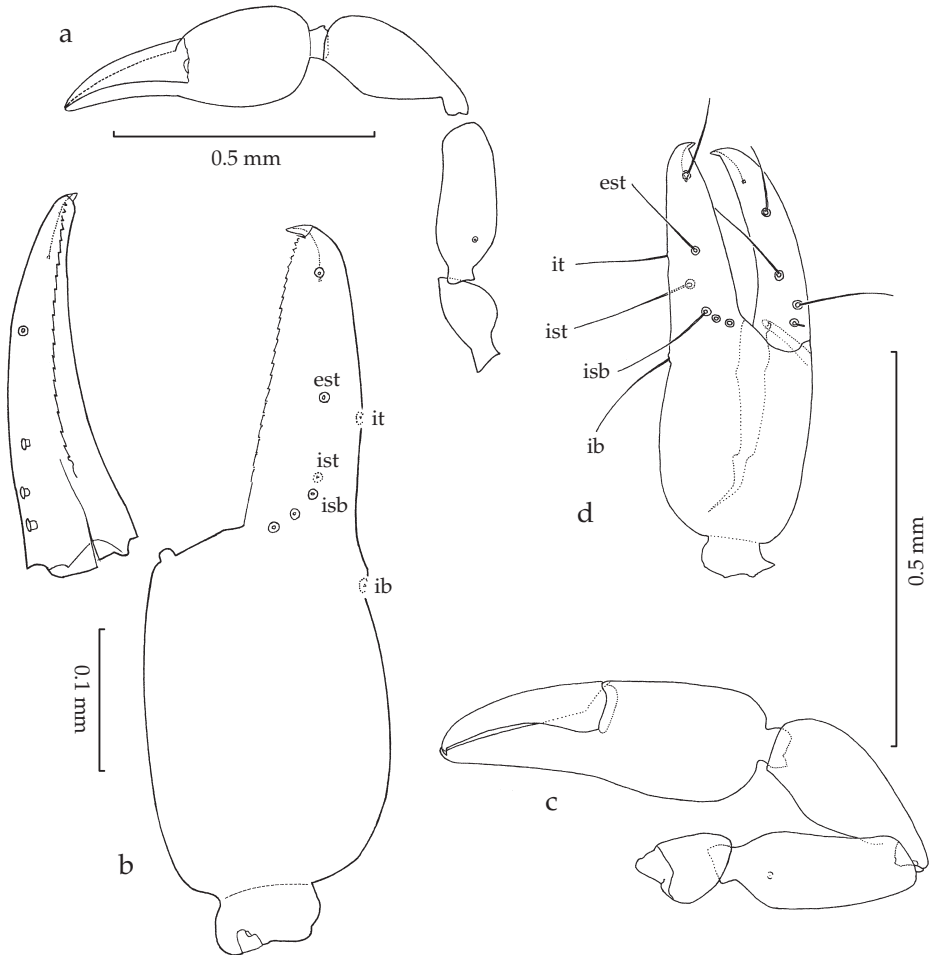


Fig. 27. *Leptolpium prospaeum* spec. nov., holotype ♂, 1289 (a-b) from Curaçao, and paratype ♀, 752 (c-d) from Aruba. a. Ventral aspect of patella + chela, and dorsal aspect of trochanter + femur. b. Extero-lateral aspect of left chela (movable finger distorted, trichobothria broken off). c. Ventral aspect of left pedipalp. d. Extero-lateral aspect of right chela.

Chaetotaxy of metatarsus of fourth leg (fig. 23e): exterior lateral T+1 (T close to proximal end), dorsal: 1, interior lateral: 1 × 2 (near distal end), ventral: 1.

Protonymph. Description based on 1 specimen from Aruba and 1 specimen from Curaçao (figs. 22d, 23d, 26 partly). Ratios and counts expressed as ranges.

Body L 1.31/1.35.

Chelicera: serrula exterior with 14/14 blades, flagellum of 3 spine-like setae, anteriormost one longest: about 1.6/1.7 as long as continuous ones.

Pedipalp (fig. 22d, chela): trochanter 0.155/0.17/0.09/0.10, L/W 1.64/1.75; femur 0.21/0.23/0.11/0.11, L/W 1.94/2.18; patella 0.21/0.24/0.12/0.12, L/W 1.71/1.93; chela without pedicel 0.45/0.45/0.16/0.17, L/W 2.66/2.76; chela with pedicel 0.48/0.48/W same, L/W 2.82/2.97; hand without pedicel 0.22/0.22/0.16/0.17, L/D 1.31/1.36; hand with pedicel: 0.25/0.26/D same, L/D 1.52/1.58; movable finger L 0.24/0.25, 1.09/1.16 × L hand without pedicel. *sb* on dorsum palpal femur 0.09/0.09 from exterior key point of femoral base; palpal femur L 2.41/2.52 × distance from *sb* to exterior key point of femoral base.

Fixed finger with 22/25 marginal teeth in distal 3/4 of finger, ranging from small conical teeth at distal end to long and very flat teeth at proximal end of row; *est* up to level of 15th/15/16th marginal tooth from apical tooth; *ist* and *eb* near base of finger; *et*, *it*, *esb*, *isb* and *b* absent; nodus ramosus up to level of about 8th marginal tooth from apical tooth (1).

Movable finger with 20/20 marginal teeth in distal 1/2 of finger, shape as in fixed finger; "*t*" up to level of 19th/20th marginal tooth from apical tooth; "*st*", "*sb*" and "*b*" absent; nodus ramosus up to level of about 10th marginal tooth from apical tooth.

First leg: femur 0.10/0.11/0.05/0.06, L/D 1.76/2.0; patella 0.08/0.08/0.06/0.06, L/D 1.28/1.29; femur L 1.27/1.32 × patella L.

Fourth leg: femur + patella 0.27/0.29/0.11/0.13, L/D 2.31/2.38; metatarsus: 0.09/0.09/0.05/0.05, L/D 1.71/1.775.

Chaetotaxy of metatarsus of fourth leg (23d): exterior lateral: T+1/T+1 (T close to proximal end), dorsal: 1/1, interior lateral: 2/2, ventral: 1/1.

Remarks: *Pachyolpium arubense variabilis* subspec. nov. and *P. arubense arubense* Beier have been collected together from 4 (of 19) localities in Curaçao (St. 222, 328, 349 and 351), 3 (of 12) localities in Aruba (St. 246, 262 and 278), and 2 (of 13) localities in Bonaire (St. 194 and 310). It means that the new subspecies "*variabilis*" and the nominate subspecies "*arubense*" are sympatric in about one in five examined locations (20.45%). That here nevertheless is argued to hold "*variabilis*", is connected with the ascertainment that the ♂♂, ♀♀, trito-, deuto- and protonymphs differ taxonomically with those in "*arubense*". The explanation of the for a small part sympatric occurrence of these subspecies could be by supposing that maybe this form represents a taxon introduced from elsewhere, which ultimately will shade off into the nominate form by secondary fusion.

