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REDESCRIPTIONS OF FIVE SPECIES OF THE FEATHER MITE GENUS *PTERODECTES* ROBIN, 1877 (ACARI: PROCTOPHYLLODIDAE: PTERODECTINAE), WITH THE PROPOSAL OF A NEW GENUS AND A NEW SPECIES

M. P. Valim[1] and F. A. Hernandes[2]

[1] Laboratório de Ixodides, Pavilhão Mourisco, sala 214; Instituto Oswaldo Cruz, Fiocruz; Av. Brasil, 4365, Manguinhos, Rio de Janeiro, RJ, BRAZIL, 21045-900, e-mail: mpvalim@hotmail.com
[2] Departamento de Zoologia e Botânica; Programa de Pós-Graduação em Biologia Animal — Universidade Estadual Paulista — UNESP; Rua Cristóvão Colombo, 2265, Jardim Nazareth, São José do Rio Preto, SP, BRAZIL, 15054-000, e-mail: fabio_akashi@yahoo.com.br

ABSTRACT: Five species of the feather mite genus *Pterodectes* Robin, 1877 are redescribed (type hosts are given in parenthesis): *Pterodectes rutilus* Robin, 1868 (the Northern House-Martin, *Delichon urbicum*), *P. crassus* Trouessart, 1885 (the Plush-crested Jay, *Cyanocorax chrysops*), *P. gracilis* Trouessart, 1885 (the Crested Oropendola, *Psarocolius decumanus*), *P. sialiarum* (Stoll, 1893) (the Eastern Bluebird *Sialia sialis*) and *P. muticus* Banks, 1909 (the Vesper Sparrow, *Pooecetes gramineus*). One new species, *P. banksi* sp. n., is described from the Eastern Phoebe, *Sayornis phoebe* (Tyrannidae), and a new monotypic genus *Cotingodectes* gen. n. is proposed to accommodate *C. interifolius* (Trouessart, 1899) comb. n. from the Andean Cock-of-the-Rock, *Rupicola peruviana* (Cotingidae), previously referred to the genus *Pterodectes*.

KEY WORDS: feather mite, Astigmata, Proctophyllodidae, *Pterodectes*, systematics

INTRODUCTION

The feather mite genus *Pterodectes* Robin, 1877 (Astigmata, Proctophyllodidae, Pterodectinae) is currently considered to comprise 20 valid species. In a comprehensive review of the subfamily Pterodectinae, Park and Atyeo (1971) redefined the genus *Pterodectes* and recognized nine species, among which six species were described in the end of the nineteenth and beginning of the early twentieth century (Robin 1868; Trouessart 1885, 1899; Stoll 1893; Banks 1909). Four more species were described by Berla (1958, 1959, 1973), six species by Černý (1974) and more recently, three species were described from Brazil (Hernandes and Valim 2005, 2006) and Galapagos Islands (OConnor et al. 2005) as belonging to the genus *Pterodectes*. Finally, in a partial revision of the genus *Montesauria* Oudemans, 1905 (Proctophyllodidae, Pterodectinae), Mironov (2006) proposed the transfer of *Montesauria trulla* (Trouessart, 1885) into the genus *Pterodectes*.

Despite this current knowledge regarding the genus *Pterodectes*, this genus is likely to comprise actually a much higher number of undescribed species, as can be seen in the surveys that many unnamed species collected from several little explored hosts (e.g. Rojas 1998; Roda and Farias 1999; Lyra-Neves et al. 2003; Reeves et al. 2007; Kanegae et al. 2008). When redefining the genus, Park and Atyeo (1971) already pointed out that there were about 90 undescribed species in their collection.

In order to facilitate the future studies of such large and poorly known genus and to avoid possible instances of synonymies as well, it is important that all currently recognized species have clear specific and differential diagnoses. Only three of 20 species were originally described using the current concept of the genus (OConnor et al. 2005; Hernandes and Valim 2005, 2006), and four species were recently redescribed to meet with the current morphotaxonomical standards (Valim and Hernandes 2006).

In the present paper we redescribe five species of *Pterodectes* originally described by Charles Philippe Robin (1821–1885), Édouard Luis Trouessart (1842–1927), Otto Stoll (1849–1922) and Nathan Banks (1868–1953) in the classical period of feather mite exploration (*sensu* Mironov 2003). Additionally, one new species is described from *Sayornis phoebe* (Latham, 1790) (Tyrannidae), a former second host species of *P. muticus* Banks, 1909, and a new genus is proposed to accommodate *P. interifolia* Trouessart, 1899.

MATERIAL AND METHODS

With the exception for *Pterodectes muticus*, type specimens of redescribed species were not examined. The redescriptions are based, when possible, on samples collected from the type hosts and/or locality, all species being thoroughly compared with their original descriptions. Since no remarkable differences were noticed between the original descriptions and the mites collected from those same hosts, we have confidence that they represent the original named species. In some instances the old descriptions even mention particularities of the species (e.g. *P. crassus*, *P. interifolia*, *P. gracilis*), which make our interpretation in those cases more reliable.

The idiosomal and leg chaetotaxy follow Griffiths et al. (1990) and Atyeo and Gaud (1966),

respectively; and host names were updated according to Dickinson (2003). All measurements are in micrometres (μm); distance between setae is measured as a direct distance between their bases; distances between setae belonging to different pairs were taken on one side of the body. Measurements for particular structures of the body were standardized for further descriptions of the genus *Pterodectes* and include: (i) idiosomal length, measured from the anterior margin of prodorsal shield to the lobar apices in males, and excluding the terminal appendages in females; (ii) idiosomal width, measured at the level of setae *cp*; (iii) prodorsal shield dimensions, length measured along the midline and width at the posterior margin; (iv) hysteronotal shield length (in males), measured from the anterior margin to lobar apices, and anterior hysteronotal shield length (in females), measured from the anterior to posterior margin (lobar shields excluded); (v) hysteronotal shield width (in both sexes), measured at the level of setae *cp*; (vi) lobar shield dimensions (in females), length measured from the anterior margin to the apices of lobes excluding appendages and width measured at the level of setae *h2*; (vii) distance between prodorsal and hysteronotal shields, measured along the midline; (viii) distance between male anal suckers, measured between their centres; (ix) length of terminal cleft (in both sexes), measured from its anterior end to the level of lobar apices; (x) dimensions of setae, length taken from bases to visible ends, and width of setae *c3* (in both sexes) and *h2* (in females) at their greatest dimensions and; (xi) length of tarsi IV (in males), measured excluding the pretarsus.

The specimens studied herein are deposited in the following institutions: Museum of Zoology, University of Michigan, Ann Arbor, Michigan, USA (UMMZ); Collection of the Museu Nacional do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil (MNRJ); Collection of Acari of Departamento de Zoologia e Botânica da Universidade Estadual Paulista, São José do Rio Preto, São Paulo, Brazil (DZSJRP); and Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA (MCZ).

SYSTEMATICS

Family Proctophyllodidae Trouessart et Mégnin, 1884

Subfamily Pterodectinae Park et Atyeo, 1971

Genus *Pterodectes* Robin, 1877

Type species: *Pterodectes rutilus* Robin, 1877 by subsequent designation.

The genus *Pterodectes* in the recent concept of Park and Atyeo (1971) includes 20 species that occur mainly on Neotropical passerines (Passeriformes). These authors recognized two species groups within the genus: the *rutilus* group, composed by a sole species, *P. rutilus*, which is associated exclusively with the swallows (Hirundinidae) and distributed in both the Old and the New Worlds, and the *gracilis* group, constituted by all remaining species, which occur only on birds of the New World. The main morphologic distinction between these two groups is that the former has setae *c2* inserted on the hysteronotal shield, and in the females the setae *h2* are long whip-like with a filiform distal part. In the *gracilis* group, the setae *c2* are on the soft tegument or near humeral shields, if they are present, and setae *h2* in females are dagger-like, without a terminal filament. However, at least three species (*P. turdinus*, *P. crassus*, and *P. muticus*), that were described before the proposal of this subdivision, have actually the setae *h2* of dagger-like form but with a terminal filament. An odd species *P. ralliculae* Atyeo et Gaud, 1977 described from the Forbe´s Forest Rail (Gruiformes, Rallidae), was provisionally placed among this genus (Atyeo and Gaud 1977), but it is not herein considered as a member of *Pterodectes*, because of its genital papillae set posterior to the genital arch.

Pterodectes rutilus Robin, 1877

Figs 1–2

Pterodectes rutilus Robin, 1868: 787 (*nomen nudum*).

Proctophyllodes (*Pterodectes*) *rutilus* Robin, in: Robin, Megnin, 1877: 644.

Dermaleichus hirundinis Canestrini, 1878: 66.

Pterodectes rutilus: Canestrini, 1886: 305. Gaud, Till, 1961: 255, figs. 158 A–B. Černý, 1967: 17. Park, Atyeo, 1971: 56, figs. 21–24. Černý, Lukoschus, 1975: 196.

Pterodectes rhodesiensis Till, 1954: 90, figs. 5–6.

Type host: *Delichon urbicum* (Linnaeus, 1758) (Hirundinidae) — the Northern House-Martin, Europe.

Material examined: 5 males and 5 females from the Barn Swallow *Hirundo rustica* Linnaeus, 1758 (Hirundinidae), Chokpak, Djambul Province, Kazakhstan, 06.IX.1984, coll. S.V. Mironov, deposited in DZSJRP.

