

**Two new species of *Parichoronyssus* Radovsky, 1966
(Acari, Dermanyssoidea, Macronyssidae)
from bats of the Genus *Phyllostomus*
(Mammalia, Chiroptera, Phyllostomidae)
in Paraguay and Cuba**

Mike Heddergott

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Two new species of bat mites of the *Parichoronyssus* Genus from Central and South America are described. *Parichoronyssus kretzschmari* spec. nov. were found on two phyllostomid bat species: the *Macrotus waterhousii* (Gray, 1843), from Isla de Pinos, San Pedro and Júcaro and *Phyllonycteris poeyi* Gundlach, 1860 from Sancti Spiritus Province and La Serafina, all locations on Cuba. The female, male and protonymph are described and illustrated.

Parichoronyssus moralesmalacari spec. nov. was found on *Sturnira lilium* (E. Geoffroy, 1810), a phyllostomid bat species, from Puesto Warnes in the Defensores del Chaco National Park, and Puerto Obligado, both in San Salvador and also from Puerto Risso, in Paraguay. The female, male, deutonymph and protonymph are described and illustrated.

To date, including the two new species, nine species of the *Parichoronyssus* genus are known.

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Introduction

Up to the present day, the *Parichoronyssus* Radovsky, 1966 genus consisted of seven species, which primarily occur on the host species of neotropical bats of the Phyllostomidae family: *Parichoronyssus sclerurus* Radovsky, 1966; *Parichoronyssus crassipes* Radovsky, 1967; *Parichoronyssus cyrtosternum* Radovsky, 1967; *Parichoronyssus euthysternum* Radovsky, 1967; *Parichoronyssus radovskyi* Morales-Malacara, 1992; *Parichoronyssus lopezi* Morales-Malacara, 1996 and *Parichoronyssus bakeri* Morales-Malacara & Guerrero, 2007 (Radovsky 1966, 1967; Morales-Malacara 1992, 1996; Morales-Malacara & Guerrero 2007).

The eighth and ninth species of *Parichoronyssus* genus are described in this paper. These two new species represent the first records of the *Parichoronyssus*

genus for Paraguay and, in addition to *Parichoronyssus sclerurus* Radovsky, 1966, *P. radovskyi* Morales-Malacara, 1992 and *P. lopezi* Morales-Malacara, 1996, the fourth species of the genus for Cuba (Heddergott, in press).

Material and Methods

Parasites were collected from reptiles, birds and mammals in the course of two expeditions in South America in 2002 and 2004. In the course of these studies, 1264 species of ectoparasites were collected from 58 different bat species. The bats were caught in nets and released in the same location after identification and the taking of ectoparasite samples. Further parasites were collected in bat quarters and the guano

found there. An evaluation of the complete material collected will be published in different periodicals over the next few years.

In addition, specimens collected by G. G. Sanches-Ménoça and F. Steidl in the course of their bat survey projects on Cuba from 1966 to 2000 were also evaluated.

The locations where the collected material is deposited is shown in the text by the following abbreviations: American Museum of Natural History, New York (AMNH), Collection of parasitic mites M. Heddergott (CMH-pM), Facultad de Ciencias, Universidad Nacional Autónoma de México, Coyoacán (FCUMC), Natural History Museum, London (NHM), Natural Museum of Natural History, Smithsonian Institution, Washington (NMNH), Natural Science Museum of the Humboldt University, Berlin (MNUH) and Zoologische Staatssammlung, München (ZSM).

Prior to examination, the ectoparasites are stored in a 70 % alcohol solution. Drawings were made with a phase contrast Zeiss microscope (Göttingen, Lower Saxony, Germany) with a drawing tube.

The nomenclature of idiosoma chaetotaxy is based on studies by Lindquest & Evans (1965) and Micherdzinski (1980). All measurements are given in micrometers (μm).

Parichoronyssus moralesmalacari spec. nov.

(Figs. 1-17)

Type series. Holotype. ♀, Allotype ♂, 5 Paratype ♀♀, 2 Paratype ♂♂, 2 Paratype PNN and 2 Paratype DNN [NMNH] ex *Sturnira lilium* 2 ad. ♀♀, 7 km south of Puesto Warnes, Defensores del Chaco National Park (20°01'22"N 60°44'32"E), Paraguay, 25.VII.2002, leg. M. Heddergott, H. J. Mendece, F. Salkowa & G. Wagner.

Paratype. 1♀, 1♂, 1 PN and 1 DN [AMNH] ex *Sturnira lilium* 1 ad. ♂, 7 km south of Puesto Warnes, Defensores del Chaco National Park (20°01'22"N 60°44'32"E), Paraguay, 25.VII.2002, leg. M. Heddergott, H. J. Mendece, F. Salkowa & G. Wagner. – 1♀ and 2 DNN [ZSM] ex *Sturnira lilium* 1 ad. ♀, 4 km north of Puesto Palmares, Defensores del Chaco National Park (20°12'13"N 60°08'02"E), Paraguay, 27.VII.2002, leg. M. Heddergott, H. J. Mendece, F. Salkowa & G. Wagner. – 2♀♀, 2♂♂ and 1 PN [MNUH] ex *Sturnira lilium* 1 ad. ♂, Puerto Obligado (27°06'03"N 55°34'31"E), Paraguay, 16.VI.2004, leg. M. Heddergott & H. J. Mendece. – 1♀, 2♂♂, 2 PNN and 1 DN [FCUMC] ex *Sturnira lilium* 1 ad. ♀, Puerto Obligado (27°06'03"N 55°34'31"E), Paraguay, 16.VI.2004, leg. M. Heddergott & H. J. Mendece. – 4 PNN and 3 DNN [CMH-pM 5672-5676/2004] [CMH-pM 5977-5980/2004] ex *Sturnira lilium* 1 ad. ♀, Puerto Obligado (27°06'03"N 55°34'31"E), Paraguay, 16.VI.2004, leg. M. Heddergott & H. J. Mendece. – 2♀♀ and 2 DNN [FCUMC] ex *Sturnira lilium* 1 ad. ♂, Puerto Obligado

(27°06'03"N 55°34'31"E), Paraguay, 16.VI.2004, leg. M. Heddergott & H. J. Mendece. – 2♀♀, 1♂, 1 PN and 1 DN [NHM] 2♀♀ and 2 DNN [FCUMC] ex *Sturnira lilium* 1 ad. ♂, Puerto Obligado (27°06'03"N, 55°34'31"E), Paraguay, 16.VI.2004, leg. M. Heddergott & H. J. Mendece. – 9♀♀, 6♂♂, 11 PNN and 4 DNN [CMH-pM 5992-6022/2004] ex *Sturnira lilium* 2 ad. ♀♀ and 1 ad. ♂, San Salvador (22°51'15"N 57°47'09"E), Paraguay, 21.VI.2004, leg. M. Heddergott, G. H. Jung & H. J. Mendece. – 5♀♀, 4♂♂, 9 PNN and 2 DNN [CMH-pM 6075-6095/2004] ex *Sturnira lilium* 2 ad. ♀♀, Puerto Risso (22°21'16"N 57°49'17"E), Paraguay, 27.VI.2004, leg. M. Heddergott, G. H. Jung & H. J. Mendece.