The apparent differences between *Pachyolpium arubense arubense* and *P. arubense variabilis* in both ♂ and ♀ refer to:

- body L (mean value in ♂ 2.27 versus 2.58, in ♀ 2.555 versus 3.38);
- palpal and pedal proportions (figs. 19-20);

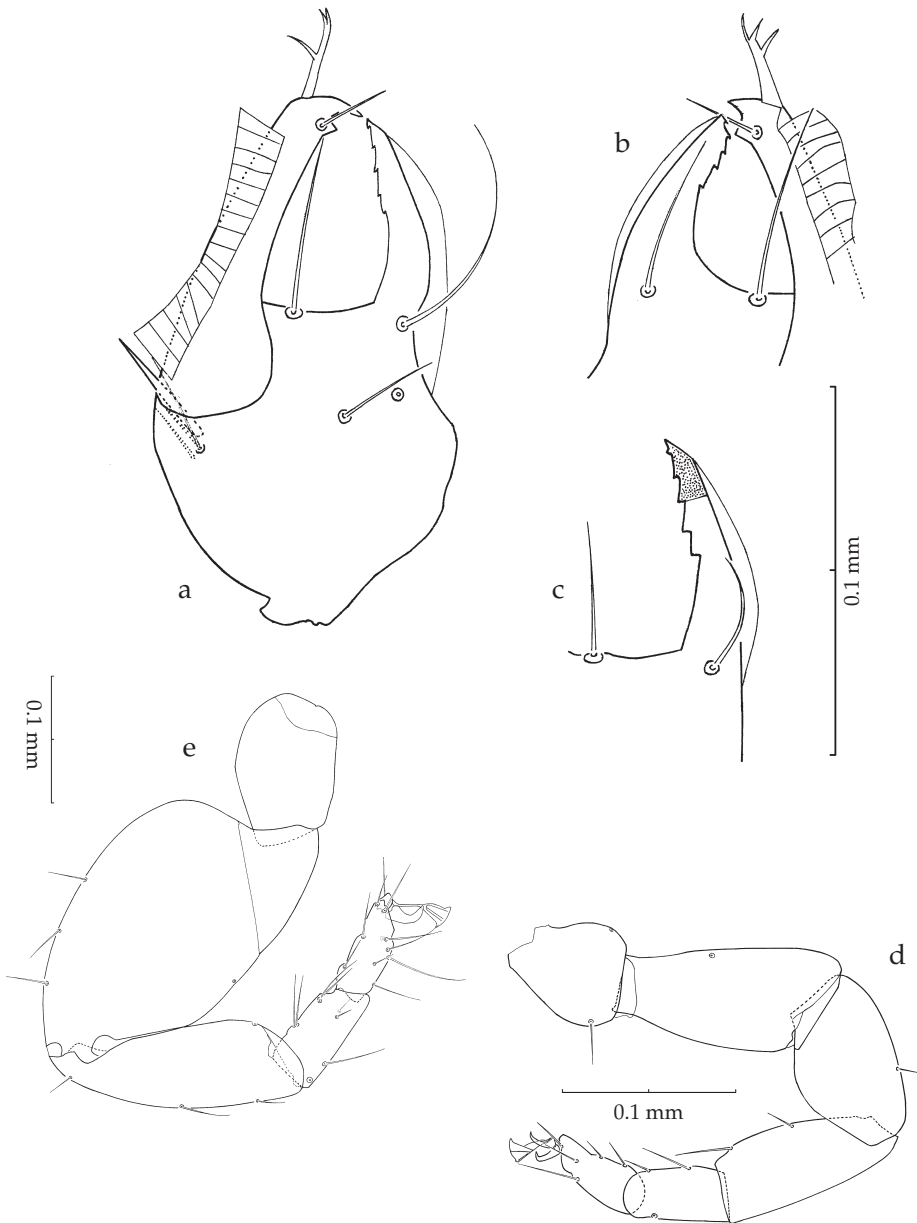


Fig. 28. *Leptolpium prospaeum* spec. nov., holotype ♂, 1289 (a, e) from Curaçao, allotype ♀, 1345 (b) and paratype ♀, 752 (d) from Aruba, and paratype ♀, 88 (c) from Bonaire. a. Exterior aspect of left chelicera. b. Outer aspect of fixed finger and tip of movable finger of right chelicera, showing dentition and lamina exterior on fixed finger, and galea, subapical lobe and part of serrula exterior on movable finger. c. Outer aspect of fixed finger of left chelicera, showing dentition and lamina exterior. d. Posterior aspect of right leg I. e. Posterior aspect of left leg IV. Attention focused on chaetotaxy of metatarsus.

- mean value of L/W of chelicera (in ♂ 1.76 versus 1.57, in ♀ 1.74 versus 1.62);
 - position of *ist* in relation to *eb*, *esb*, *ib* and *isb* on fixed chelal finger i.e not associated (figs. 5b, 6b) versus associated (figs. 10b, 11b);
 - distance of *t* from base apical tooth on outside curve and its position in relation to marginal teeth on movable chelal finger (average tooth number in ♂ up to 12.88 versus 22.71, in ♀ up to 13.82 versus 24.125); and chaetotaxy on metatarsus IV (fig. 21).
- Moreover in the ♂ there is differentiation in genital chaetotaxy (along posterior margin of anterior lip of aperture (average number of setae 9.125 versus 5.0) and on posterior operculum (average number of setae 6.125 versus 4.0).

Differences in *tritonymph* (fig. 24), as well as in *deutonymph* (fig. 25) and *protonymph* (fig. 26) refer to:

- L/W of palpal femur;
- ratio femur L/patella L of leg I; and L/D of metatarsus IV.

Specific difference in both *tritonymph* and *deutonymph* refers to:

- L/D of femur of leg I (mean value 2.44 versus 2.0 and 2.34 versus 1.86).

Specific differences only applying to *tritonymph* refer to:

- position of "t" of movable chelal finger in relation to marginal teeth (up to average tooth number 14.19 versus 20.58); and chaetotaxy of dorsal and ventral side of metatarsus IV (2, fig. 23c, versus 1, fig. 23f).

Specific differences only applying to *deutonymph* refer to:

- body L (mean value 1.49 versus 2.08); and number of setae on interior lateral side of metatarsus IV (2 × 2, fig. 23b, versus 2, fig. 22e).

Specific differences only applying to *protonymph* refer to:

- body L (mean value 0.93/1.00 versus 1.31/1.35); ratio palpal femur L/distance *sb* on dorsum of femur from base (3.19/3.20 versus 2.41/2.52);
- L/W of palpal chela without and with pedicel (3.12/3.25 versus 2.66/2.76 and 3.32/3.43 versus 2.82/2.97);
- position *est* on fixed chelal finger in relation to marginal teeth (up to tooth number 12/13 versus 15/16); and
- position of *t* on movable chelal finger in relation to marginal teeth (up to tooth number 15/16 versus 19/20).

Etymology: the name of the subspecific epithet (*variabilis* (Latin) - changeable), will express that the Caribbean olpiids are a tricky family often giving cause for much confusion.

Genus *Leptolpium* nov.

Type species: *Leptolpium prospaeum* spec. nov.

Diagnosis: Sharing the characters of the family Olpiidae, subfamily Olpiinae and tribe Olpiini (as given by Hoff, 1964: 18-19), to separate from the genera *Pachyolpium* and *Olpiolum* by the following: (i) body very slender; (ii) pedipalps and legs a little stocky; (iii) nodus ramosus in fixed chelal finger at level of *et* (versus proximad of *et* in *Pachyolpium* and distad of *et* in *Olpiolum*); (iv) *it* and *est* near the middle of fixed chelal finger (such as in *Olpiolum*, but *it* proximad of *est* in *Pachyolpium*); (v) *ib* inserted at a

very low level, not in a group with *eb*, *esb* and *isb* (as is the case in both other genera); (vi) subapical lobe of movable chelicaler finger prominent and sharp conical (versus short conical and blunt in *Pachyolpium*, and prominent and bifurcate in *Olpiolum*); (vii) chelicaler galea with 2 terminal rami and 1 lateral ramus (versus 3 terminal rami in both other genera); (viii) metatarsus IV with 8-10 setae (versus mostly about 14 or 15 in both other genera). The presence of *sb* on dorsum palpal femur has the genus in common with both other genera.