Differential diagnosis. The following combination of characters in both sexes readily distinguishes *P. rutilus* from all other known *Pterodectes* species: epimerites I fused as a Y; setae *c2* are

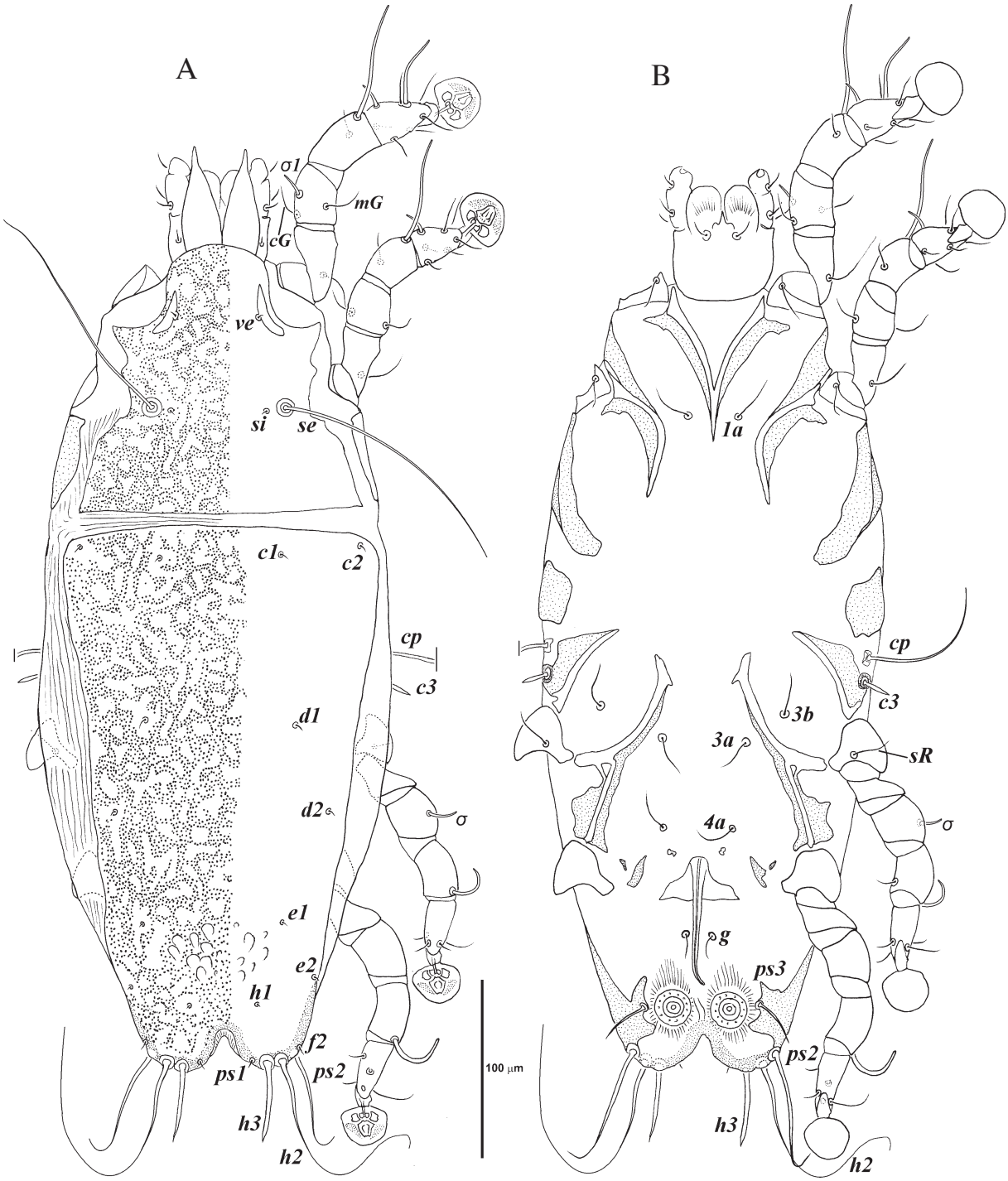

Fig. 1. *Pterodectes rutilus* Robin, 1868. Male: dorsal (A) and ventral (B) views.

in the anterior angles of hysteronotal shield; setae *c3* are spine-like; humeral shield are well developed, situated ventrally and not fused with epimerites III. The females of this species have relatively small lobar region and setae *h2* are setiform, and the males have anal suckers with dentate corolla.

Male (Figs 1A–B) (n = 5). Length of idiosoma 429–473, width 176–198. Prodorsal shield: 122–141 in length, 128–152 in width, antero-lateral extensions acute, posterior margin slightly convex or straight, surface with faint sculpturing, but without lacunae or pale-sclerotized areas. Setae *ve* present. Scapular setae *si* and *se* arranged in transverse line, and both on prodorsal shield. External scapular setae *se* 141–163 in length, their bases separated by 71–84; bases of *si* separated by 49–61. Humeral shields present, situated ventrally, separated from epimerites III. Setae *c1* on hysteronotal shield, setae *c2* in anterior angles of hysteronotal shield. Setae *c3* spine-like, 14–16 in length and about 3 in width. Setae *cp* set on stri-

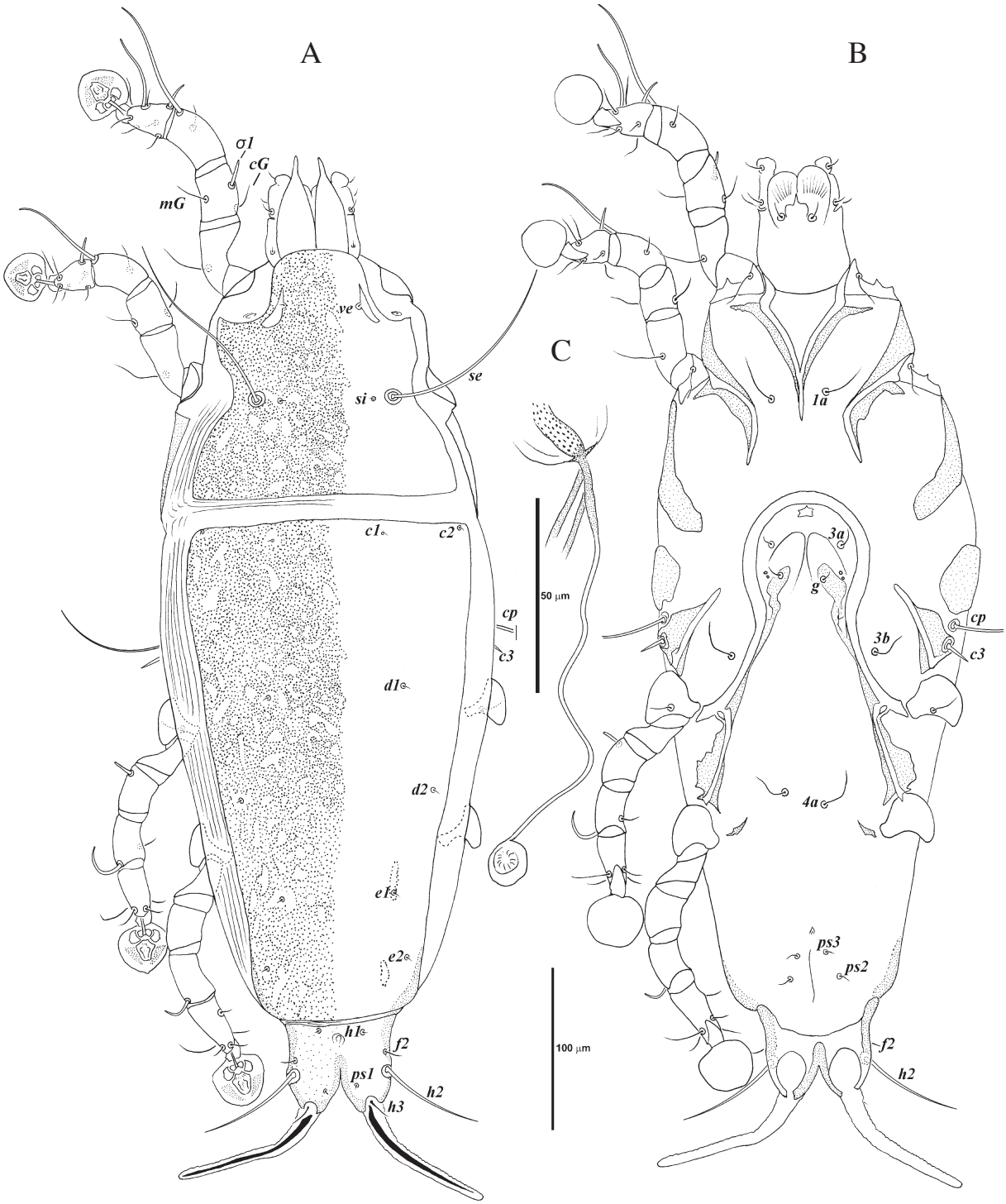

Fig. 2. *Pterodectes rutilus* Robin, 1868. Female: dorsal (A) and ventral (B) views; spermatheca (C).

ated tegument (Fig. 1B). Distance between prodorsal and hysteronotal shields 16–30. Hysteronotal shield: 280–313 in length, 158–180 in width; anterior margin slightly convex, anterior angles rounded, surface with faint sculpturing but without lacunae or pale-sclerotized areas. Terminal cleft U-shaped with divergent branches, 24–27 in length, supranal concavity indistinct. Setae *h3* spiculiform, approximately equal in length to distance between their bases. Length of setae: *ps1* 5–8, *h3* 27–44, *h2* 150–158, *ps2* 60–68, *f2* 7–8, *ps3* 19–27. Distance between dorsal setae: *si–c1* 71–92, *c1–c2* 33–49, *c1–d1* 75–95, *d1–d2* 50–65, *d1–e1* 101–120, *d2–e1* 49–65, *e1–e2* 27–54, *e1–h1* 44–54, *e2–h1* 20–33, *h1–f2* 24–30, *h3–h3* 38–49.

Epimerites I fused as Y; epimerites I, II, and III with narrow sclerotized areas; coxal fields I–III open. Rudimentary epimeral sclerite rEpIIa absent. Epimerites IVa present and represented by two little sclerites. Aedeagus extending to anterior

margin of anal suckers, 73–75 in length; genital arch 24–30 in length and 44–48 in width. Distance between ventral setae: *3a–4a* 41–54, *4a–g* 57–68, *g–ps3* 44–49, *ps3–ps3* 58–65. Anal suckers 19–20 in diameter, separated by 24–34, corolla dentate. Opisthoventral shields restricted to lateral borders of lobes, with large roughly rectangular projecting toward anal suckers; setae *ps3* on inner margin of these projections, at midlevel of anal suckers.