Typus locality. 7 km south of Puesto Warnes, Defensores del Chaco National Park (20°01'22"N 60°44'32"E), Paraguay.

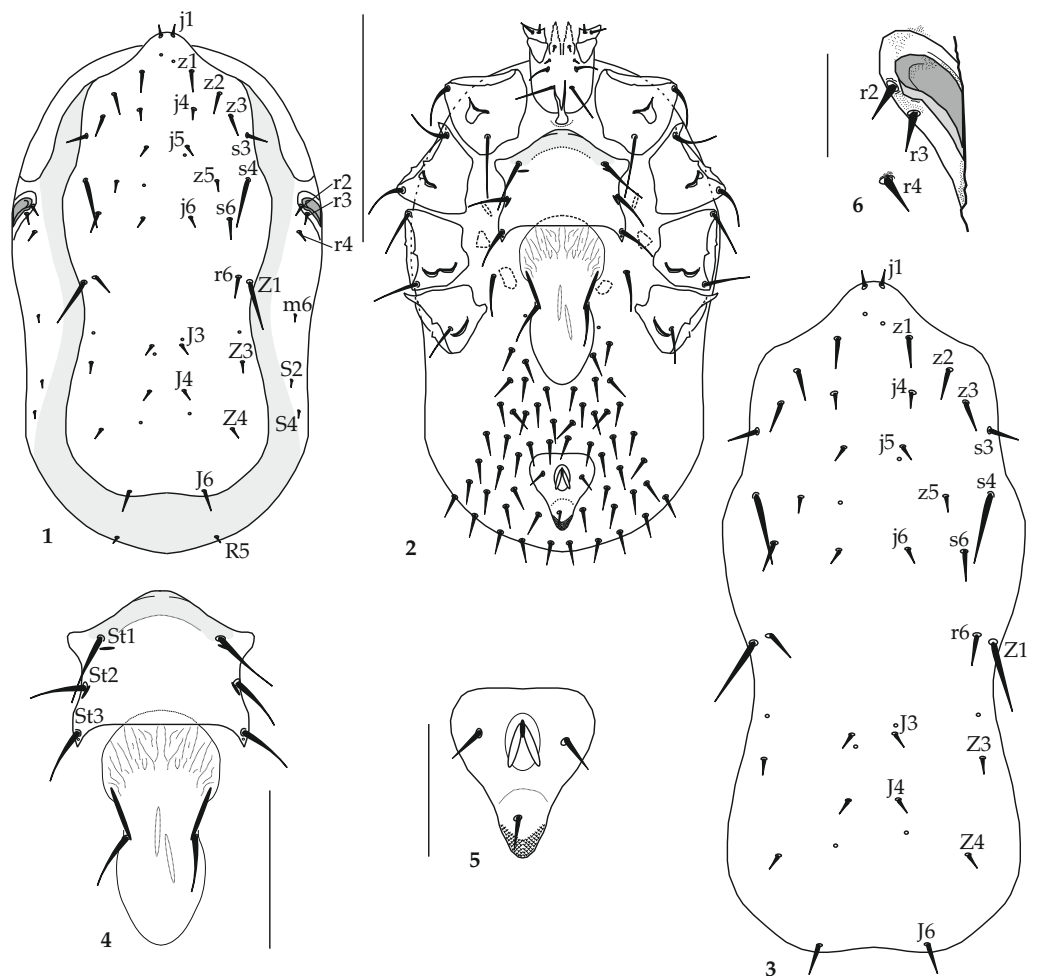
Host species. *Sturnira lilium* (E. Geoffroy, 1810) (Chiroptera: Phyllostomidae).

Diagnosis. Female dorsal shield with 18 setal pairs, setae s4 and Z1 very long, and more robust and noticeably larger than the remaining setae. Dorsal integument with seven small setae. Seta r2 present. The Setae r2 and r3 of the female are on the peritremal shield. The epigynial shield has one additional seta. Coxa I with a powerful ridge and a very pronounced hyaline projection. Characteristic of the species is the anterodorsal tooth on Coxa IV. Setae of hypostome and palpal trochanter all present.

Description

Female (Figs. 1-7). Dorsum (Figs. 1, 3, 6). Dorsal shield with 18 setal pairs. Setae s4 and Z1 considerably longer and more robust than the other setae. Setae z1, z2, z3, s4, r6 and J6 long and slender but only half as large as s4 and Z1. The remaining setae slender and short (Figs. 1, 3). Seven setal pairs are located outside the dorsum (r2, r3, r4, R1, S2, S3 and Z5). Setae S2 and S4 on the border of the dark area. Seta r2 present. Setae r2 and r3 are on the edge of the peritreme which is arched towards the dorsum. (Fig. 6).

Venter (Figs. 2, 4, 5). Tritosternum bipartite with laciniae short and smooth but with a few denticles. The upper edges of the sternal shield between both sternal setae St1, in the form of an arch, greatly elevated, and clearly separated from the underside by a semi-circular ridge (Fig. 4). Setae of the sternal shield long, smooth, and robust. Sternal shield about as long as it is broad. (Fig. 4). Epigynial shield quite robust narrowing to a blunt tip and slightly concave at the level of the epigynial setae (Fig. 4). Anal shield triangular with three anal setae. A half-moon shaped weak ridge above the lower anal setae (Fig. 5). The anterior part of the opisthosoma has 27-31 smooth, somewhat longer, and more robust pairs of bristles (Fig. 2).



Figs. 1-6. *Parichoronyssus moralesmalacari* spec. nov. ♀, holotype. 1. Dorsal. 2. Ventral. 3. Dorsal shield. Scale: 200 µm. 4. Sternal shield. Scale: 100 µm. 5. Anal shield. Scale: 50 µm. 6. Peritremal shield. Scale: 25 µm.