Leptolpium prospaeum spec. nov.
(figs. 27a-d, 28a-e)

Material.— Holotype: ♂ (1289), **Curaçao**: 212, St. Jago, Schaarloo, Willemstad, 26.x.1936. Altitude: 30-35 m; coral-limestone; scattered shrubs with few trees, mainly *Croton*, under stones with some detritus. Allotype (body crushed): ♀ (1345), **Aruba**, 252, Vader Piet, SE of Fontein, 9.ii.1937. Altitude: 25 m; diabase; few small, scattered shrubs, mainly *Croton*; under debris with nearly no plant decay. Paratypes: **Curaçao**: 234, Top of Seroe Christoffel, 11.ii.1949: 1 (828). **Aruba**: 262B, West of Spaans Lagoen, 1.i.1949: 1 ♂ (184); 272, southern slope of Hudishibana, Westpunt, 9.xii.1936: 1 ♂ (1602); Oranjestad, 1948 (A.D. Ringma coll.): 3 ♂♂ (753, 755-756), 1 ♀ (752). **Bonaire**: 198, Near Pos Bronswinkel, N of Brandaris, 27.iii.1937: 2 ♀♀ (88, 1552); 313, Near Pos Dominica, S of Rincon, 15.ix.1948: 1 ♀ (508). Localities of all types fully described by Wagenaar Hummelinck, 1940: 30-31, 37, 40; 1953: 13, 17, 19.

Description (unfortunately the specimens in the type series were partially damaged during the sorting out of the samples. However this did not raise problems in

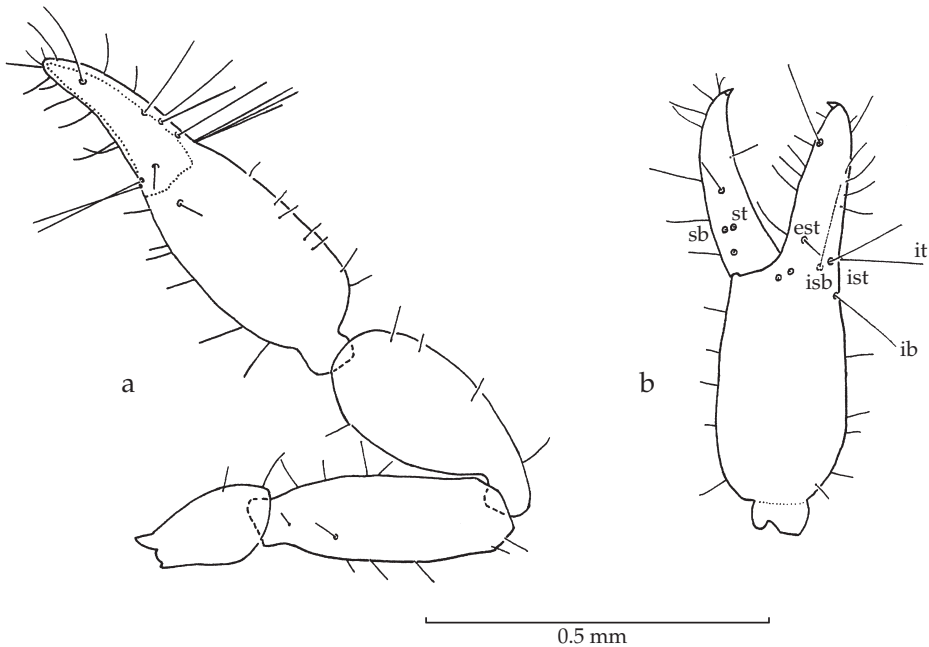


Fig. 29. *Serianus gratus* Hoff, ♂, 500, from Curaçao (a-b). a. Dorsal aspect of right pedipalp. b. Extero-lateral aspect of left chela.

recognizing the new species): ♂. Description based on the holotype from Curaçao, 1 paratype from Curaçao and 5 paratypes from Aruba (figs 27a-b, 28a-e).

Body and legs very weakly pigmented, carapace pale orange green, pedipalps orangish.

Body L 1.16-1.30-1.50, very slender (in alc.).

Carapace: 0.33-0.35-0.37 (5)/greatest W 0.245-0.26-0.27 (4); ocular width 0.195-0.21-0.22 (4); L/W 1.31-1.36-1.39 (4); surface smooth, furrows absent; 2 pair of well developed eyes; anterior margin with 6 setae (4), posterior margin with 4 setae (4).

Abdomen: tergites and sternites undivided; middle tergites with about 6 setae and middle sternites with about 8 setae.

Chelicera (figs. 28a, e): 0.12-0.13-0.14/0.07-0.075-0.085, L/W 1.63-1.72-1.83, and 0.36-0.37-0.38 × as long as carapace (5); movable finger L 0.075-0.09-0.10; galea L 0.02-0.02-0.03, with 2 curved terminal rami and 1 longer curved lateral ramus, 0.01 in L, arising about 3/4 from base main stalk; only apical tooth in fixed finger weakly sclerotic, light ash grey in colour; inner margin of fixed finger with 5 teeth of which most distal 2 small denticles, situated on inner margin of apical tooth, continuous ones flat retroconical non-sclerotic teeth; movable finger with prominent sharp conical subapical lobe; serrula exterior with 16 blades; serrula interior with about 6 blades (1), forming a velum by basal fusion; flagellum of 3 spine-like setae, anteriormost one 0.02-0.02-0.03 long and at least pinnate in distal half of anterior side, continuous ones respectively about 1/2 and 3/5 L shorter; lamina exterior present. Chaetotaxy: 5 setae on exterior surface of hand and 1 on movable finger.

Pedipalp (figs. 27a-b): trochanter 0.17-0.18-0.195/0.08-0.09-0.10, L/W 1.97-2.09-2.29; femur 0.24-0.27-0.30/0.09-0.10-0.12, L/W 2.44-2.58-2.78; patella 0.25-0.28-0.31/0.10-0.12-0.13, L/W 2.22-2.33-2.49; chela without pedicel 0.40-0.45-0.48/0.14-0.16-0.18, L/W 2.70-2.895-3.04; chela with pedicel 0.45-0.49-0.56/0.14-0.16-0.18, L/W 2.905-3.125-3.28; hand without pedicel 0.21-0.23-0.24/0.14-0.15-0.175, L/D 1.39-1.47-1.55; hand with pedicel 0.24-0.27-0.29/0.14-0.15-0.175, L/D 1.635-1.73-1.80; movable finger L 0.21-0.24-0.26, 0.96-1.04-1.17 × L hand without pedicel. *sb* on dorsum palpal femur 0.04-0.06-0.07 from exterior key point of femoral base; palpal femur 4.04-4.745-5.925 × distance from *sb* to exterior key point of femoral base.