Setae *cG* and *mG* of genua I and II setiform. Solenidion σ*1* of genu I stick-like, 13–15 long, situated at midlevel of segment. Setae *sR* on trochanter and solenidion σ on genu III present. Tarsus IV 37–41 in length, without apical claw-like process; setae *d* and *e* button-like, inserted at midlevel and sub-apically, respectively (Fig. 1A).

Female (Figs 2A–C) (n = 5). Length of idiosoma 539–589, width 209–242. Prodorsal shield: 152–171 in length and 152–166 in width, surface and shape, setae *ve*, scapular setae *si* and *se* as described for the male. Setae *se* 152–158 in length, their bases separated by 87–92; pair *si* separated by 57–64. Setae *c3* spine-like, 16–18 in length and 3 in width. Humeral shields and positions of setae *c1, c2* and *cp* as in male (Fig. 2B).

Distance between prodorsal and hysteronotal shields 11–22. Anterior hysteronotal and lobar shields separated by thin band of soft cuticle. Anterior hysteronotal shield: 313–340 in length and 180–193 in width, anterior margin straight, anterior angles roughly rectangular, rounded on the posterior end; surface of this shield without lacunae or pale-sclerotized areas. Lobar region: 60–68 in length and 65–68 in width. Terminal cleft as an inverted V, 33–41 in length, reaching level of setae *h2*. Supranal concavity poorly distinct. Setae *h2* entirely setiform, 73–84 in length and 3 in width. Setae *h1* inserted near anterior margin of lobar shield, anterior to supranal concavity; setae *h1* and *f2* in trapezoidal arrangement. Setae *ps1* set at midlevel of setae *h2* and *h3*, close to margin of terminal cleft. Distance between dorsal setae: *si–c1* 87–92, *c1–c2* 46–54, *c1–d1* 95–114, *d1–d2* 68–92, *d1–e1* 128–150, *d2–e1* 61–73, *e1–e2* 35–44, *e1–h1* 87–98, *e2–h1* 52–60, *h1–f2* 22–27, *f2–h2* 8–12. Setae *h3* 15–16 long, about 1/5–1/6 of terminal appendages.

Epimerites I fused as Y; epimerites I, II, and III with narrow sclerotized areas. Epimerites IVa present. Distance between ventral setae: *1a–3a* 90–103, *3a–g* 20–27, *4a–ps3* 76–98, *g–4a* 136–166, *ps2–ps3* 18–22, *ps2–ps2* 30–44, *ps3–ps3* 19–30. Setae *ps2* and *ps3* setiform, in trapezoidal arrangement, both situated at level of anal opening. Spermatheca and spermaducts as in Fig. 2C. Legs I and II as in the male; setae *cG* and *mG* of genua I and II setiform. Solenidion σ*1* of genu I stick-like, 16–17 long, situated at midlevel of segment. Setae *sR* on trochanter and solenidion σ on genu III present. Legs IV extending by ambulacral disc at maximum to the level of setae *ps1*.

Remarks. Although species of *Pterodectes* have been collected mainly from Neotropical birds, *P. rutilus* associated exclusively with Hirundinidae, is the only described species collected from birds of the Old World. Park and Atyeo (1971) established a distinct group for this species (*rutilus* group) based on its morphological peculiarities (see differential diagnosis above). Furthermore, those authors suggested that *P. rutilus* might be a species complex. In the New World, this species was reported on *H. rustica* in Cuba (Černý 1967) and on the Black-collared Swallow *Atticora melanoleuca* (Wied, 1820) in Surinam (Černý and Lukoschus 1975). The redescription presented herein is based on specimens collected from *Hirundo rustica*, the most common host of *P. rutilus*, and matches well with the available descriptions of this mite species for that host (Canestrini 1878; Till 1954, Gaud and Till 1961; Park and Atyeo 1971).

Pterodectes crassus Trouessart, 1885

Figs 3–4

Proctophyllodes (*Pterodectes*) *crassus* Trouessart, 1885: 79

Pterodectes crassus: Canestrini, Kramer, 1899: 125; Park, Atyeo, 1971: 56

Type host: *Cyanocorax chrysops* (Vieillot, 1818) (= *C. pileatus*) (Corvidae) — the Plush-crested Jay, Colombia.

Material examined: 5 males and 5 females (BMOC 88-1230-032) from *Cyanocorax chrysops* (Vieillot, 1818) (Passeriformes, Corvidae), Rio Paraguay, E. bank, 10km W Rosario, San Pedro, Paraguay, 13.IX.1988, coll. S.M. Goodman.

Differential diagnosis. This species resembles *P. muticus* Banks, 1909, *P. fissuratus* Hernandes et Valim, 2005 and *P. amaurochalinus* Hernandes et Valim, 2006 by having the U-shaped epimerites I in both sexes and setae *ps2* and *ps3* modified into button-like structures in females. Although *P. banksi* sp. n. also has U-shaped epimerites I, setae *ps2* and *ps3* in females are setiform. The following set of characters in both sexes of *P. crassus* is unique among known species of *Pterodectes*: the idiosoma is strongly enlarged in

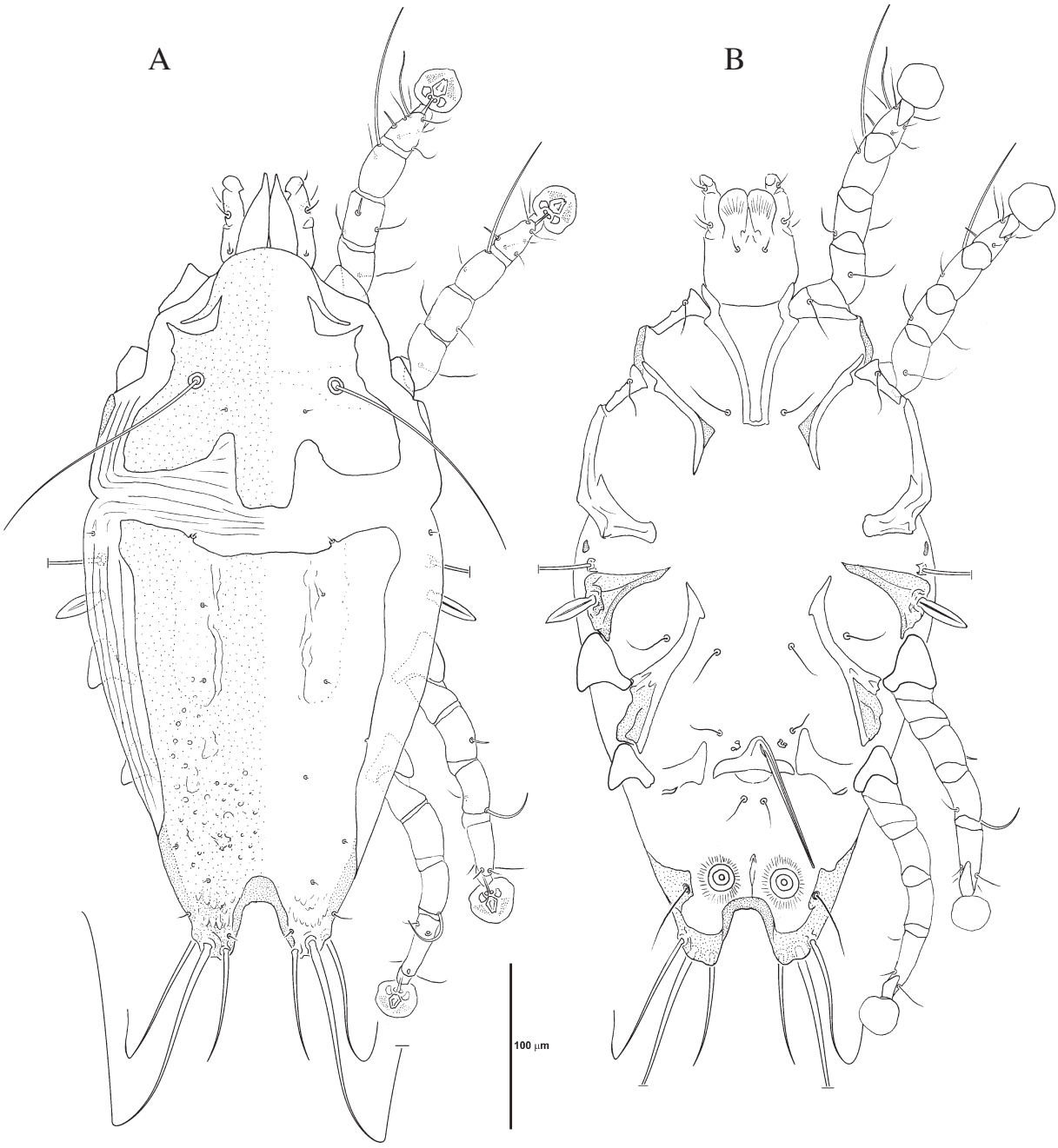

Fig. 3. *Pterodectes crassus* Trouessart, 1885. Male: dorsal (A) and ventral (B) views.

median part, the posterior margin of prodorsal shield has two conspicuous incisions; setae *si* are situated posterior to the level of setae *se*.