Gnatosoma. Deutosternal groove with 11-15 denticles. Distal hypostomal setae present and very small (4-7) less than equal in size to outer proximal setae (7-8). Palpal trochanter with lateral setae longer (27-33) than length of ridge (12-15), medial setae very small (3-5).

Legs. Coxae I-IV have very strongly proportioned

ridges with hyaline projections (Fig. 2). Coxa I with slender hyaline projection of an elongated flap-like shape and an additional anterodorsal tooth. Coxae II and III with two slender hyaline projections. Coxa IV with additional anterodorsal tooth (Fig. 7). The anterodorsal tooth of Coxa IV is larger than that of Coxa II. The leg chaetotaxy is summarised in Table 1.

Table 1. Leg chaetotaxy of *Parichoronyssus moralesmalacari* spec. nov.

Leg	Coxa	Trochanter	Femur	Genu	Tibia	Tarsus
I	2	1-2/2-1(6)	2-4/5-3(14)	3-5/3-2(13)	3-5/3-2(13)	-/-
II	2	1-2/2-1(6)	2-4/3-2(11)	3-5/3-1(12)	2-4/3-1(10)	4-5/8-4(21)
III	2	1-1/2-1(5)	2-4/2-2(10)	2-3/2-1(8)	2-3/3-2(10)	3-5/8-4(20)
IV	1	1-1/3-1(6)	1-4/3-2(10)	1-2/2-1(6)	1-3/3-2(9)	2-6/6-4(18)

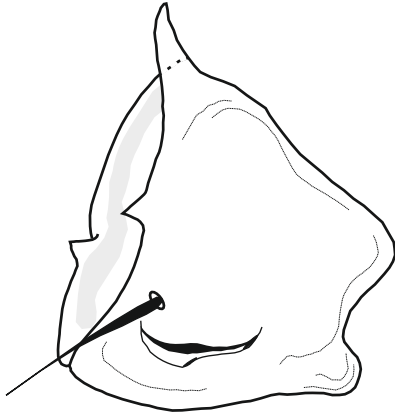


Fig. 7. *Parichoronyssus moralesmalacari* spec. nov. ♀, holotype. Coxa IV with a lobe-like anterodorsal tooth. Scale: 25 µm

Measurements. Holotype ♀ (11 Paratypes ♀♀ and Holotype ♀: minimum-maximum; ranges followed by means in parentheses): Idiosoma length 469 (427-502; 476.3) and with at level of peritreme 286 (257-301; 296.1). Dorsum: Dorsal shield long 396 (365-399; 387.3); with at level of setae s6 192 (182-201; 191.7). Setae length: j1 10 (8-12; 8.91); j4 8 (5-9; 6.62); j5 8 (7-10; 8.62); j6 8 (7-9; 8.32); z1 21 (18-23; 19.23); z2 23 (21-23; 21.87); z3 21 (19-23; 20.98); z5 9 (8-11; 9.03); s3 22 (20-23; 22.62); s4 48 (46-53; 51.72); s6 21 (19-22; 20.78); m6 16 (15-19; 17.21); r2 10 (8-11; 9.62); r3 9 (7-11; 8.87); r4 12 (10-14; 11.07); Z1 47 (45-53; 50.21); Z3

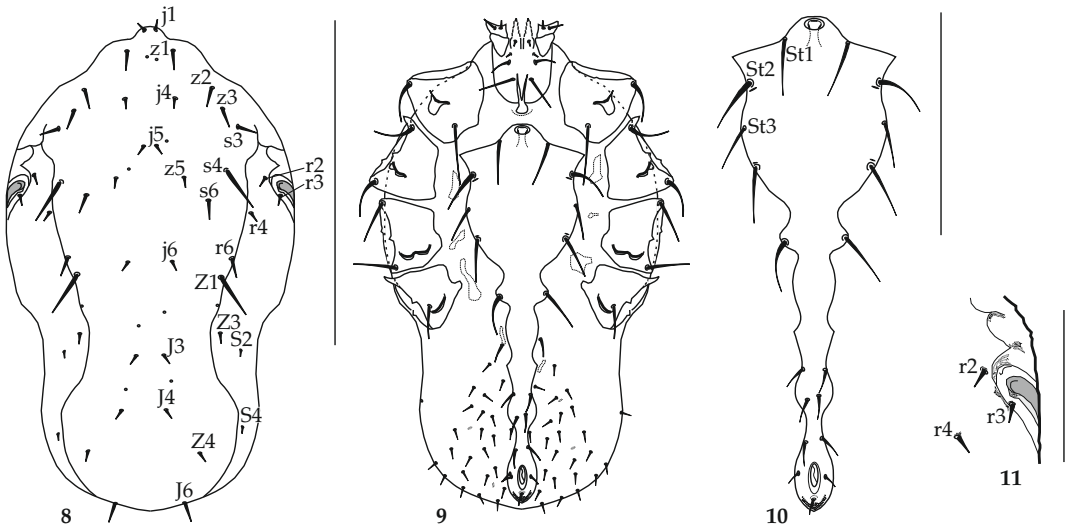
10 (8-11; 10.36); Z4 11 (8-12; 10.86); J3 9 (8-10; 9.26); J4 8 (7-10; 8.92); J6 19 (19-23; 21.29); R1 6 (5-10; 8.17); R5 6 (5-9; 8.06); S2 7 (6-12; 11.39) and S4 13 (10-15; 12.81). Venter: Idiosoma with 25-27 pairs setae 38-42 long; anal shield length 76 (73-81; 79.3) and with 62 (59-68; 63.7); sternal shield length 85 (81-93; 87.6) and with at level of seta St1 123 (115-127; 125.8). Setae length: St1 49 (47-52; 50.56); St2 45 (44-50; 46.91); St3 42 (40-48; 45.03); St1-St1 73 (71-77; 75.72); St2-St2 89 (87-95; 91.56) and St3-St3 97 (95-101; 98.45).

Male (Figs. 8-11). Smaller than the female. Dorsum (Figs. 8, 11). Dorsal shield as female with 18 pairs of setae (Fig. 8). Dorsal shield club-shaped towards end. Setae j4, j5, z5, j6, J3 J4 and Z4 long, slender and smooth. Setae s4 and Z1 very long, robust and smooth; all remaining setae shorter but robust and smooth. Five small setae are located outside the dorsal shield (r2, r3, r4, S2 and S4). Seta r2 is present, r3 inserted on the edge of the peritreme (Fig. 11). The peritreme is slightly arched towards the dorsum.