Fixed finger with 20-21.86-25 marginal teeth. Movable finger with 20-21.86-24 marginal teeth. Marginal teeth in both fingers ranging from small retroconical teeth at distal end of row to low and flat teeth with poorly developed cusps at proximal end. Fixed finger with *eb*, *esb* and *isb* in one row close together at base, *ib* subdorsal on a level 3 areolar diameters caudal to the level of *eb*; *est* and *it* near middle of finger; level of *est* about 1 areolar diameter distal to level of *it*; *ist* about midway between *isb* and *it*; distance of *et* up to level of 4/5th-5.21-6th marginal tooth from apical tooth; *est* up to level of 15th-16.71-18/19th marginal tooth from apical tooth; *it* up to level of 16th-17.0-18th marginal tooth from apical tooth; nodus ramosus up to level of 5th-5.86-7/8th marginal tooth from apical tooth; fixed finger L (arbitrarily considered equal to movable finger L) to 5.41-6.24-7.48 × venom duct L.

Movable finger with *b* about 2 areolar diameters proximal to *sb*, both within basal quarter of finger, *st* about 1/3 of finger L from base; *t* up to level of 10/11th-12-13th marginal tooth from apical tooth; nodus ramosus up to level of 5th-6.21-7th marginal tooth from apical tooth; movable finger L 4.95-5.93-7.03 × venom duct L.

First leg: trochanter (4) 0.07/0.06, L/D 1.17-1.20-1.23; femur 0.10-0.11-0.115/0.05-0.05-0.06, L/D 1.97-2.07-2.21; patella 0.07-0.08-0.09/0.05-0.05-0.06, L/D 1.40-1.46-1.60; femur L 1.34-1.40-1.45 × patella L; tibia 0.09-0.10-0.115/0.04-0.04-0.05, L/W 2.47-2.55-2.64; tibia L 1.21-1.31-1.36 × patella L; metatarsus (6) 0.05-0.06-0.07/0.03, L/D 1.90-2.04-2.22; tarsus (6) 0.06-0.06-0.07/0.02-0.02-0.025, L/D 2.43-2.615-2.88. Arolium not divided and about twice as long as claws.

Fourth leg (fig. 28e): trochanter 0.10-0.10-0.11 (3)/0.065-0.07-0.08 (4), L/D 1.375-1.395-1.41; femur (5) 0.09-0.095-0.105/0.06-0.06-0.07, L/D 1.33-1.51-1.69; patella 0.195-0.22-0.245/0.10-0.12-0.145, L/D 1.69-1.82-1.985; femur + patella (5) 0.23-0.26-0.285/0.10-0.12-0.145, L/D 1.96-2.11-2.29; tibia 0.17-0.18-0.20/0.055-0.06-0.07, L/D 2.83-3.045-3.24; metatarsus 0.07-0.08-0.09/0.03-0.04-0.04, L/D 1.86-2.09-2.21; tarsus 0.07-0.07-0.08/0.03, L/D 2.42-2.62-2.82. Arolium not divided and about twice as long as claws.

Chaetotaxy of metatarsus of fourth leg: exterior lateral: T+1, dorsal: 1, interior lateral: 2 × 2, ventral: 1.

Chaetotaxy of ♂ genital area: difficult to determine, but probably 4 setae on posterior lip of aperture and 4 setae on posterior operculum.

Female. Description based on the allotype and 1 paratype from Aruba and 3 paratypes from Bonaire (figs. 28b-c, d).

♀ much like ♂, except for larger size of body and on the average with stouter palpal and pedal segments.

Body L (2) 1.82-1.855-1.89.

Carapace (2): 0.40-0.145-0.43, greatest W 0.25-0.275-0.30, length/width ratio 1.46-

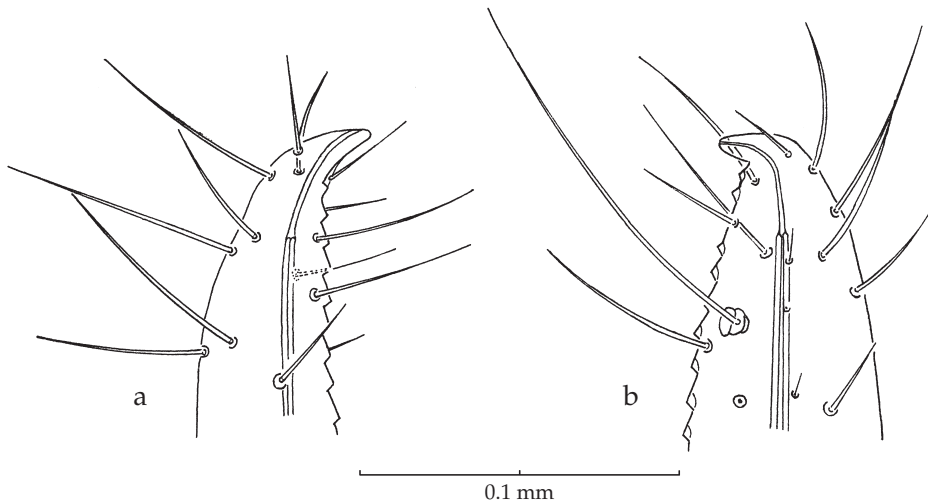


Fig. 30. *Serianus gratus* Hoff, ♂, 500, from Curaçao (a-b). Extero-lateral aspect of movable finger tip (a) and fixed finger tip (b) of left chela, showing primary venom duct, nodus ramosus and secondary venom ducts.

1.525-1.59; eyes: 2 pairs, well developed; anterior margin of carapace with 4-5-6 setae, posterior margin of carapace with 4 setae.

Abdomen (2): tergites and sternites undivided; middle tergites with probably 6-8 setae, middle sternites with probably 6 setae.

Chelicera (figs. 28b-c, d): 0.13-0.14-0.15 (3)/0.08 (3), L/W 1.61-1.72-1.79 (3), and 0.375 × carapace L (1); movable finger L (4) 0.10-1.105-0.11; galea L (4) 0.03, with 2 curved terminal rami and 1 longer curved lateral ramus, 0.01 in L, arising about 3/4 height of stem; only apical tooth in fixed finger sclerotic, dark ash grey in colour; inner margin of fixed finger with 5 teeth of which most distal 3 situated on inner margin of apical tooth, namely 1 small blunt denticle near tip and 2 continuous retroconical teeth followed by 2 retroconical but non-sclerotic teeth; movable finger with very prominent sharp conical subapical lobe; serrula exterior (4) with 16-16.25-17 blades; serrula interior present, but number of blades not determinable; flagellum (4) as in ♂, anteriormost seta L 0.04, continuous ones 0.03 and 0.02; lamina exterior present. Chaetotaxy as in ♂.

Pedipalp (figs. 27c-d): trochanter (3) 0.20-0.20-0.21/0.09-0.10-0.10, L/W 2.02-2.11-2.17; femur 0.26-0.29-0.31/0.10-0.12-0.13, L/W 2.38-2.49-2.61; patella 0.27-0.30-0.31 (4)/0.11-0.13-0.15, L/W 2.24-2.30-2.36 (4); chela without pedicel 0.48-0.51-0.53 (4)/0.18-0.19-0.195 (3), L/W 2.67-2.80-3.03 (3); chela with pedicel 0.52-0.55-0.57 (4)/0.18-0.19-0.195 (3), L/W 2.90-3.03-3.28 (3); hand without pedicel (4) 0.25-0.26-0.27/0.17-0.18-0.185, L/D 1.40-1.50-1.63; hand with pedicel (4) 0.29-0.31-0.32/0.17-0.18-0.185, L/D 1.66-1.78-1.93; movable finger L 0.23-0.26-0.275, 0.92-0.99-1.04 × L hand without pedicel (4). *sb* on dorsum palpal femur 0.05-0.06-0.07 from exterior key point of femoral base; palpal femur L 4.05-4.77-5.96 × distance from *sb* to exterior key point of femoral base.