Male (Figs 3A–B) (n = 5). Length of idiosoma 418–451, width 209–231; median part of idiosoma strongly enlarged. Prodorsal shield: 155–169 in length, 158–169 in width, antero-lateral extensions acute, lateral margins entire, posterior margin with two deep incisions resulting in conspicuous lobed shape, surface without lacunae and pale-sclerotized areas (Fig. 3A). Setae *ve* absent. Scapular setae *si* set posterior to level of setae *se*. External scapular setae *se* 114–136 in length, their bases separated by 79–87; bases of *si* separated by 46–60. Humeral shield represented by little rudimentary sclerites situated ventrally. Setae *c1* set on anterior margin of hysteronotal shield; setae *c2* on striated tegument; setae *c3* lanceolate, 33–37 in length and 10–11 in width; humeral seta *cp* on striated tegument (Fig. 3B). Distance between prodorsal and hysteronotal shields 14–27. Hysteronotal shield: 253–280 in length, 163–185 in width; anterior margin slightly concave; anterior angles rounded or with acute tip; surface with little sparse circular lacunae concentrated mainly on posterior 3/4 of this shield and with two longitudinal depressions in anterior third of hysteronotal shield between levels of setae *c1* and *d2* (Fig. 3A). Ter-

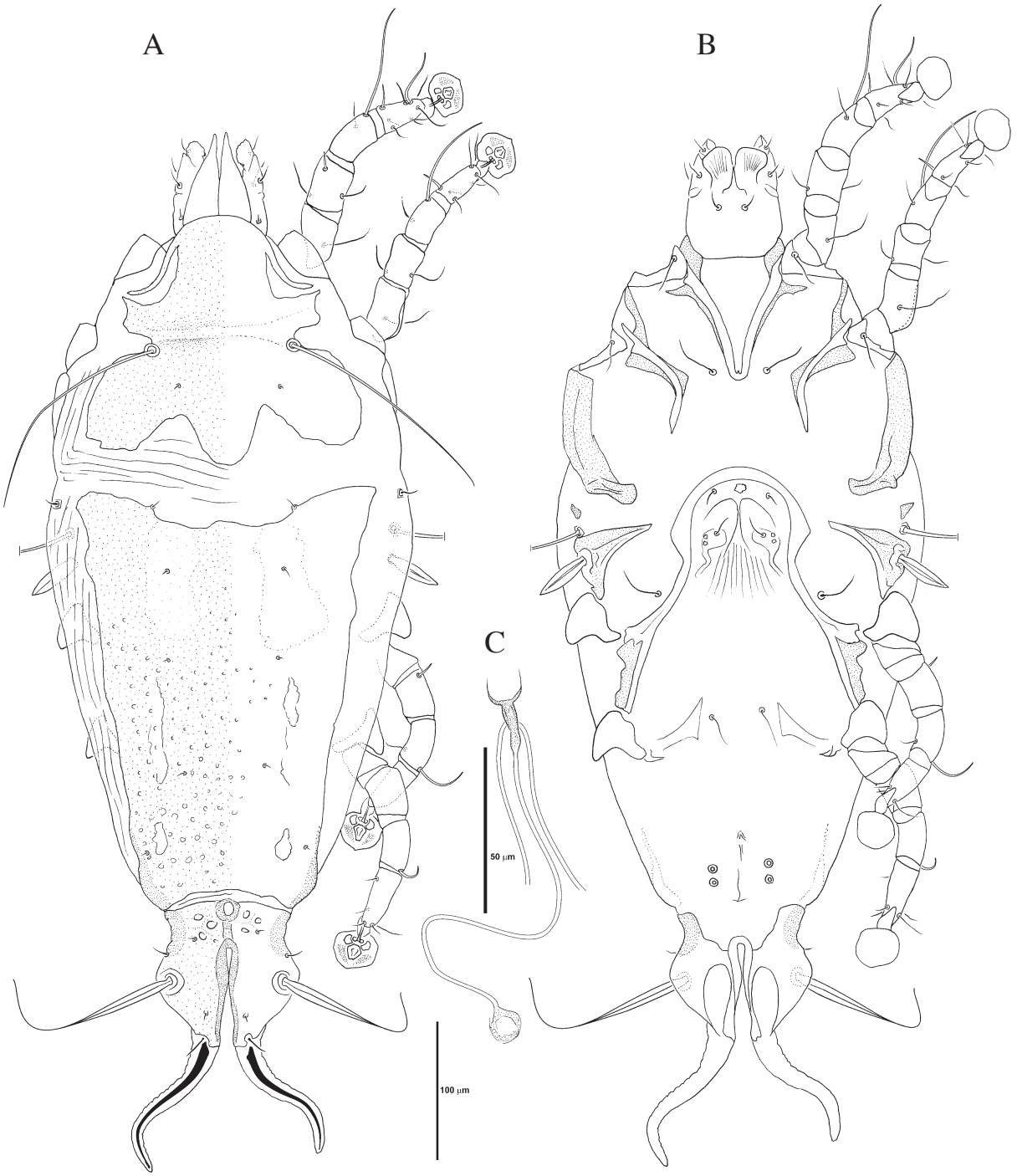

Fig. 4. *Pterodectes crassus* Trouessart, 1885. Female: dorsal (A) and ventral (B) views; spermatheca (C).

minal cleft U-shaped, 33–38 in length, supranal concavity indistinct. Setae *h3* thick setiform, approximately 1.5 times longer than distance between them. Length of setae: *ps1* minute, *h3* 60–68, *h2* 223–237, *ps2* 95–112, *f2* 8–11, *ps3* 41–44. Distance between dorsal setae: *si–c1* 68–79, *c1–c2* 54–71, *c1–d1* 30–44, *d1–d2* 42–57, *d1–e1* 106–122, *d2–e1* 60–65, *e1–e2* 41–46, *e1–h1* 54–68, *e2–h1* 27–38, *h1–f2* 19–27, *h3–h3* 38–44.

Epimerites I fused into a narrow U; epimerites II with narrow sclerotized areas on inner margins; coxal fields I–III open. Rudimentary epimeral sclerite rEpIIa absent. Epimerites IVa broad but poorly sclerotized. Aedeagus extending to anterior margin of anal suckers, 84–92 in length; genital arch 19–27 in length and 44–49 in width. Distance between ventral setae: *3a–4a* 46–54, *4a–g* 44–49, *g–ps3* 65–71, *ps3–ps3* 71–82. Anal suckers 16–18 in diameter and separated by 38–41, corolla edentate. Opisthoventral shields occupying lateral margin of opisthosoma and distal half of lobes, inner margins with broad roughly rectangular projections at level of anal suckers; setae *ps3* situated on

these projections at level of posterior margins of anal suckers.

Setae *cG* and *mG* of genua I and II setiform. Solenidion σ*1* of genu I stick-like, 8–9 long, situated at midlevel of segment. Setae *sR* on trochanter III absent and solenidion σ on genu III present. Tarsus IV 46–50 in length, without apical claw-like process; setae *d* and *e* button-like, well separated from each other, situated on proximal and distal portions of the segment, respectively (Fig. 3A).

Female (Figs 4A–C) (n = 5). Length of idiosoma 572–583, width 231–253; idiosoma enlarged in medial part as in male. Prodorsal shield: 171–180 in length and 180–196 in width, shape generally as in male but lateral margins with rounded incisions extending to bases of setae *se*; surface, setae *ve*, and scapular setae *si, se* as in male. Setae *se* 133–150 in length, their bases separated by 94–103; pair *si* separated by 56–73. Humeral shield represented by small rudimentary sclerite situated ventrally. Setae *c1* set on anterior margin of hysteronotal shield; setae *c2* on striated tegument; setae *c3* lanceolate, 38–41 in length and 10–12 in width, humeral setae *cp* on striated tegument.

Distance between prodorsal and hysteronotal shields 24–41. Anterior hysteronotal and lobar shields separated by thin band of soft cuticle. Anterior hysteronotal shield: 258–272 in length, 196–215 in width, anterior margin concave, pattern of dorsal ornamentation as described for hysteronotal shield in male; at least one pair of pale-sclerotized areas present in postero-lateral angles, near setae *e2*. Lobar region: 95–112 in length and 98–109 in width; anterior third between seta *h1* with at least three pairs of little circular lacunae; terminal cleft as an inverted and narrow U (65–79 in length), reaching the level of setae *f2*, its inner margins touching at level of setae *h2* (Fig. 4A). Supranal concavity well expressed. Setae *h2* spindle-like with terminal filament, 122–139 in length, 7–8 in width. Setae *h1* inserted posterior to supranal concavity; setae *h1* and *f2* in trapezoidal arrangement. Setae *ps1* set at level nearest from *h3* than setae *h2*. Distance between dorsal setae: *si–c1* 79–90, *c1–c2* 60–73, *c1–d1* 35–48, *d1–d2* 54–68, *d1–e1* 141–150, *d2–e1* 82–90, *e1–e2* 57–65, *e1–h1* 117–122, *e2–h1* 73–79, *h1–f2* 22–33, *f2–h2* 16–22. Setae *h3* 15–16 long, about 1/6 of terminal appendages.

Epimerites I U-shaped; epimerites I and II with narrow sclerotized areas, coxal fields I and II open. Epimerites IVa present, large. Distance between ventral setae: *1a–3a* 73–90, *3a–g* 24–30, *4a–ps3* 109–114, *g–4a* 122–133, *ps2–ps3* 11–14, *ps2–ps2* 38–44, *ps3–ps3* 33–38. Setae *ps2* and *ps3* button-like, in rectangular arrangement, situated at midlevel of anal opening. Spermatheca and spermaducts as in Fig. 4C.

Legs I and II as in the male; setae *cG* and *mG* of genua I and II setiform. Solenidion σ*1* of genu I stick-like, 11–12 long, situated in distal half of segment. Setae *sR* on trochanter III absent and solenidion σ on genu III present. Legs IV extending by ambulacral discs to the level of setae *f2* (Fig. 4A).

Pterodectes gracilis Trouessart, 1885

Figs 5–7

Proctophyllodes (*Pterodectes*) *gracilis* Trouessart, 1885: 79.

Pterodectes gracilis: Canestrini, Kramer, 1899: 125; Berla, 1959: 9, figs. 15–17; Park, Atyeo, 1971: 56.

Type host: *Psarocolius decumanus* (Pallas, 1769) (= *P. citrius*) (Icteridae) — the Crested Oropendola, Brazil.

Material examined: 3 males (MNRJ 44926, n° 57; MNRJ 44927, n° 58; MNRJ 44930, n° 61) and 2 females (MNRJ 44928, nº 59; MNRJ 44931, n° 62) from Crested Oropendola *Psarocolius decumanus* (Pallas, 1769) (Icteridae), Fazenda Rubião, Mangaratiba, Rio de Janeiro, Brazil, 05. IV.1958, coll. H.F. Berla; 1 male and 1 female (MNRJ 44932, nº 361) from Green Oropendola *P. viridis* (Müller, 1776) (Icteridae), from same data.