Venter (9 and 10). Holoventral shield very long and slender. The ventral region of the holoventral shield with six setae. The holoventral shield is strongly upwardly vaulted. Holoventral shield has five long and smooth setae St1, St2, St3, St4 and one smaller epigynial seta (Fig. 10), with pronounced bulges at the level of the epigynial seta. On the opisthosoma 18-23 additional setae pairs on either side of the holoventral shield.

Gnatosoma. Hypostomal and palpal trochanter setae as in female.

Legs (Fig. 9). Coxae I-IV have very powerfully



Figs. 8-11. *Parichoronyssus moralesmalacari* spec. nov. ♂. 8. Dorsal. 9. Ventral. Scale: 200 µm. 10. Holoventral shield. Scale: 100 µm. 11. Peritremal shield. Scale: 25 µm.

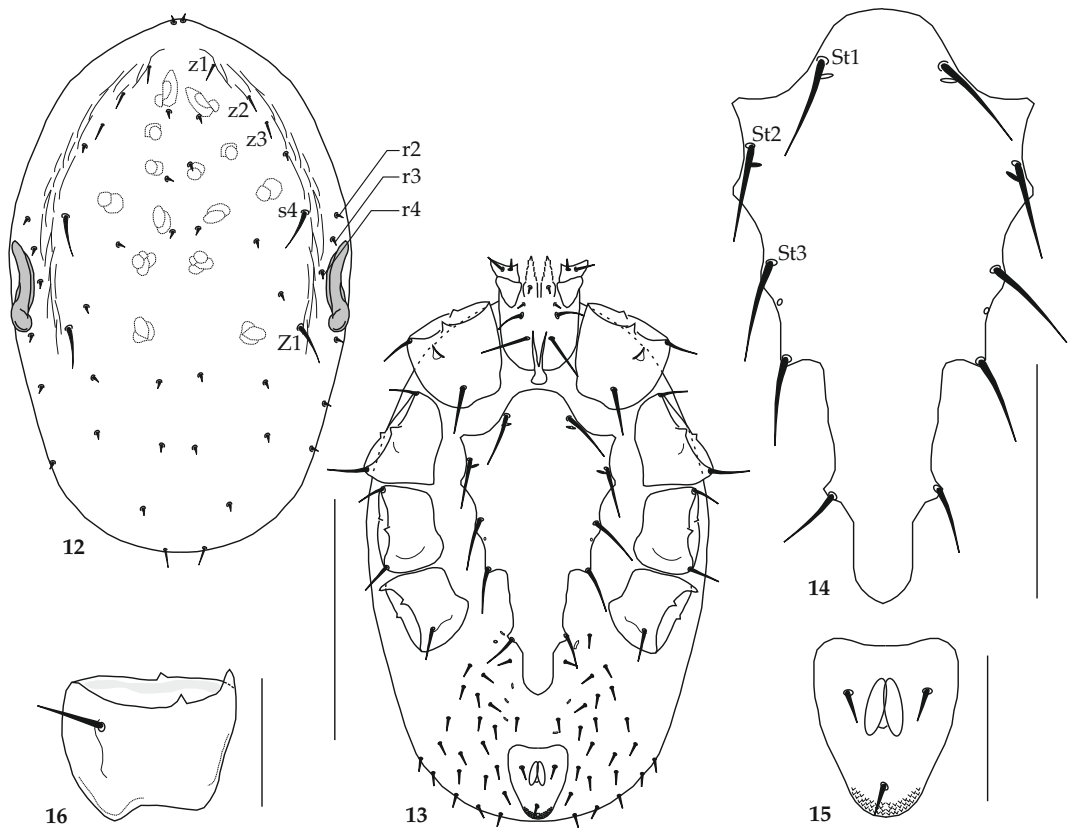


Fig. 12-16. *Parichoronyssus moralesmalacari* spec. nov., deutonymph. 12. Dorsal. 13. Ventral. Scale: 200 μ m. 14. Holoventral shield. Scale: 100 μ m. 15. Anal shield. Scale: 50 μ m. 16. Coxa IV with a lobe-like anterodorsal tooth. Scale: 25 μ m

developed ridges with hyaline projection (Fig. 9). Coxa I has a slender hyaline projection of about the same size and shape as the female. Coxae II and III have two slender hyaline projections. Coxa IV has an additional anterodorsal tooth (Fig. 9). The anterodorsal tooth on Coxa IV is larger than that of Coxa II.

Measurements. Allotype δ (6 Paratypes $\delta\delta$ and Allotype δ : minimum-maximum; ranges followed by means in parentheses): Idiosoma length 385 (373-397; 386.9) and with at level of peritreme 246 (238-256; 251.5). Dorsum: Dorsal shield length 385 (373-397; 386.9) and with at level of s4 152 (147-191; 163.7). Setae length: j1 10 (8-11; 9.72); j4 11 (9-12; 9.76); j5 10 (7-11; 9.29); j6 11 (9-13; 12.45); z2 14 (11-16; 13.70); z3 12 (12-18; 14.29); z5 9 (8-12; 10.82); s3 13 (11-17; 14.06); s4 29 (26-33; 31.96); s6 13 (11-16; 14.02); r2 8 (6-10; 8.42); r3 9 (8-11; 9.51); r4 11 (9-13; 11.73); r6 14 (12-16; 15.63); Z1 30 (28-35; 31.86); Z3 11 (9-13; 10.29); Z4 13 (10-15; 12.63); J3 12 (10-14; 13.72); J4 13 (10-15; 12.21);

J6 17 (13-20; 16.91); S2 7 (6-11; 9.61) and S4 10 (8-11; 8.91). Venter: Idiosoma with 23-26 setal pairs 9-14 long; holoventral shield length 237 (228-253; 241.6) and with at level of seta St2 76 (73-89; 81.47). Setae length: St1 27 (24-31; 28.92); St2 26 (24-32; 28.56); St3 21 (19-26; 23.47); St1-St1 26 (24-28; 27.45); St2-St2 67 (61-76; 72.61) and St3-St3 87 (80-93; 87.86).

Deutonymph (Figs. 12-16). Smaller than both female and male. Dorsum (Fig. 12). Dorsal idiosoma lacks a defined shield; a faintly noticeable edge of the podosomal shield is however visible. The edge extends from above setae z1 to below setae Z1. Setae z1, z2, z3, s4 and Z1 are inserted on the inner side of the edge. Setae z1, z2 and z3 long, smooth and slender; setae s4 and Z1 three times as long and more robust. The dorsum has 24 pairs of very short, smooth and weak setae. One paratype has only 21 pairs of setae; with setae r4 and r3 missing but trichopores present. Seta r2 always present. Dorsal peritreme elongated.