Fixed finger with 23-23.6-25 marginal teeth. Movable finger with 22-23.4-25 marginal teeth. Marginal teeth in both fingers as in ♂. Trichobothria on chelal fingers as in ♂.

Fixed finger with *et* up to level of 5/6th-5.70-6th marginal tooth from apical tooth; *est* up to level of 17th-17.70-18th marginal tooth from apical tooth; *it* up to level of 16th-17.30-19th marginal tooth from apical tooth; nodus ramosus up to level of 5th-5.5-6/7th marginal tooth from apical tooth; fixed finger L (arbitrarily considered equal to movable finger L) 6.125-6.70-7.86 × venom duct L.

Movable finger with *t* up to level of 12th-12.60-14th marginal tooth from apical tooth; nodus ramosus up to level of 5/6th-6.4-7/8th marginal tooth from apical tooth; movable finger L 5.82-6.89-8.87 × venom duct L.

First leg (fig. 28d): trochanter (1) 0.06/0.06, L/D 1.08; femur 105-0.12-0.13 (3)/0.05-0.06-0.06 (4), L/D 1.99-2.04-2.13 (3); patella (4) 0.07-0.09-0.10/0.05-0.06-0.07, L/D 1.33-1.47-1.57; femur L 1.31-1.42-1.50 × patella L (3); tibia (4) 0.10-0.115-0.12/0.04-0.045-0.05, L/D 2.49-2.57-2.70; tibia L 1.23-1.31-1.40 × patella L (4); metatarsus (4) 0.055-0.06-0.07/0.03, L/D 1.85-2.065-2.25; tarsus (4) 0.06-0.07-0.07/0.02-0.03-0.03, L/D 2.50-2.62-2.70; arolium and claws as in ♂, but a little stouter.

Fourth leg: trochanter (2) 0.12-0.125-0.13/0.08, L/D 1.44-1.51-1.59; femur 0.09-0.11-0.12/0.065-0.07-0.07, L/D 1.38-1.53-1.69; patella 0.215-0.24-0.26/0.12-0.13-0.14, L/D 1.80-1.87-1.195; femur + patella 0.25-0.29-0.31/0.12-0.13-0.14, L/D 2.15-2.23-2.32; tibia 0.17-0.20-0.21/0.06-0.07-0.07, L/D 2.82-2.97-3.29; metatarsus 0.07-0.08-0.09/0.04, L/D 1.91-2.09-2.29; tarsus: 0.08-0.09-0.09/0.03-0.03-0.035, L/D 2.40-2.55-2.83; arolium and claws as in ♂, but a little stouter.

Chaetotaxy of metatarsus of fourth leg: exterior lateral: T+1, dorsal: 1-1.4-2, interior lateral: 2×2 , ventral 1-1.2-2 (T = tactile seta).

Chaetotaxy and internal structure of ♀ genital area: probably 6 setae on anterior operculum and 4 setae on posterior operculum; cribriform plates only in one case identifiable: 1 medial pair of close-set large oval clusters and probably 1 smaller lateral pair.

Remarks: *Leptolpium prospaeum* spec. nov. is a soilinhabiting species. It has been collected together with *Pachyolpium a. arubense* Beier, 1936 from one locality in Curaçao: 234c; with *Pachyolpium a. arubense*, *P. a. variabilis* and *Aphelolpium scitulum* Hoff, 1964 from one locality in Aruba: 262B; together with *P. a. variabilis* and *A. scitulum* from one locality in Bonaire: 198; and with *P. a. arubense* and *A. scitulum* from another locality: 313 on the same island.

Etymology: The new generic name of this olpiid (*Leptolpium*) refers to the very slender shape of the body (*leptos* (Greek) - slender), the specific epithet (*prospaeum*) refers to the surprising find of this new species from the Netherlands Antilles of the Leeward Group, north of Venezuela (*prospao* (Greek) - unexpected).

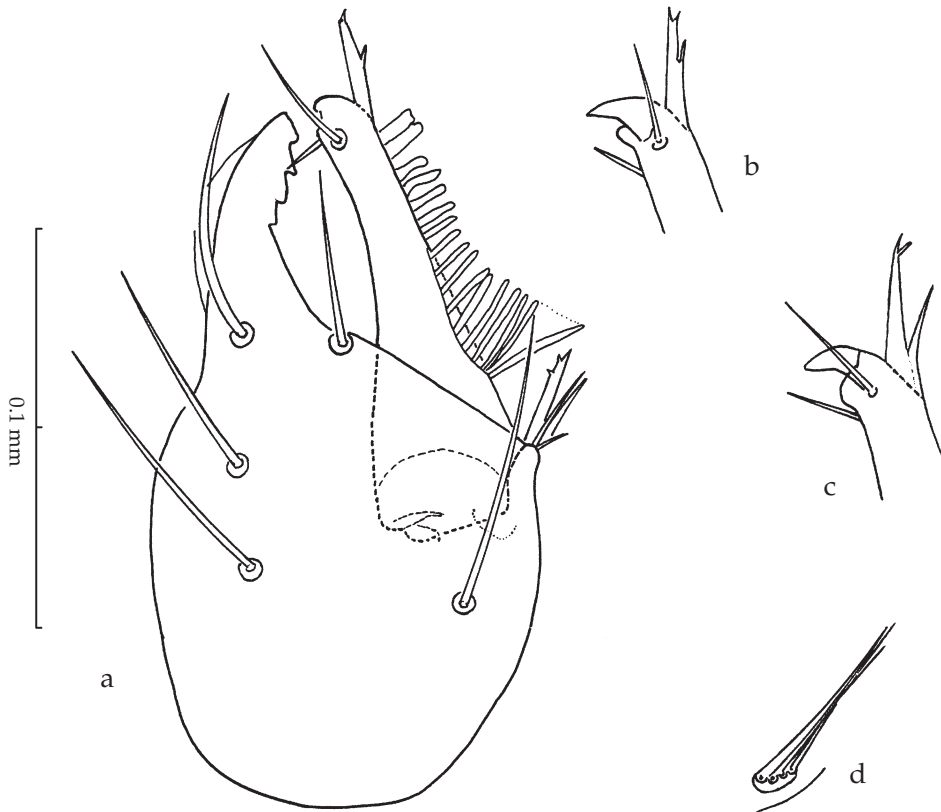


Fig. 31. *Serianus gratus* Hoff, ♂: 500 (a), 192 (b); and ♀: 195 (c-d) from Curaçao. a. Exterior aspect of right chelicera. b-c. Exterior aspect of tip of movable finger of right chelicera. d. Exterior aspect of flagellum of right chelicera.

Subfamily Garypininae Daday, 1888
Genus *Serianus* Chamberlin, 1930

The most striking characteristics of this genus are: arolia of legs bifurcate; patella of both forelegs distinctly longer than femur; at least anteriormost tergites and sternites completely divided into scuta; chelicera with flagellum of 4 blades; chelal fixed finger with *it*, *ist* and *isb* located near base, close together, and distinctly distal to *ib*; *it* and *ist* closer to level of *esb* than to level of *est*; chelal movable finger with *st* and *sb* closely paired; *ib* in solitary basal position.

Serianus gratus Hoff, 1964
 (figs. 29-34).

Serianus gratus Hoff, 1964: 35-39, figs. 13-14 [Jamaica]; Muchmore, 1977: 76 [Br. Honduras (now Belezé)]; Muchmore, 1979: 207 [Florida].