Differential diagnosis. This species resembles *Pterodectes bilineatus* Berla, 1958, *P. turdinus* Berla, 1959 and *P. storkani* Černý, 1974 by having the epimerites I in males as a narrow inverted π with their posterior extensions connected to epimerites II (Fig. 5B). Both sexes of *P. gracilis* can be distinguished from *P. bilineatus* and *P. storkani* by having spine-like setae *cG* on genua I and II (instead of strongly dagger-like), the males differ by lacking the dorsal groove on the hysteronotal shield, and the females differ by the slender "waist" in anterior third of lobar region. The males of *P. gracilis* are readily separable from *P. turdinus* by the relatively longer aedeagus reaching the midlevel of opisthosomal lobes, shape of setae *h3*, absence of the rudimentary epimeral sclerites rEpIIa; in the females, setae *h2* are properly dagger-like rather than ending with a long terminal filament.

Male (Figs 5A–B) (n = 3). Length of idiosoma 462–473, width 171–176. Prodorsal shield:

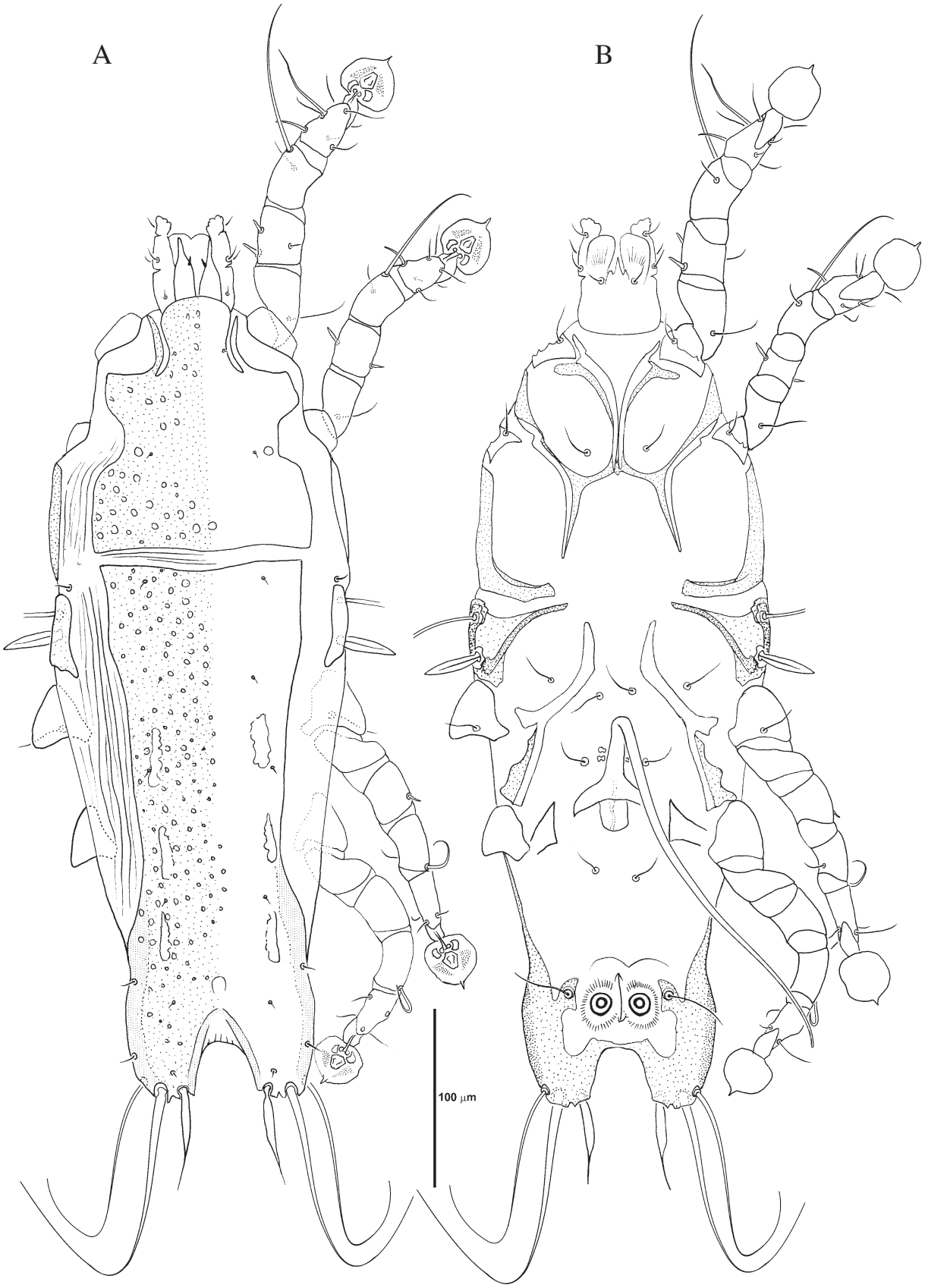

Fig. 5. *Pterodectes gracilis* Trouessart, 1885. Male: dorsal (A) and ventral (B) views.

141–147 in length, 114–128 in width, antero-lateral extensions rounded, lateral margins entire, posterior margin straight or slightly convex; surface with sparsely disposed lacunae of circular shape. Setae *ve* present. Scapular setae *si* and *se* arranged in transverse line. External scapular setae

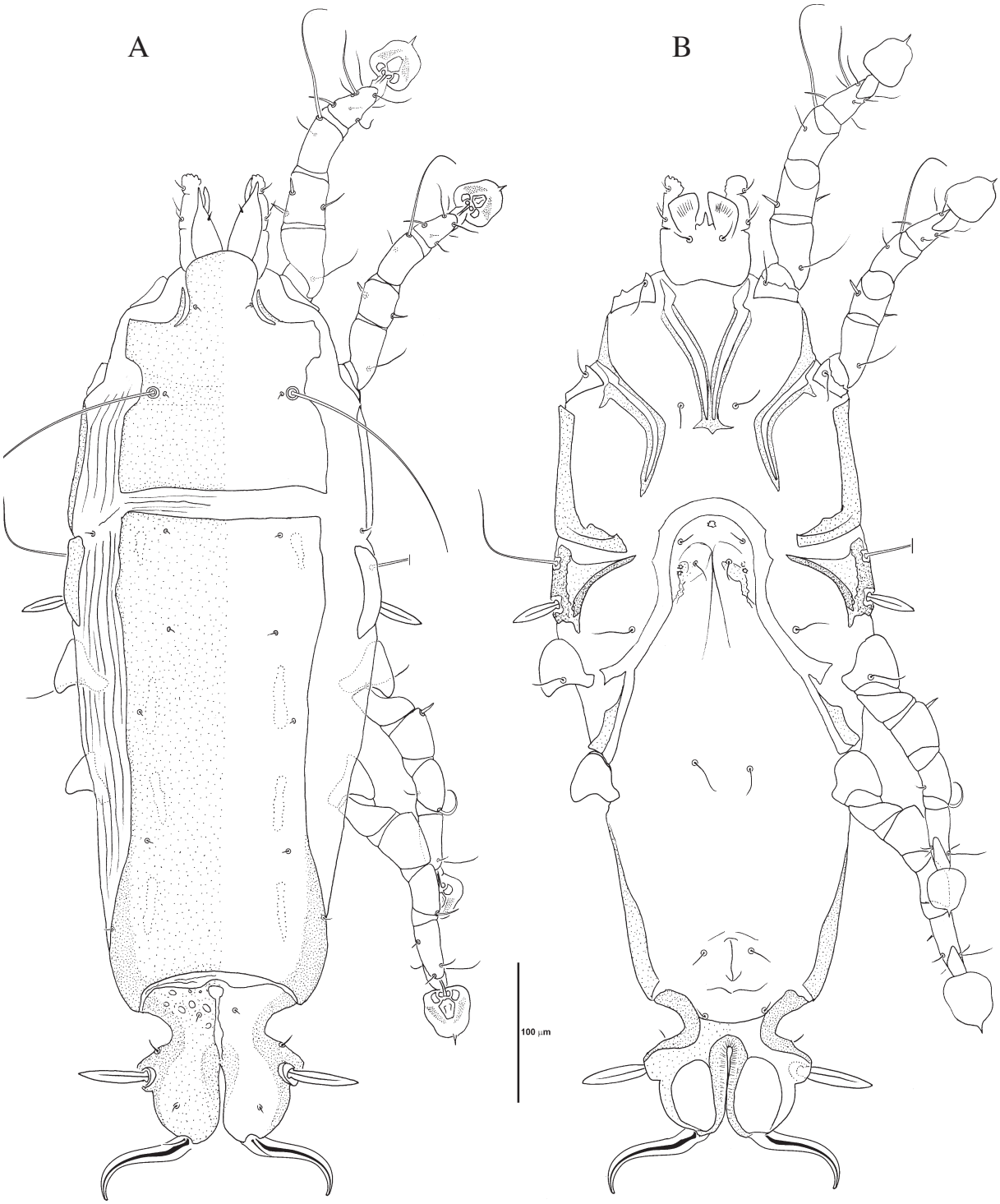

Fig. 6. *Pterodectes gracilis* Trouessart, 1885. Female: dorsal (A) and ventral (B) views.

se missed in all specimens examined, their bases separated by 71–76; bases of *si* separated by 60. Humeral shield present dorsally, ventral part fused with outer margin of epimerites III. Setae *c1* set on hysteronotal shield near to its anterior margin; *c2* on striated tegument, near to anterior end of humeral shield. Setae *cp* set on humeral shields. Setae *c3* lanceolate, 33–35 in length and 5–8 in width. Distance between prodorsal and hysteronotal shields 3. Hysteronotal shield: 307–313 in length, 109–120 in width; anterior margin slightly concave, anterior angles acute; surface with numerous circular lacunae monotonously distributed on this shield. Terminal cleft U-shaped, 38–41 in length. Supranal concavity poorly distinct. Setae *h3* narrowly lanceolate, with a small terminal filament, slightly longer than distance between their bases. Length of setae: *ps1* 7, *h3* 63–73, *h2* 177–204, *ps2* 103–131, *f2* 12–14, *ps3* 27–31. Distance between dorsal setae: *si–c1* 71–76, *c1–c2*