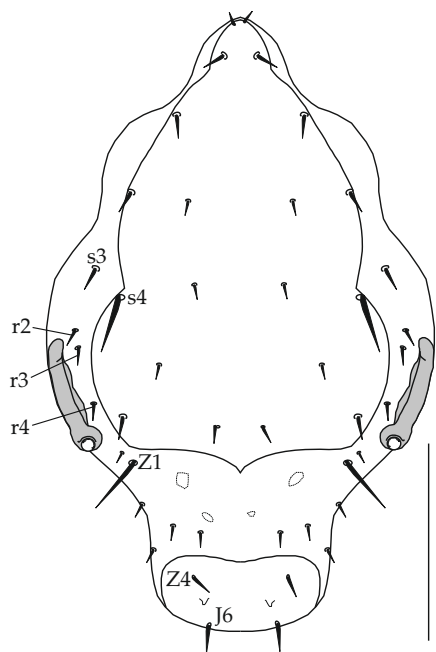


Fig. 17. *Parichoronyssus moralesmalacari* spec. nov., protonymph dorsal. Scale: 100 μ m.

Ventral (Figs. 13-15). Sternogenital shield plate-like and long and in the genital region extends well beyond coxa IV with a blunt and somewhat slender point. The sternal part is strongly upwardly vaulted. Sternogenital shield with five setae St1, St2, St3, St4 and an epigynial seta (Fig. 14). Pronounced horizontal bulges in the area of the epigynial seta. The opisthosoma has 22-25 setae on either side (one paratype with 19 pairs of setae). Anal shield triangular with three anal setae (Fig. 15).

Gnatosoma. Hypostomal and palpal trochanter setae as in adults. Chelicerae weakly developed: fixed and mobile digits as hyaline structures, small and pointed.

Legs (Figs. 13, 16). Coxae I-IV have weakly developed ridges. Coxa I has an additional slender hyaline projection (Fig. 13). Coxa II has only a very short ridge without anterodorsal tooth (Fig. 16).

Measurements. Paratype DN (3 Paratypes DN: minimum-maximum; ranges followed by means in parentheses): Idiosoma length 397 (392-410; 402.4) and with at level of s4 256 (236-271; 259.3). Dorsum: Setae length: z1 11 (9-13; 11.72); z2 13 (10-14; 12.51); z3 12 (9-15; 11.86); s4 31 (29-46; 35.82); r2 9 (8-10; 9.12); r3 8 (6-10; 7.12); r4 12 (10-14; 11.07) and Z1 32 (28-47; 41.46). Venter: Idiosoma with 22-28 pairs setae 10-14 long; sternal shield long 212 (204-232; 215.7) and with at level of St2 121 (115-128; 122.7);

anal shield length 52 (46-54; 48.3) and with 42 (40-47; 45.1). Setae length: St1 39 (35-46; 42.56); St2 32 (30-37; 34.62); St3 38 (35-44; 42.43); St1-St1 42 (36-43; 39.47); St2-St2 113 (108-123; 117.91) and St3-St3 75 (70-79; 75.82).

Protonymph (Fig. 17). Smaller than female, male and deutonymph. The underside of the podosomal shield extends noticeably beyond the peritreme and, at the central lower end, shows a noticeably tapering pointed shape (Fig. 17). Podosomal shield with 9 pairs of small and slender setae with seta s4 powerful, long and robust on the edge of the podosomal shield. On the rest of the dorsum there are 10 pairs of small and weakly developed setae. Of these, seta Z1 is powerful and robust as with s4. Seta s3 is longer and stronger than seta r4. Seta r2 is present. The pygidial shield has two long and smooth setae (Z4 and J6). On the pygidial shield, between Z4 and J6 on both sides, there is a small, clearly visible elevated ridge. The anal shield has 3 anal setae, triangular and with a lightly arched ridge over the lower setae. Coxae I-III ventral with slightly developed ridge. Coxa II has a weakly developed ridge without any obvious anterodorsal tooth. Coxa IV has a weak ridge and a weakly developed anterodorsal tooth.

Measurements. Paratype PN (7 Paratypes PN: minimum-maximum; ranges followed by means in parentheses): Idiosoma length 327 (299-332; 315.3) and with at level of peritreme 197 (189-211; 202.6); podosomal shield length 231 (214-246; 235.7) and with at level of s4 145 (142-153; 147.6) and pygidial shield length 29 (26-32; 30.1) and with 81 (74-85; 79.4). Setae length: s3 15 (14-21; 16.75); s4 29 (27-32; 28.89); r2 9 (9-11; 9.46); r3 9 (7-11; 8.57); r4 11 (9-13; 11.33); Z1 31 (28-33; 30.21); Z4 13 (11-15; 14.32) and J6 19 (18-23; 21.88).

Larva. Unknown.