Material.— **Curaçao**: 323, Hofje Groot St. Joris, 9.iv.1949: 3 ♂♂ (192, 194, 197), 1 ♀ (195) and 1 deutonymph (196); 327, S Hofje Santa Barbara, 14.viii.1948: 1 ♂ (654); 334, Klein Hofje Groot Piscadera, 27.i.1949: 2 ♂♂ (500, 814) (localities fully described by Wagenaar Hummelinck, 1953: 11-28).

The specimens taken in Curaçao appear to belong to this species. However the body length of both the ♀ and deutonymph is little longer, and chelal movable finger in both sexes is on the average somewhat shorter, but these slight differences fall probably within the geographic variation of the species.

Diagnosis: *Serianus gratus* from Curaçao may be distinguished from the nearest known relative, *Serianus carolinensis* Muchmore, 1968 from the eastern United States and Florida (Muchmore, 1968: 145-150, 3 figs.; 1979: 207, 1 fig.), by following differences in the ♂ and ♀: palpal femur and femur + patella of fourth legs slightly less slender, on the average little shorter chelal movable finger, and as stated below differences in chelicera; in ♂: palpal patella slightly less slender. Critical points of difference in chelicera: serrula exterior in both sexes with probably 17 plates instead of 15 or 16; galea in ♂ with short lateral ramus arising at about midpoint or somewhat distal to midpoint of main stalk and about 1/5-1/6 as long as main stalk; galea in ♀ with lateral ramus arising at midpoint or somewhat basal to midpoint of main stalk and about half as long as main stalk. In *Serianus carolinensis* the ♂ chelicera is in all respects similar to that of ♀: lateral ramus of galea arises at about midpoint and is nearly as long as main stalk (Muchmore, 1968: 149, fig. 1), or 1/2 or more the length of galea (Muchmore, 1979: 212).

Description: ♂. Description based on 6 specimens (figs. 29-30, 31a-b, 32-33).

Body (5) L 1.77-2.02-2.15.

Carapace: 0.42-0.50-0.54/greatest W 0.35-0.37-0.40, L/W 1.20-1.34-1.48; eyes 2 pairs, well developed, anterior pair about half their own diameter from posterior pair; anterior margin of carapace probably with 4 setae, posterior margin probably with 2 setae.

Abdomen (4): 1.35-1.49-1.605, greatest W (3) 0.54-0.64-0.69, L/W (2) 2.21-2.235-2.26; tergites I-III through VIII-IX weakly divided, scuta more developed and stronger sclerotic towards posterior end of abdomen; chaetotaxy tergites I-IX (3): 4: 4: 4: 4: 4-5.3-6: 6: 6: 6; sternites III through V-IX weakly divided, scuta more devel-

oped and stronger sclerotic towards posterior end of abdomen; chaetotaxy sternites IV-IX (3): 6: 6: 0/3(5)0/2: 0/2(5)0/2: 0/2(2)0/2: 6 [(5) indicates semicircularly-shaped cluster of 5 setae on sternites VI and VII, situated anteriorly with respect to marginal setae; (2) means cluster of 2 setae on sternite VIII, situated in similar way; position of clusters with respect to midline 1 × to left side, 2 × to right side, if observed from ventral sight]; anterior stigmatic plates (3) with 2 setae, posterior stigmatic plates (3) with 1 seta.

Chelicera (fig. 31a): 0.16-0.17-0.19/0.09-0.10-0.115, L/W 1.65-1.765-1.83; movable finger L 0.10-0.11-0.12; galea L 0.03-0.03-0.035, main stalk terminally bifid, lateral ramus arising 0.01-0.015-0.02 from base, L lateral ramus 0.005-0.01-0.01; inner margin of fixed finger with 6 (1 with 5) teeth; movable finger with a modest undivided subapical lobe and just proximal to that a spinelike blade (about half as long as galeal seta) near inner margin of finger; serrula exterior probably with 17 blades; flagellum consists of 4 spiny setae, 3 of which of same L, posterior seta of about 3/4 L, only anterior 2 setae unilaterally dentate in the distal quarter. Chaetotaxy: 5 setae on exterior surface of hand and 1 seta on exterior surface of movable finger, originating close to base of subapical lobe, about as long as galea.

Pedipalp (figs. 29a-b, 30a-b): maxilla 0.23-0.25-0.27/0.105-0.13-0.15, L/W 1.61-1.91-2.17; trochanter 0.195-0.20-0.21/0.09-0.10-0.11, L/W 1.82-1.945-2.16; femur 0.32-0.345-0.37/0.12-0.13-0.14, L/W 2.64-2.70-2.81; patella 0.315-0.35-0.37/0.15-0.16-0.17, L/W

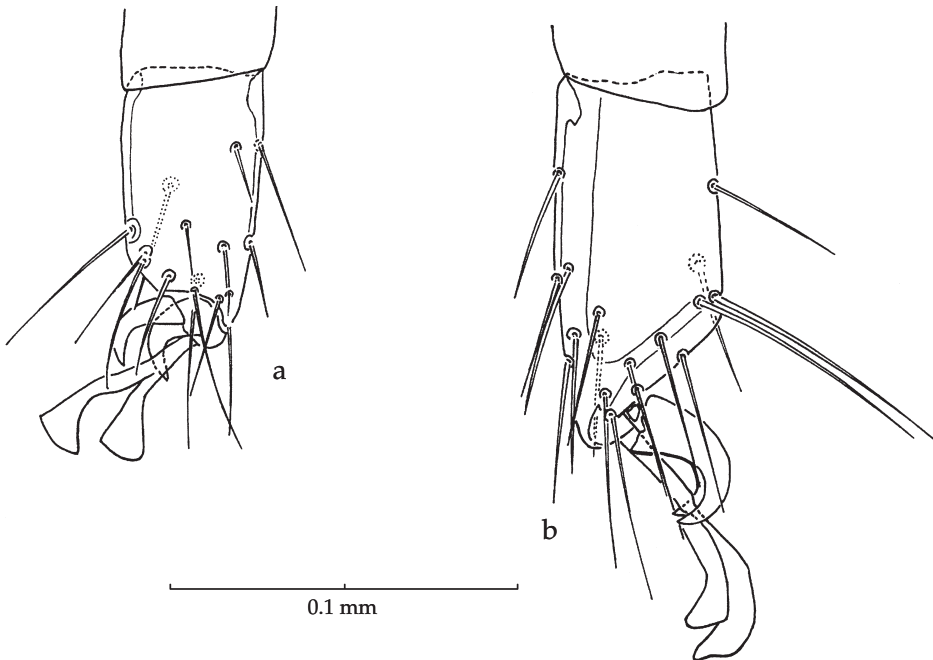


Fig. 32. *Serianus gratus* Hoff, ♂, 500, from Curaçao (a-b). Tarsi of legs I and IV, showing claws and divided arolium. a. Posterior aspect of left leg I. b. Anterior aspect of left leg IV.