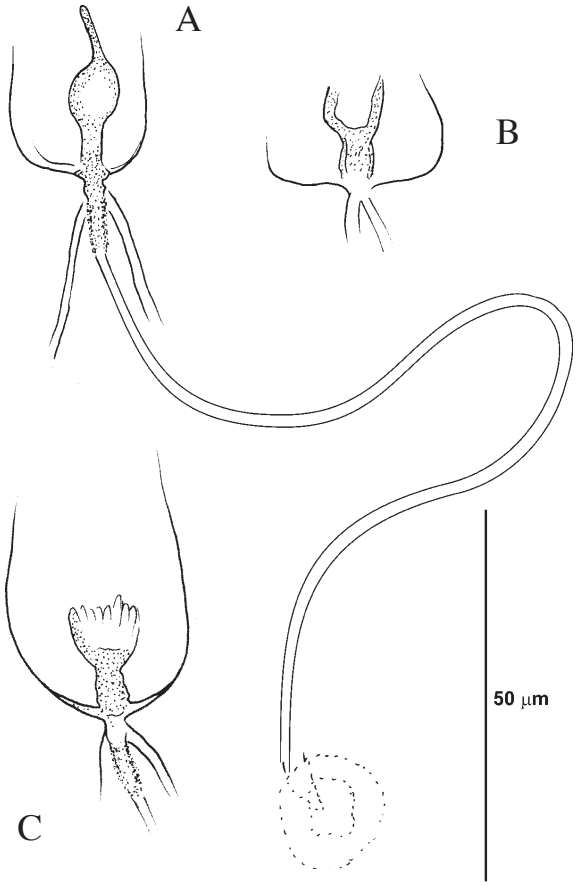

Fig. 7. *Pterodectes gracilis* Trouessart, 1885. Spermatheca of female specimens from *Psarocolius decumanus* (A–B) and *P. viridis* (C).

38–44, *c1–d1* 52–60, *d1–d2* 52–54, *d1–e1* 128–131, *d2–e1* 76–79, *e1–e2* 46–49, *e1–h1* 63–65, *e2–h1* 27–33, *h1–f2* 49–54, *h3–h3* 45–46.

Epimerites I fused as a narrow inverted π, posterior tips of epimerites connected with middle part of epimerites II by thin transverse sclerotized bands. Rudimentary epimeral sclerites rEpIIa absent. Coxal fields II and III open. Epimerites IVa large but poorly sclerotized. Aedeagus arises forwards from genital arch, bends backwards at level of trochanters III and reaches midlevel of opisthosomal lobes, 223–237 in length from the bend (at level of trochanters III) to tip; genital arch 35–44 in length and 44–52 in width. Distance between ventral setae: *3a–4a* 41, *4a–g* 63–71, *g–ps3* 71–73, *ps3–ps3* 57–63. Anal suckers 14–19 in diameter, separated by 19–33, corolla edentate. Opisthoventral shields occupying lateral margin of opisthosoma and entire lobes; inner projections situated at level of anal suckers, enlarged apically and bear setae *ps3*.

Setae *cG* and *mG* of genua I and II spine-like. Solenidion σ*1* of genu I stick-like, 7 long, situated at midlevel of segment. Setae *sR* on trochanter and solenidion σ on genu III present. Tarsus IV 38–44 in length, without apical claw-like process; setae *d* and *e* button-like, situated at midlevel of segment and apically, respectively (Fig. 5A).

Female (Figs 6A–B, 7A–C) (n = 2). Length of idiosoma 627–660, width 220–242. Prodorsal shield: 174–177 in length and 150 in width: general form as in male, surface lacking lacunae; setae *ve*, scapular setae *si* and *se* as in male. Setae *se* 114–122 in length, their bases separated by 102–105; setae *si* separated by 82–86. Humeral shields as in male. Setae *c1* on anterior hysteronotal shield; setae *c2* on striated tegument, anterior to humeral shield; setae *cp* set on humeral shield; setae *c3* lanceolate, 33–36 in length and 8 in width.

Distance between prodorsal and anterior hysteronotal shields 22–24. Anterior hysteronotal and lobar shields separated by thin bow-shaped band of soft cuticle. Anterior hysteronotal shield: 330–341 in length and 140 in width, anterior margin straight, anterior angles right-angular; surface without lacunae but with several pairs of weakly expressed pale-sclerotized areas along lateral margins, normally with four pairs. Lobar region 109–122 in length, 120–122 in width, with a strong narrowing between *h1* and *f2*, resulting in a conspicuous "waist"; lobar shield almost completely split into two pieces by narrow median band of soft tegument running from supranal concavity to anterior end of terminal cleft; anterior third of lobar shield with several little circular lacunae. Terminal cleft as a narrow inverted U, 63–65 in length, reaching level of setae *h2*. Supranal concavity distinct. Setae *h2* dagger-like, without terminal filament, 54 in length and 9–10 in width. Setae *h1* inserted posterior to supranal concavity; setae *h1* and *f2* in trapezoidal arrangement. Setae *ps1* set at midlevel of setae *h2* and *h3*, distant from inner margin of lobar cleft (Fig. 6A). Distance between dorsal setae: *si–c1* 87–103, *c1–c2* 52–54, *c1–d1* 73–76, *d1–d2* 65–78, *d1–e1* 158–160, *d2–e1* 84–95, *e1–e2* 54, *e1–h1* 120–125, *e2–h1* 84–95, *h1–f2* 42–46, *f2–h2* 18–22. Setae *h3* 17–18 long, about 1/4 of terminal appendages.

Epimerites I almost contiguous by posterior ends, fused by sclerotized areas around them, posterior ends of epimerites with short and acute lateral extensions; epimerites II bent angle-likely, entirely surrounded by narrow sclerotized areas. Coxal fields I and II open. Epimerites IVa indistinct. Distance between ventral setae: *1a–3a* 90–106, *3a–g* 16–22, *4a–ps3* 139–147, *g–4a*

132–144, *ps2–ps3* 33–48, *ps2–ps2* 75, *ps3–ps3* 32. Setae *ps2* and *ps3* setiform, in a nearly rectangular arrangement, setae *ps3* at level of anal opening, setae *ps2* near to anterior margin of translobar apodeme. Spermatheca with slight variation among the specimens studied (Fig. 7A–C). Legs I and II as in the male; setae *cG* and *mG* of genua I and II spine-like. Solenidion σ*1* of genu I stick-like, 10 long, situated at midlevel of segment. Setae *sR* on trochanter and solenidion σ on genu III present. Pronounced rounded dorso-basal crests on genua IV (Fig. 6A). Legs IV extending by ambulacral disc at maximum to level of setae *f2*.

Remarks. Berla (1959) redescribed this species and for the first time presented drawings illustrating *P. gracilis*. His drawings, although accurate enough to allow the identification of that species in the time, omitted the pattern of ornamentation on dorsal shields in both sexes. The material from the Crested Oropendola from Brazil, which was personally collected by H.F. Berla and used for that primary redescription, is used for redescription in the present study. One male and one female from the Green Oropendola, *Psarocolius viridis,* were also found in the Berla's collection, although it was not mentioned in his redescription (Berla 1959). With the exception of slight differences in the head of spermatheca (Fig. 7C), the couple from *P. viridis* completely fit the description of *P. gracilis* from the type host. This difference could possibly be instraspecific variation or a mounting artifact.

Pterodectes sialiarum (Stoll, 1893)

Figs 8–9

Proctophyllodes sialiarum Stoll, 1893: 42, pl. 21, figs. 3–4.

Pterodectes sialiarum: Atyeo, Braasch, 1966: 317; Park, Atyeo, 1971: 56; Reeves et al., 2007: 56.

Type host: *Sialia sialis* (Linnaeus, 1758) (Muscicapidae) — the Eastern Bluebird, Guatemala.

Material examined: 4 males and 3 females from *Sialia sialis* (Linnaeus, 1758) (Passeriformes, Muscicapidae), Georgia, USA, 19.VI.2004, coll. R. Carleton, deposited in DZSJRP.

Differential diagnosis. This species resembles *P. geothlypis* Berla, 1973, *P. atyeoi* OConnor, Foufopoulos et Lipton, 2005 and *P. havliki* Černý, 1974 by having V-shaped epimerites I with small acute projections on its posterior tip in males, but it can be distinguished from all of them by the length of aedeagus reaching the anterior end of terminal cleft and by the absence of the rudimentary epimeral sclerite rEpIIa (Fig. 8B). The females of *P. sialiarum* are separable from those species by the absence of circular lacunae around setae *h1* on the lobar shield; the head of spermatheca in this species is indistinct and the proximal portion of primary duct is enlarged (Fig. 9C).

Male (Figs 8A–B) (n = 4). Length of idiosoma 341–374, width 143–154. Prodorsal shield: 103–112 in length, 106–120 in width, antero-lateral extensions acute, lateral margins entire, posterior margin almost straight, surface with rare and sparsely arrayed lacunae in anterior part. Setae *ve* present. Scapular setae *si* and *se* arranged in transverse line; external scapular setae *se* 139–152 in length, their bases separated by 52–60; bases of *si* separated by 38–48. Humeral shields present dorsally, separated from epimerites III. Setae *c1* set on hysteronotal shield, setae *c2* and *cp* on striated tegument; setae *c3* lanceolate, 22–24 in length and 6–7 in width. Distance between prodorsal and hysteronotal shields 11–16. Hysteronotal shield: 218–234 in length, 103–122 in width; anterior margin slightly convex, anterior angles almost right-angular, surface without lacunae. Terminal cleft U-shaped, 27–30 in length; supranal concavity distinct. Setae *h3* long and setiform, nearly 2 times longer than distance between their bases. Length of setae: *ps1* 8–11, *h3* 57–71, *h2* 163–204, *ps2* 54–92, *f2* 5, *ps3* 29–33. Distance between dorsal setae: *si–c1* 57–73, *c1–c2* 27–35, *c1–d1* 46–63, *d1–d2* 31–41, *d1–e1* 87–92, *d2–e1* 52–57, *e1–e2* 29–31, *e1–h1* 41–44, *e2–h1* 22–27, *h1–f2* 19–24, *h3–h3* 35–48.