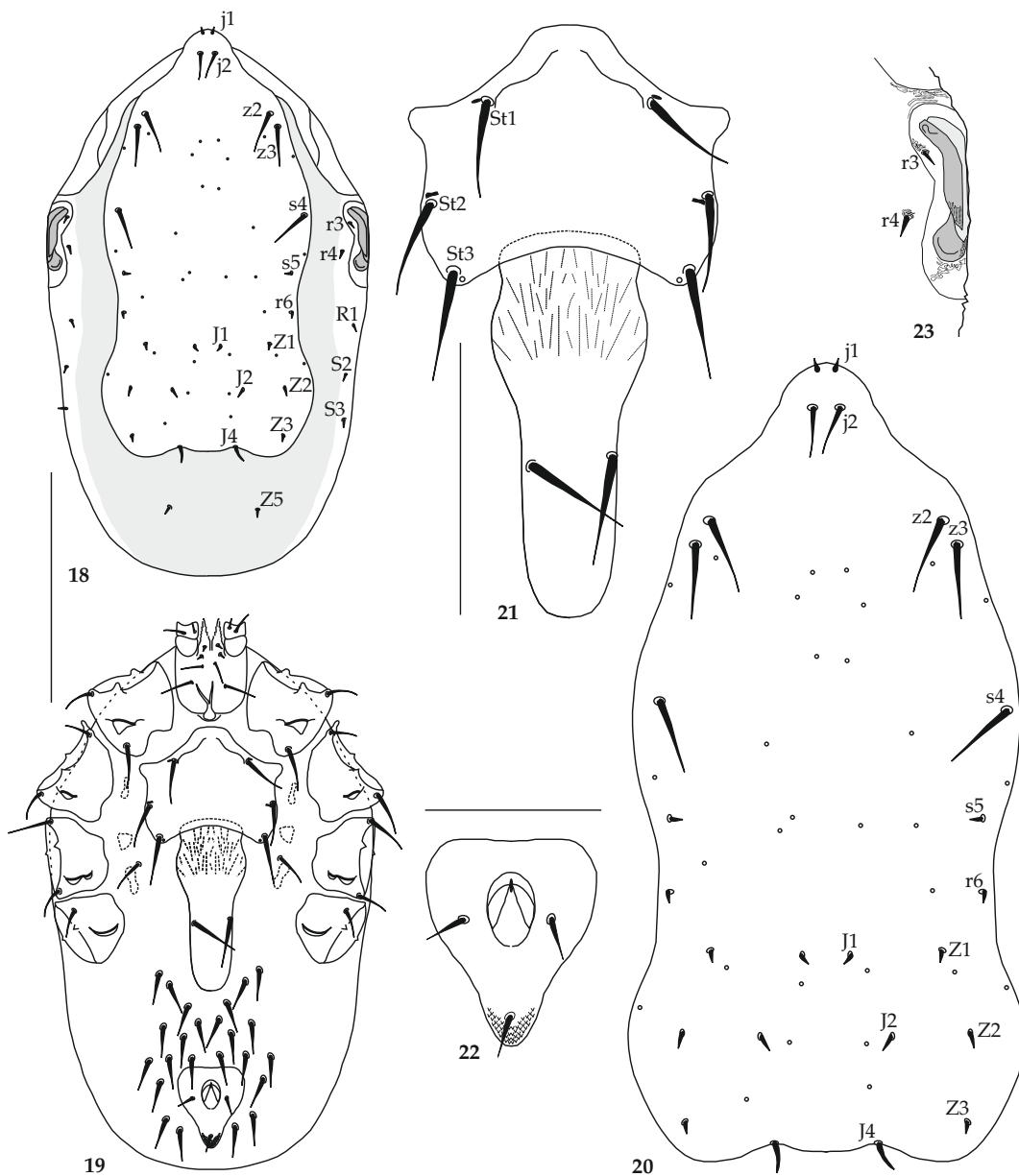
Distribution. Paraguay.

Etymology. This new species is named after Dr. Juan B. Morales-Malacara (Coyoacán; México) in recognition of his year-long work as specialist for ectoparasites on bats in Central and South America.

Parichoronyssus kretzschmari spec. nov.
(Figs. 18-25)

Type series. Holotype ♀, Allotype ♂, 2 Paratype PNN [NMNH] ex *Macrotus waterhousii* 1 ad. ♂, Isla de Pinos, San Pedro (21°36'12"N 82°52'35"E), Cuba, 17. VII 1970, leg. F. Steidl.

Paratypes. 1♂, 1♀ and 1 PN [NMNH] ex *Macrotus waterhousii* 1 ad. ♀, Isla de Pinos, San Pedro (21°36'12"N 82°52'35"E), Cuba, 17. VII 1970, leg. F. Steidl. - 1♂ and



Figs. 18-23. *Parichoronyssus kretzschmari* spec. nov., ♀, holotype. 18. Dorsal. 19. Ventral. Scale: 200 µm. 20. Dorsal shield. Scale: 100 µm. 21. Sternal shield. Scale: 100 µm. 22. Anal shield. Scale: 50 µm. 23. Peritremal shield. Scale: 25 µm.

2♀♀ [AMNH] ex *Macrotus waterhousii* 1 ad. ♂, Isla de Pinos, San Pedro (21°36'12"N 82°52'35"E), 17.VII 1970, leg. F. Steidl. – 1♂, 1♀ and 1 PN [FCUMC] ex *Macrotus waterhousii* 1 ad. ♂, Isla de Pinos, San Pedro (21°36'12"N 82°52'35"E), 17. VII 1970, leg. F. Steidl. – 1♂, 1♀ and 1 PN [ZSM] ex *Macrotus waterhousii* 1 ad. ♂, Isla de Pinos, Júcaro (21°49'17"N 82°43'51"E), Cuba, 20. VII

1970, leg. F. Steidl. – 1♀ and 2 PNN [MNUH] ex *Macrotus waterhousii* 1 ad. ♂, Isla de Pinos, Júcaro (21°49'17"N 82°43'51"E), Cuba, 20. VII 1970, leg. F. Steidl. – ♂ [CMH-pM 2366/1970] ex *Macrotus waterhousii* 1 ad. ♀, Isla de Pinos, Júcaro (21°49'17"N 82°43'51"E), Cuba, 20.VII 1970, leg. F. Steidl. – 2♀♀ [CMH-pM 2568/1970] [CMH-pM 2578/1970] ex *Macrotus waterhousii* 2 juv.

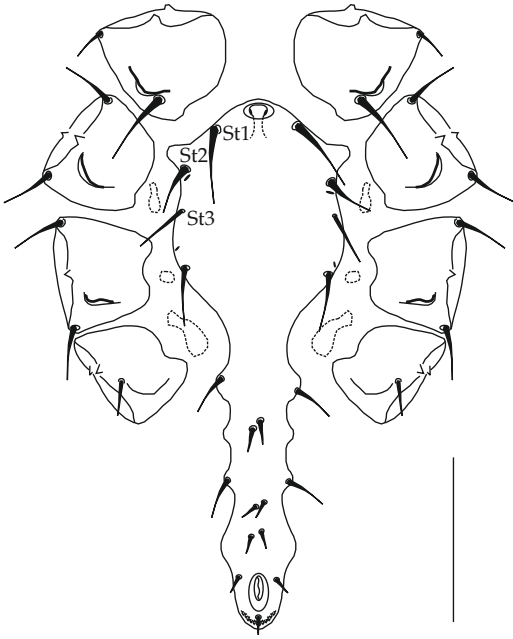


Fig. 24. *Parichoronyssus kretzschmari* spec. nov., ♂, holoventral shield and coxae I-IV. Scale: 100 µm.

♀♀, Isla de Pinos, Júcaro (21°49'17"N 82°43'51"E), Cuba, 20.VII 1970, leg. F. Steidl. – 2♀♀ [CMH-pM 2392/1994] [CMH-pM 2398/1994] and 1 PN [CMH-pM 2411/1994] ex *Phylloncyteris poeyi* 1 ad. ♂, Sancti Spiritus Province, La Serafina (21°50'32"N 79°24'09"E), Cuba, 11.VI.1994, leg. G.G. Sánchez-Ménoça.