2.12-2.215-2.30; chela without pedicel 0.52-0.57-0.61/0.16-0.17-0.19, L/W 3.16-3.275-3.40; hand without pedicel 0.29-0.32-0.34/0.145-0.18-0.19, L/D 1.77-1.825-1.99; movable finger L 0.23-0.26-0.28, 0.74-0.82-0.88 × L hand without pedicel. *sb* on dorsum femur long and slender, 0.10-0.12-0.15 from exterior key point of femoral base; palpal femur L 2.37-2.87-3.48 × distance from tactile seta on dorsum femur to exterior key point of femoral base. Fixed finger with 18-20.7-22 marginal teeth, 2 of 3 of basal part of row flattened or reduced; all trichobothria, with exception of *et*, within basal third part of finger; *et* up to level of 6/7th-6.8-7/8th marginal tooth from apical tooth; *it* up to level of 18th-19.5-21st marginal tooth from apical tooth; nodus ramosus up to level of 3rd-3.4-4th marginal tooth from apical tooth; fixed finger L (5) (arbitrarily considered equal to movable finger L) to 8.86-9.24-9.93 times venom duct L.

Movable finger with 16-17.0-18 marginal teeth, 5 or 6 of basal part of row more or less flattened or reduced; *sb* and *st* on same level, separated by less than 1 areolar diameter, distad to *b* and proximal to *t*; *t* up to level of 12/13th-13.7-14/15th marginal tooth from apical tooth; nodus ramosus up to level of 3/4th-4.3-5th marginal tooth from apical tooth; movable finger L 6.69-7.81-8.42 × venom duct L.

First leg (fig. 32a, tarsus): trochanter (5) 0.06-0.075-0.09/0.05-0.06-0.07, L/D 1.03-1.16-1.29; femur 0.08-0.08-0.09/0.08-0.09-0.09, L/D 0.88-0.97-1.04; patella 0.13-0.14-0.15/0.09-0.095-0.10, L/D 1.40-1.455-1.55; patella L 1.58-1.63-1.71 × femur L; tibia 0.15-0.16-0.17/0.06, L/D 2.51-2.66-2.79; metatarsus 0.05-0.05-0.06/0.035-0.04-0.04, L/D 1.2-1.3-1.45; tarsus 0.06-0.075-0.08/0.035-0.04-0.04, L/D 1.67-1.99-2.21; bifurcate arolium about twice as long as claws.

Fourth leg (fig. 32b, tarsus): trochanter (5) 0.10-0.12-0.13/0.08-0.09-0.10, L/D 1.17-1.31-1.50; femur 0.13-0.14-0.15/0.09-0.10-0.10, L/D 1.44-1.46-1.50; patella 0.27-0.29-0.32/0.14-0.16-0.17, L/D 1.72-1.87-2.0; femur + patella 0.325-0.36-0.39/0.14-0.16-0.17, L/D 2.14-2.28-2.39; tibia 0.22-0.24-0.26/0.08-0.09-0.09, L/D 2.64-2.76-2.86; metatarsus 0.07-0.08-0.08/0.05-0.05-0.06, L/D 1.44-1.485-1.53; tarsus 0.09-0.10-0.105/0.04-0.05-0.05, L/D 2.08-2.28-2.23; bifurcate arolium about twice as long as claws.

Chaetotaxy of ♂ genital area (4): each side of midline with a group of 4 setae along anterior lip and 1 pair of setae along posterior lip of genital slit.

Female: Description based on 1 specimen (figs. 31c-d, 34).

Body L 2.77.

Carapace: 0.47/greatest W 0.40, L/W 1.17; eyes: 2 pairs, well developed, anterior pair about half their own diameter from posterior pair; anterior margin of carapace with 4 setae, posterior margin probably also with 4 seta.

Abdomen: 2.34/greatest W 0.93, L/W 2.52; tergites III through IX weakly divided, scuta more developed and stronger sclerotic towards posterior end of abdomen; chaetotaxy tergites I-X: 4: 4: 6: 6: 6: 6: 8: 7: 7; sternites III through IX weakly divided, scuta more developed and stronger sclerotic towards posterior end of abdomen: chaetotaxy sternites IV-IX: 4: 6: 1(3)3: 1(3)3: 1(2)2: 3 [(3) indicates cluster of 3 setae on sternites VI and VII; (2) means cluster of 2 setae on sternite VIII; clusters situated anteriorly with respect to marginal setae and to left side of midline if observed from ventral side]; anterior stigmatic plates with 3 setae, posterior stigmatic plates with 1 seta.

Chelicera (figs 31c-d): 0.19/0.105, L/W 1.77; movable finger L 0.12; galea L 0.04, main stalk terminally bifid, lateral ramus arising 0.01 (left) and 0.02 (right) from base,

L lateral branch 0.02; inner margin of fixed finger with 5 teeth; movable finger with an obvious, not divided subapical lobe and just proximal to that a spine-like blade (about 3/4 as long as galeal seta) near inner margin of finger; number of plates of serrula exterior not clearly perceptible, but probably 17; flagellum consists of 4 spiny setae, probably of about same length.

Chaetotaxy: 5 setae on exterior surface of hand and 1 seta on exterior surface of movable finger, originating very close to base subapical lobe, about as long as galea.

Pedipalp: maxilla 0.26/0.13, L/W 2.04; trochanter 0.21/0.11, L/W ratio 1.94; femur 0.35/0.13, L/W ratio 2.67; patella 0.35/0.16, L/W 2.33; chela without pedicel 0.59/0.175, L/W 3.35; hand without pedicel 0.34/0.17, L/W 1.99; movable finger L 0.26, $0.77 \times$ L hand without pedicel. *sb* on dorsum femur long and slender, 0.12 from exterior key point of femoral base; palpal femur L $3.01 \times$ distance from *sb* on dorsum femur to exterior key point of femoral base. Fixed finger with 20 marginal teeth, 5 of basal part of row reduced; all trichobothria, with exception of *et*, within basal quarter of finger; *et* up to level of 6/7th marginal tooth from apical tooth; *it* beyond level of 20th marginal tooth from apical tooth; nodus ramosus up to level of

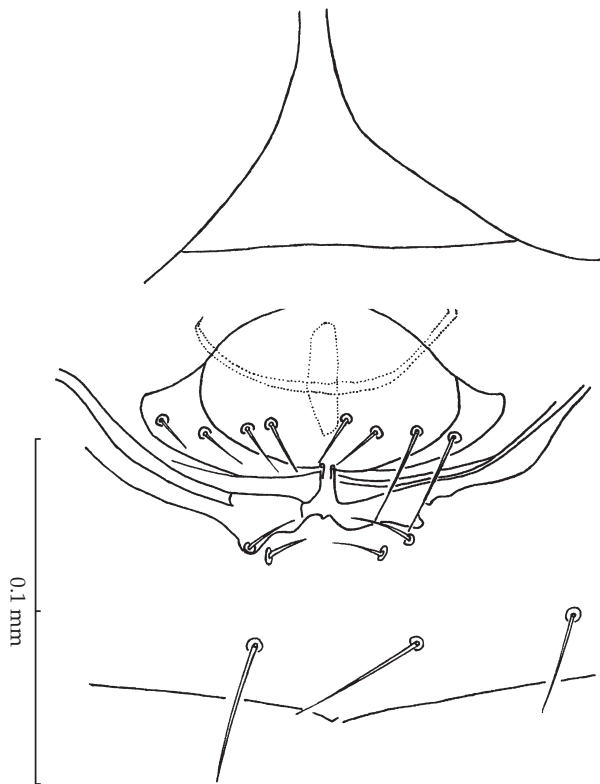


Fig. 33. *Serianus gratus* Hoff. External aspect of ♂ genital area, showing chaetotaxy, in specimen from Curaçao (197).

3rd/4th marginal tooth from apical tooth; fixed finger L (arbitrarily considered equal to movable finger L) to $10.0 \times$ venom duct L.