Epimerites I V-shaped, posterior part trifurcate; epimerites II with narrow sclerotized areas on its margins and coxal fields I–III open. Rudimentary epimeral sclerite rEpIIa absent. Epimerites IVa weakly developed, almost indiscernible. Aedeagus extending almost to anterior end of terminal cleft, 95–98 in length; genital arch 16–19 in length and 41 in width. Distance between ventral setae: *3a–4a* 34–44, *4a–g* 35–39, *g–ps3* 57–61, *ps3–ps3* 54–60. Anal suckers 11–12 in diameter, separated by 29–33, corolla edentate. Opisthoventral shields occupying lateral margin of opisthosoma and posterior half of lobes, inner margins of shields at midlevel of anal suckers with inward projection bearing seta *ps3*.

Setae *cG* and *mG* of genua I and II setiform. Solenidion σ*1* of genu I stick-like, 8–9 long, situated at midlevel of segment. Setae *sR* on trochanter and solenidion σ on genu III present. Tarsus IV

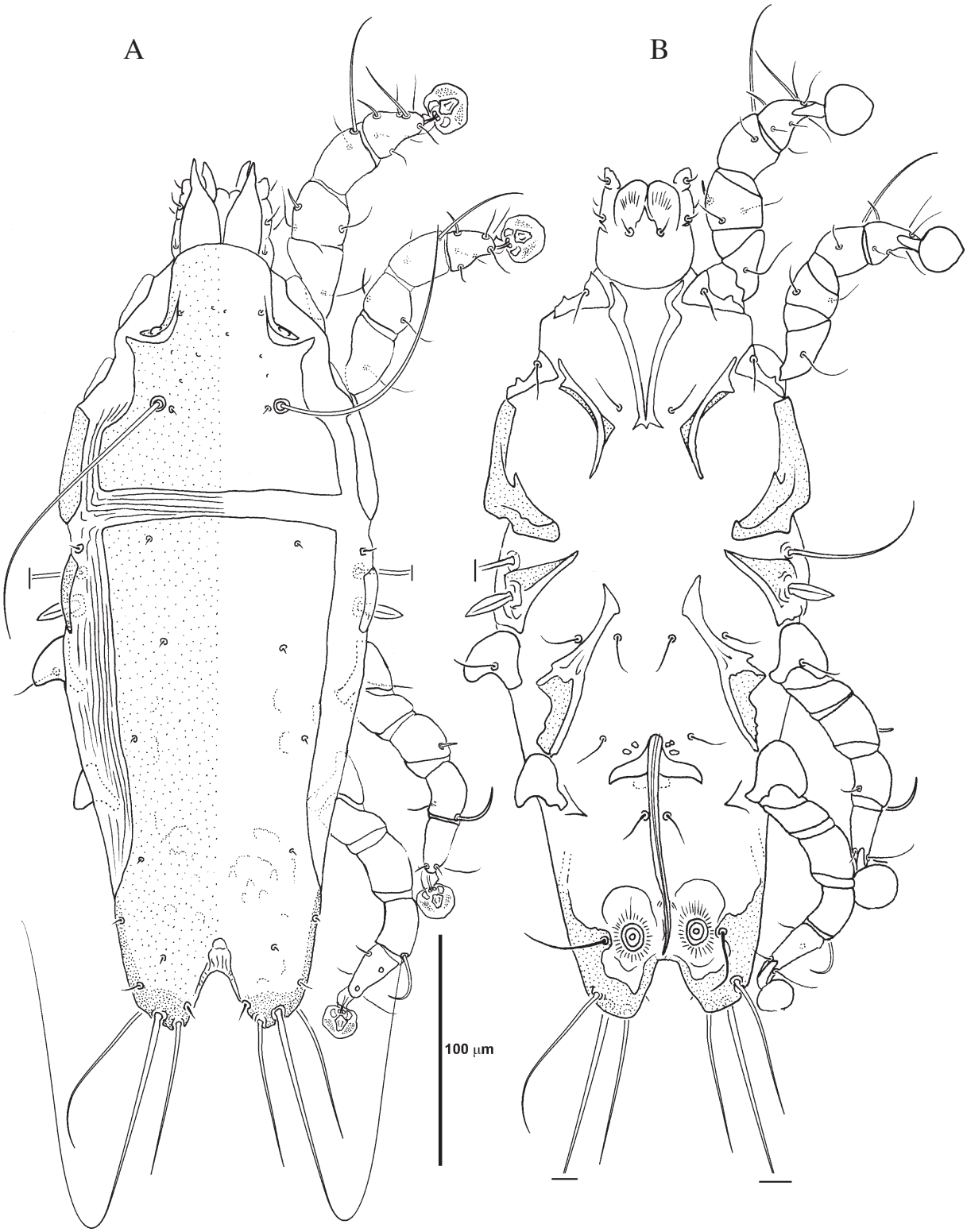

Fig. 8. *Pterodectes sialiarum* (Stoll, 1893). Male: dorsal (A) and ventral (B) views.

30–33 in length, without apical claw-like process; setae *d* and *e* button-like, situated in basal and apical parts of segment, respectively (Fig. 8A).

Female (Figs 9A–C) (n = 3). Length of idiosoma 484–528, width 176–209. Prodorsal shield: 122–133 in length and 128–147 in width, shape generally as in male except for concave posterior margin, surface without lacunae; setae *ve*, scapular setae *si* and *se* as in male. Setae *se* 141–166 in length, their bases separated by 73–84; setae *si* separated by 53–54. Humeral shields present dorsally, separated from epimerites III. Setae *c1* set on anterior hysteronotal shield, setae *c2* on striated tegument anterior to humeral shield, setae *cp* on

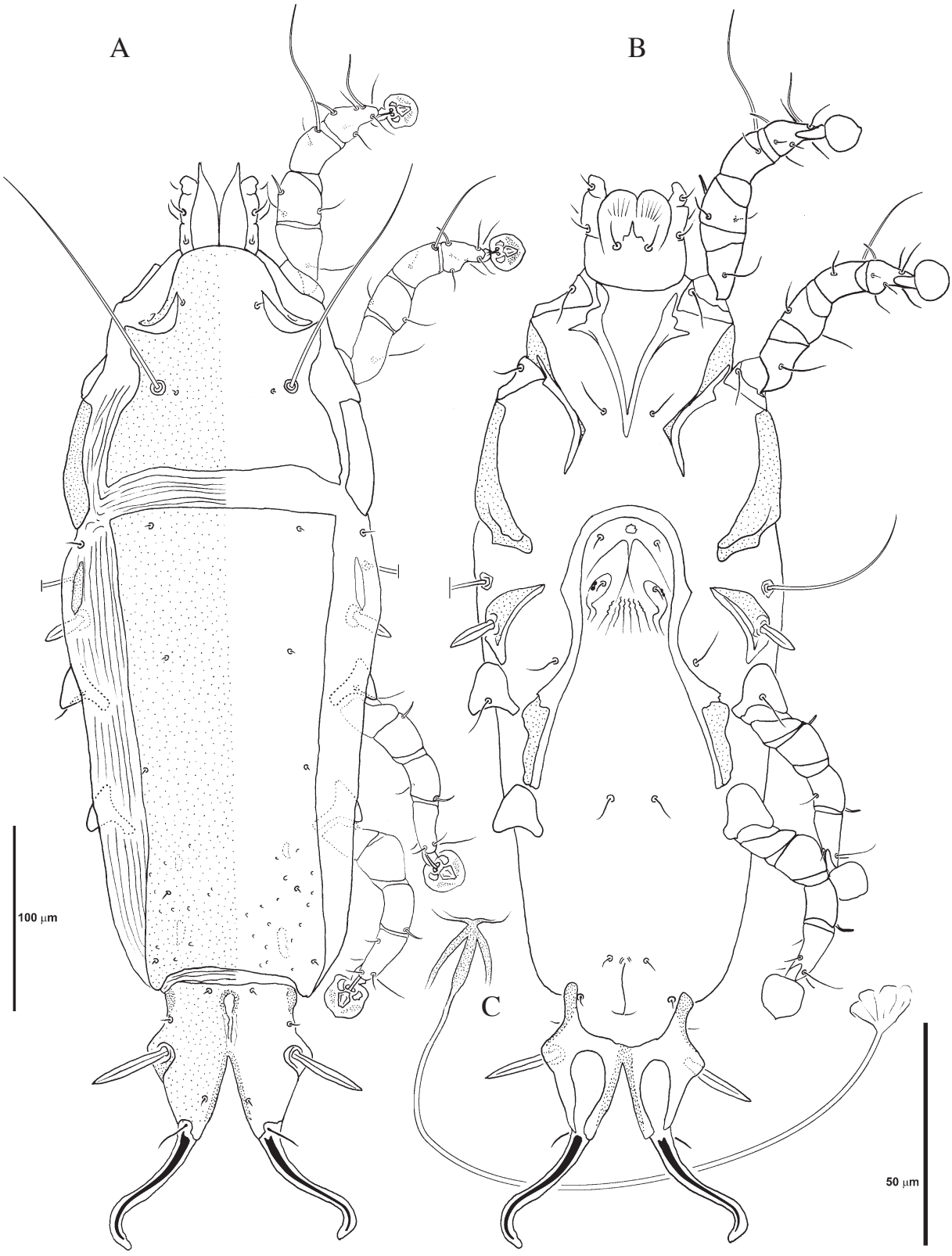

Fig. 9. *Pterodectes sialiarum* (Stoll, 1893). Female: dorsal (A) and ventral (B) views; spermatheca (C).

striated tegument; setae *c3* lanceolate, 27 in length and 8 in width.