Typus locality. Isla de Pinos, San Petro (21°36'12"N 82°52'35"E), Cuba.

Host species. *Macrotus waterhousii* (Gray, 1843) and *Phylloncyteris poeyi* Gundlach, 1860 (Chiroptera: Phyllostomidae).

Diagnosis. Female dorsal shield with 13 setal pairs; setae z2, z3 and s4 are about the same size. Dorsal integument has five setae. Seta r2 absent. Seta r3 present on the peritremal plate in the female. Sternal shield has clearly pronounced structure zones. Anal shield with anterior margin uninterrupted by perianal zone. Coxa I with pronounced ridge and very pronounced hyaline projection. Setae of hypostome and palpal trochanter all present. Leg I longer than leg IV.

Description

Female (Figs. 18-23). Dorsum (Figs. 18, 20, 23). Dorsal shield with 13 setal pairs: j2, z2, z3 and s4 in part significantly larger and more robust (J4 twice as large as the others) as the remaining setae. Setae

z2, z3 and s4 about the same size. Setae j4, j5, j6, s6 and J3 missing; but indicated by the trichopores. Seta s3 is completely absent. The dorsal integument with five small setae. Seta r4 on the edge of the dark area at the level of the central peritreme. Setae R1, S2 and S3 outside, and Z5 on the dark area of the idiosoma. Seta r2 absent. One miniscule seta r3 on peritremal shield (Fig. 23).

Venter (Figs. 19, 21, 22). Tritosternum bipartite with laciniae short and smooth but with a few denticles. Sternal shield about as long as it is broad with rounded, clearly pronounced structure zones next to St1 and lightly attached ridges (Fig. 21). The edges of the sternal shield slightly outwardly vaulted. The setae of the sternal shield long and smooth. Epigynial shield slender with blunt tip and one pair of epigynial setae (Fig. 21). Anal shield triangular in shape and with three anal setae. The anterior of the opisthosoma with 11-15 smooth long pairs of bristles.

Gnatosoma. Deutosternal groove with 8-11 denticles. Distal hypostomal setae present and very small (3-5) less than equal in size to outer proximal setae (5-8). Palpal trochanter with lateral setae longer (23-30) than length of ridge (10-17), medial setae very small (4-6).

Legs. All coxae I-IV have well developed ridges with hyaline projection (Fig. 19). Coxa I with pronounced ridge and very pronounced hyaline projection. Coxa II with ridge and weak hyaline projection. Coxa III ridge two small hyaline projections. Coxa IV ridge with long and slender hyaline projection. See Table 2 for the leg chaetotaxy.

Measurements. Holotype ♀ (6 Paratypes ♀♀ and Holotype ♀: minimum-maximum; ranges followed by means in parentheses): Idiosoma length 469 (458-491; 473.4) and with at level of peritreme 273 (256-288; 269.7). Dorsum: Dorsal shield long 317 (301-339; 326.3) and with at level of setae s4 173 (168-189; 172.8). Setae length: j1 8 (6-10; 7.86); j2 21 (20-22; 21.81); z2 32 (28-33; 30.27); z3 38 (32-39; 37.19); s4 37 (35-41; 37.08); s5 9 (8-10; 9.52); r3 8 (7-11; 9.37); r4 13 (10-14; 13.28); r6 10 (7-12; 11.63); J1 9 (7-10; 8.67); J2 16 (15-17; 15.98); J4 27 (23-30; 26.23); Z1 12 (10-13; 11.09); Z2 18 (15-18; 17.73); Z3 11 (8-14; 10.67); Z5 14 (10-17; 15.05); R1 20 (16-22; 18.92); S2 17 (15-18; 17.27) and S3 19 (17-21; 20.27). Venter: Idiosoma with 11-15 setal pairs 27-31 long; anal shield length 66 (63-69; 67.3) and with 37 (35-39; 37.6); sternal shield length 81 (78-83; 80.2) and with at level of setae St2 109 (102-117; 110.9). Setae length: St1 43 (41-44; 42.92); St2 47 (46-50; 48.32); St3 41 (39-43; 41.76); St1-St1 62 (59-65; 62.79); St2-St2 108 (99-110; 105.23) and St3-St3 87 (84-93; 90.84).

Male (Fig. 24). Smaller than the female. Dorsum. Dorsal shield as female with 13 setal pairs. Five

small setae are located outside the dorsal shield. Setae S2 and S3 on the outer edge of the idiosoma. Setae r3 and r4 on the edge at the level of the central peritreme (r3 outside the peritreme) at the same level as s4 and r6. The peritreme slightly arched towards the dorsum. Seta r2 absent.

Venter (Fig. 24). Holoventral shield long and slender. The ventral region of the holoventral shield with 13 setae two paratypes had only 11 setae; one paratype only 10 setae). On the idiosoma, on either side of the holoventral shield, 10-15 setal pairs are located.

Gnatosoma. Hypostomal and palpal trochanter setae as in female.

Legs. Coxae I-III similar to the female. Coxa IV with weak and long segment.

Measurements. Allotype ♂ (6 Paratypes ♂♂ and Allotype ♂: minimum-maximum; ranges followed by means in parentheses): Idiosoma length 384 (359-388; 385.8) and with at level of peritreme 227 (218-246; 239.6). Dorsum: Dorsal shield length 304 (302-310; 306.3) and with at level of s4 176 (171-189; 182.6). Setae length: j1 7 (6-10; 8.23); j2 22 (21-24; 23.79); z2 30 (27-31; 29.57); z3 36 (32-36; 35.21); s4 36 (35-40; 37.83); s5 7 (6-9; 8.52); r3 6 (5-10; 7.46); r4 13 (10-15; 13.34); r6 9 (7-11; 10.56); J1 8 (7-10; 7.95); J2 16 (15-16; 15.61); J4 25 (23-28; 27.29); Z1 13 (11-14; 13.61); Z2 17 (15-19; 17.34); Z3 9 (8-13; 10.57); Z5 13 (9-14; 11.35); R1 17 (15-21; 18.43); S2 17 (16-18; 16.92); and S3 20 (16-22; 21.17). Venter: Idiosoma with 10-16 setal pairs 32-27 long; holoventral shield 299 (278-304; 286.2) and with at level of setae St2 97 (92-103; 98.6). Setae length: St1 46 (42-48; 45.72); St2 43 (40-45; 44.82); St3 39 (38-43; 41.58); St1-St1 53 (49-55; 52.71); St2-St2 83 (81-86; 84.39) and St3-St3 79 (77-81; 78.64).