Movable finger with 16 marginal teeth, 3 of basal part of row flattened; *sb* and *st* on about same level, separated by less than $1/2$ areolar diameter, distad to *b* and proximad to *t*; *t* up to level of 13th marginal tooth from apical tooth; nodus ramosus up to level of 2nd/3rd marginal tooth from apical tooth; movable finger L 0.26 , and $8.19 \times$ venom duct L.

First leg: trochanter $0.09/0.065$, L/D 1.35 ; femur $0.08/0.08$, L/D 1.01 ; patella $0.14/0.09$, L/D 1.54 ; patella L $1.74 \times$ femur L; tibia $0.15/0.06$, L/D 2.51 ; metatarsus $0.05/0.04$, L/D 1.2 ; tarsus $0.07/0.04$, L/D 1.71 ; bifurcate arolium about twice as long as claws.

Fourth leg: trochanter $0.13/0.09$, L/D 1.40 ; femur $0.14/0.10$, L/D 1.37 ; patella $0.30/0.16$, L/D 1.94 ; femur + patella $0.37/0.16$, L/D 2.38 ; tibia $0.25/0.09$, L/D 2.78 ; metatarsus $0.08/0.06$, L/D 1.41 ; tarsus $0.10/0.05$, L/D 2.07 ; bifurcate arolium about twice as long as claws.

Genital complex (fig. 34): 1 fairly well developed medial cribriform plate and on each side 1 smaller lateral one; along posterior margin of anterior operculum 4 setae to left side of midline and 3 to right side; posterior operculum with 3 setae to each side of midline in a transverse row.

Deutonymph. Description based on 1 specimen. Characteristics only partly determinable owing to distortion of body and chela under cover slip of slide.

Body L 1.77 .

Chelicera: $0.13/0.09$, L/W 1.49 ; movable finger L 0.085 ; galea L 0.03 , main stalk apically not divided, L lateral ramus 0.01 , arising 0.01 from base; inner margin of fixed finger with 6 teeth, movable finger with a small simple subapical lobe; serrula exterior with 12 plates; flagellum consists of 4 pinnate setae, anterior 3 of same length, posterior one probably shorter.

Chaetotaxy: lacking *sb*, *b*, *es* and *gls*.

Pedipalp: trochanter $0.15/0.08$, L/W 1.93 ; femur $0.23/0.09$, L/W 2.56 ; patella $0.22/0.105$, L/W 2.125 ; chela without pedicel: $0.41/0.11$, L/W 3.69 ; hand without pedicel L 0.22 ; movable finger L 0.20 , $0.92 \times$ L hand without pedicel. *sb* on dorsum femur 0.095 from exterior key point of femoral base; palpal femur L $2.43 \times$ distance from *sb* on dorsum femur to exterior key point of femoral base.

Fixed finger with at least 12 marginal teeth, a few basal teeth probably reduced; *et* up to level of 8th marginal tooth from apical tooth; *it* and *eb* lacking.

Movable finger with at least 11 marginal teeth, a few basal teeth probably reduced; *t* far beyond level of 11th marginal tooth, probably lacking *st* and *sb*.

First leg: trochanter $0.06/0.06$, L/D 0.93 ; femur $0.06/0.07$, L/D 0.9 ; patella $0.09/0.07$, L/D 1.29 ; patella L $1.53 \times$ femur L; tibia $0.11/0.05$, L/D 2.12 ; metatarsus $0.04/0.04$, L/D 1.045 ; tarsus $0.05/0.035$, L/D 1.5 ; bifurcate arolium about twice as long as claws.

Fourth leg trochanter $0.075/0.08$, L/D 0.955 ; femur $0.105/0.08$, L/D 1.32 ; patella $0.21/0.12$, L/D 1.81 ; femur + patella $0.27/0.12$, L/D 2.28 ; tibia $0.17/0.07$, L/D 2.385 ; metatarsus $0.05/0.05$, L/W 1.11 ; tarsus $0.075/0.04$, L/W 1.87 ; bifurcate arolium about twice as long as claws.

Remarks: *Serianus gratus* was collected with *Pachyolpium arubense arubense* Beier,

1936, in one locality (Stat. 323) and with *Aphelolpium scitulum* Hoff, 1964, in two other localities (Stat. 327 and 334).

Conclusions: Apparently *Serianus gratus* is of rare occurrence in the explored area since specimens of this soil-inhabiting species are only found in material from three of 36 localities in Curaçao and none from 22 localities in Aruba, 26 localities in Bonaire, three localities in Klein Curaçao and three localities in Klein Bonaire. The presence of the species refers to specimens from the surroundings of Piscadera (one locality) and Spaanse Water (two localities).

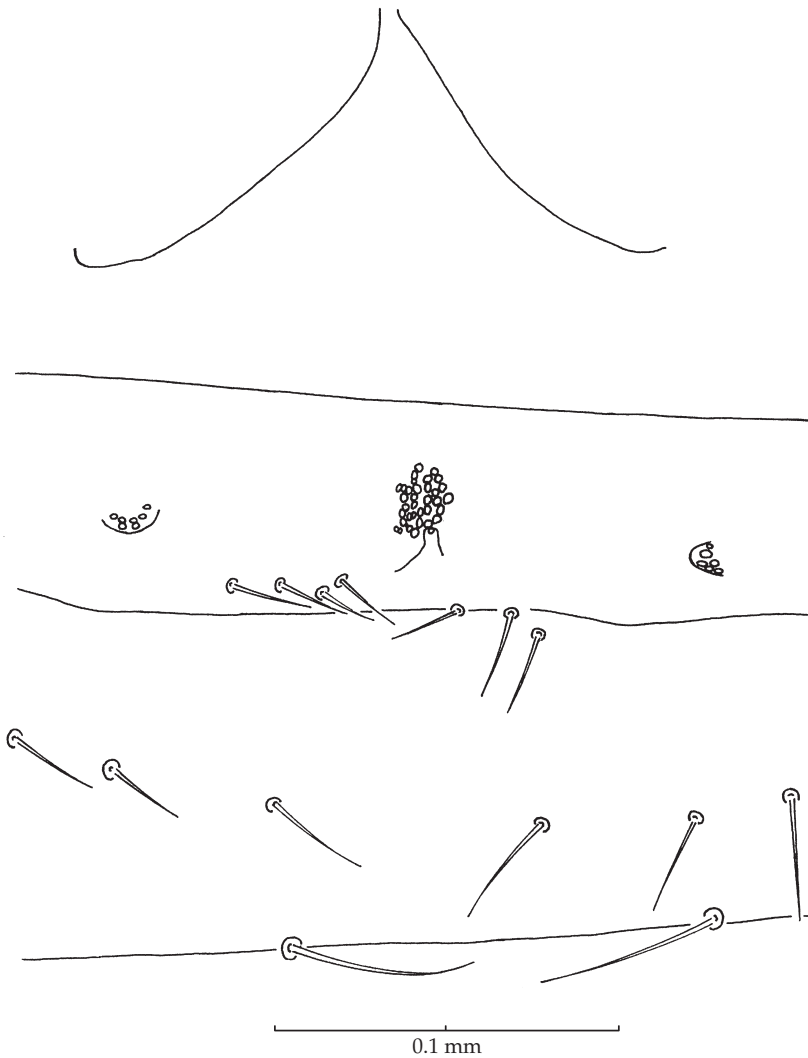


Fig. 34. *Serianus gratus* Hoff. ♀ genital area, showing chaetotaxy and cribriform plates, in specimen from Curaçao (195).

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