Protonymph (Fig. 25). Smaller than both the female and male. The underside of the podosomal shield extends beyond the peritreme. Podosomal shield with six powerful and robust setal pairs, j2, z2, z3 and s4 on the edge of the podosomal shield and about the same length (Fig. 25). Nine setal pairs are located on the rest of the dorsum, of which one pair are located on the edge of the podosomal. Pygidial shield with two setal pairs (Z3 and J4). Seta J4 very long and smooth. Anal shield triangular. Coxa I-III ventral with slightly developed ridge. Coxa I with

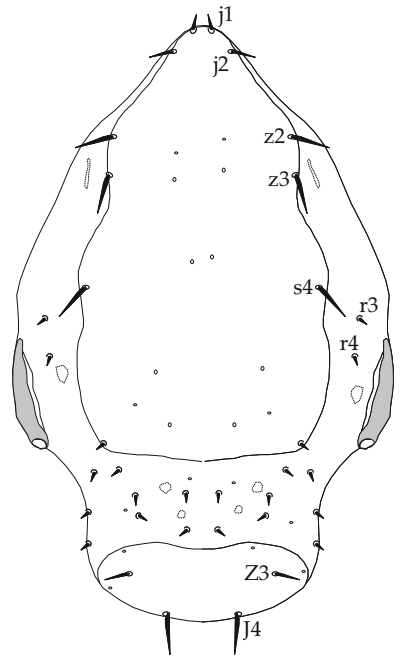


Fig. 25. *Parichoronyssus kretzschmari* spec. nov., protonymph dorsal. Scale: 100 μ m.

additional small triangular flaps. Coxa II with very weakly developed anterodorsal tooth. Coxa IV without ridge.

Measurements. Paratype PN (5 Paratypes PN: minimum-maximum; ranges followed by means in parentheses): Idiosoma length 314 (299-329; 318.7) and with at level of peritreme 197 (195-206; 199.5); podosomal shield length 231 (212-242; 235.2) and with at level of s4 119 (106-131; 122.5) and pygidial shield length 75 (71-82; 78.7) and with 107 (100-115; 111.7). Setae length: j1 8 (6-9; 7.46); j2 13 (12-14; 13.71); z2 23 (21-27; 24.91); z3 25 (22-28; 25.20); s4 31 (30-34; 32.09); r3 8 (6-10; 9.12); r4 12 (10-12; 11.37); Z3 11 (9-13; 12.62) and J4 28 (26-31; 27.91).

Deutonymph and Larva. Unknown.

Distribution. Cuba.

Table 2. Leg chaetotaxy of *Parichoronyssus kretzschmari* spec. nov.

Leg	Coxa	Trochanter	Femur	Genu	Tibia	Tarsus
I	2	1-2/2-1(6)	2-3/5-2(12)	2-5/3-1(11)	2-5/3-1(11)	-/-
II	2	1-2/2-1(6)	2-4/3-1(10)	3-4/2-1(10)	2-3/3-0(8)	3-5/8-3(19)
III	2	1-1/2-0(4)	1-4/1-1(7)	1-2/2-1(6)	1-2/3-1(7)	3-5/8-3(19)
IV	1	1-1/3-1(6)	1-3/2-1(7)	1-2/2-0(5)	1-2/3-1(7)	1-5/7-3(16)

Etymology. This new species is named after Frau Andrea Kretzschmar (Leinefelde-Worbis, Germany) in appreciation of her readiness to help at all times and her contribution to the numerous discussions.

Discussion

Both new species *P. moralesmalacari* spec. nov. and *P. kretzschmari* spec. nov. are neotropical species, and are the eighth and ninth species members of the genus *Parichoronyssus* Radovsky, 1966. Both species were collected from host species of the neotropical bats of the Phyllostomidae family. *P. moralesmalacari* spec. nov. was found in Paraguay on the host species *Sturnira lilium* (E. Geoffroy, 1810). *P. kretzschmari* spec. nov. was collected from two host species *Macrotus waterhousii* (Gray, 1843) and *Phyllonycteris poeyi* Gundlach, 1860 on Cuba. I believe that the parasite finds on the host species *Ph. poeyi* could be accidental, as G. G. Sanches-Ménoça, the collector of the bat specimens – *Ph. poeyi* (1 ad. ♂) and *M. waterhousii* (1 ad. ♂; 2 ad. ♀♀ and 2 juv. ♂♂) – kept them together in a container for some period of time at the capture location. This could have enabled a transfer of mite individuals between the host bat species, which has been reported previously in the case of ectoparasites by various authors (e.g. Micherdziński 1980, Heddergott & Kock 2003).

P. moralesmalacari spec. nov. is similar to *P. sclerulus* Radovsky, 1967. Both species have exactly the same number of dorsal setae. The new species differs from *P. sclerulus* however in the presence, and the different sizes, of the five dorsal setae z1 to z3, s6 and r6 which, in comparison with *P. moralesmalacari* are longer and more robust. In the new species the dorsal seta Z1 is present, but absent in *P. sclerulus*. This characteristic is developed in the female, male, deutonymph and protonymph. In contrast to *P. sclerulus* (2 setal pairs), the new species has only one epigynial setal pair inserted in the epigynial shield. There is also a difference in the size of the idiosoma between the species whereby that of *P. sclerulus* is smaller.

A unique characteristic, and one which distinguishes *P. moralesmalacari* spec. nov. from all other known species of the *Parichoronyssus* genus, is the anterodorsal tooth on coxa IV (Fig. 7, 9, 16).

The species *P. kretzschmari* spec. nov. is similar to the species *P. radovskyi* Morales-Malacara, 1992 and *P. bakeri* Morales-Malacara & Guerrero, 2007. All three species have the same reduced number of setae (13 pairs) on the dorsal shield. *P. kretzschmari* spec. nov. differs from *P. radovskyi* in the absence of dorsal seta r2 on the dorsal integument. The new species differs from the very similar species *P. bakeri*

in its much larger dorsal setae j2, s4 and J4. The shape of the female sternal shield on *P. kretzschmari* spec. nov. shows noticeable structural areas which are absent on *P. bakeri*, and the male's holovenral shield on *P. bakeri* is much broader. A further difference in characteristics between the species is the shape of the flanks of coxa I, which on *P. kretzschmari* spec. nov. are smooth and, on *P. bakeri*, shows a ventral ring which turns strongly inwards.

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