Distance between prodorsal and hysteronotal shields 11–19. Anterior hysteronotal and lobar shields separated by thin band of soft cuticle. Anterior hysteronotal shield: 256–283 in length and 125–144 in width, anterior margin slightly straight, anterior angles right-angular; surface with few circular lacunae in posterior portion and two pairs of pale-sclerotized areas in postero-lateral parts near to setae *e1* and *e2*, respectively. Lobar region: 84–92 in length and 92–101 in

width. Terminal cleft as an inverted V, 57–60 in length, reaching the level of setae *h2*. Supranal concavity well expressed. Setae *h2* dagger-like, without terminal filament, 46–52 in length and 7–8 in width. Setae *h1* inserted anterior to supranal concavity, near to anterior margin of lobar shield; setae *h1* and *f2* in trapezoidal arrangement. Setae *ps1* closer to setae *h3* than to *h2*, situated near margins of terminal cleft. Distance between dorsal setae: *si–c1* 65–76, *c1–c2* 41–45, *c1–d1* 76–95, *d1–d2* 50–57, *d1–e1* 125–137, *d2–e1* 68–91, *e1–e2* 41–52, *e1–h1* 63–76, *e2–h1* 38–49, *h1–f2* 27, *f2–h2* 16–22. Setae *h3* 17–18 long, about 1/4 of terminal appendages.

Epimerites I V-shaped; epimerites II with narrow sclerotized area on inner margins; coxal fields I and II open. Epimerites IVa indistinct. Distance between ventral setae: *1a–3a* 68–73, *3a–g* 24–27, *4a–ps3* 76–103, *g–4a* 120–141, *ps2–ps3* 27–29, *ps2–ps2* 52–60, *ps3–ps3* 22–24. Setae *ps2* and *ps3* setiform, in trapezoidal arrangement, setae *ps3* at level of anterior end of anal opening and setae *ps2* approximately at midlevel of that opening. Spermatheca and spermaducts as in Fig. 9C. Legs I and II as in the male; setae *cG* and *mG* of genua I and II setiform; solenidion σ*1* of genu I stick-like, 10 long, situated at midlevel of segment. Setae *sR* on trochanter and solenidion σ on genu III present. Rounded dorso-basal crests on genua IV (Fig. 9A). Legs IV extending by ambulacral discs at maximum to level of setae *f2*.

Remarks. During the preparation of the manuscript we were informed (B.M. OConnor, pers. comm., University of Michigan, USA) of a second species of *Pterodectes* collected from *Sialia sialis* in Guatemala, the type locality from where *P. sialiarum* was described. However, this second species, photos of which we received (female exemplar), probably represents an undescribed species, because differs from *P. sialiarum* by the following combination of characters: setae *h2* with long terminal filament, prodorsal and hysteronotal shields are almost in contact with each other, the surface of dorsal shields is entirely covered with large ovate lacunae. These characters are clearly distinctive from the original description and illustrations of the female *P. sialiarum* presented by Stoll (1893: plate XX, fig. 4), in particular, the long terminal filament of setae *h2* and the lesser pronounced narrowing in the lobar region in females. Based on these reasons we believe that the specimens treated and redescribed herein are true representatives of *P. sialiarum*.

Pterodectes muticus Banks, 1909

Figs 10–11

Pterodectes muticus Banks, 1909: 141, pl. 10, fig. 4 (part).

Pterodectes muticus: Park, Atyeo, 1971: 56 (part).

Type host: *Pooecetes gramineus* (Gmelin, 1789) (Emberizidae) — the Vesper Sparrow, Canada.

Material examined: 1 male (NU 1242) and 1 female (NU 1242) from Vesper Sparrow *Pooecetes gramineus* (Gmelin, 1789) (Passeriformes, Emberizidae), Lake Dallas, Dallas, Texas, USA, 26.X.1939, coll. unknown; 1 female (NU 1319) from same host species, 7 miles SE. Lytle, Atascosa CO., Texas, USA, 30.I.1949, coll. W.A. Thornton, at UMMZ. Several syntypes (MCZ 75521) from Vesper Sparrow (= *P. gramineus*), Canada, 19.IV.1907, coll. unknown.

Differential diagnosis. As in *Pterodectes fissuratus*, *P. amaurochalinus* and *P. crassus*, both sexes of *P. muticus* are characterized by the epimerites I fused into a simple U without any extensions, and the females of this species have setae *ps2* and *ps3* button-like and setae *h2* with a terminal filament. *Pterodectes muticus* can be easily distinguished from these three species by the structure of the prodorsal shield in both sexes, surface of which is uniformly punctured and the posterior margin has just one pair of shallow concavities. In *P. fissuratus,* the prodorsal shield has a deep and heavily sclerotized median groove and numerous circular lacunae; in *P. crassus,* the posterior margin of this shield has a pair of deep incisions and solenidion σ*1* is present on genu III (Figs 3A, 4A); in *P. amaurochalinus,* the entire surface of the prodorsal shield is covered with numerous circular lacunae.

Male (Figs 10A–B) (n = 1). Length of idiosoma 352, width 132. Prodorsal shield: 106 in length, 101 in width, antero-lateral extensions acute, lateral margins entire, posterior margin with pair of shallow concavities and short median extension, surface without lacunae and pale-sclerotized areas. Setae *ve* present. Scapular setae *si* and *se* arranged in transverse line. Setae *se* 139 in length, their bases separated by 60; bases of *si* separated by 41. Humeral shields absent. Setae *c1* on hysteronotal shield; setae *c2* and *cp* on striated tegument; setae *c3* lanceolate, 24 in length and 7 in width. Distance

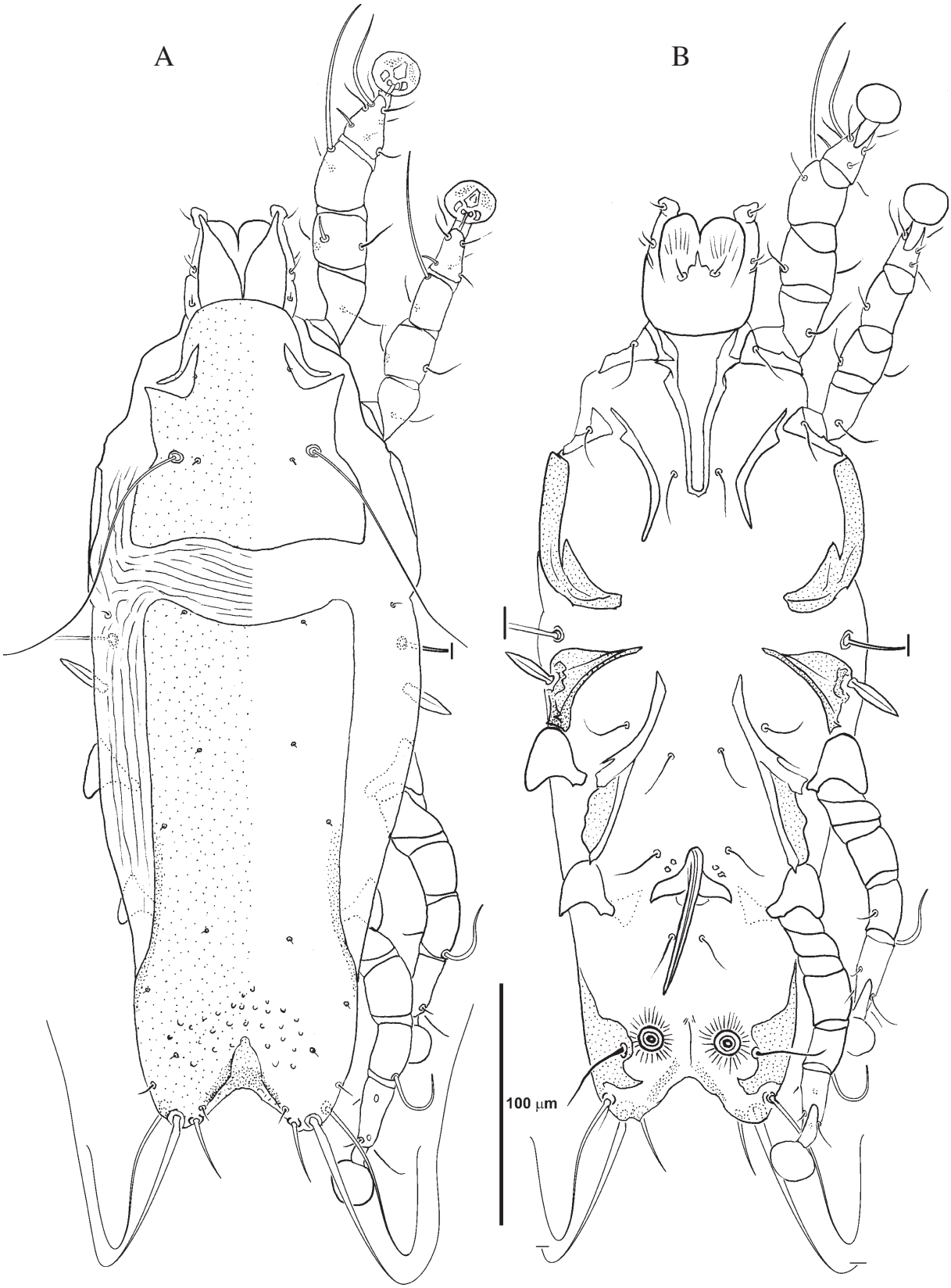

Fig. 10. *Pterodectes muticus* Banks, 1909. Male: dorsal (A) and ventral (B) views.

between prodorsal and hysteronotal shields 33. Hysteronotal shield: 223 in length, 90 in width; anterior margin concave, anterior angles rounded, surface with a few circular lacunae situated mainly in posterior quarter of opisthosoma posterior to setae *e2*. Terminal cleft as an inverted U with strongly divergent branches, 22 in length; supranal concavity distinct. Setae *h3* setiform, short, not longer than distance between their bases. Length of setae: *ps1* minute, *h3* 24, *h2* 212, *ps2* 95, *f2* 8, *ps3* 35.

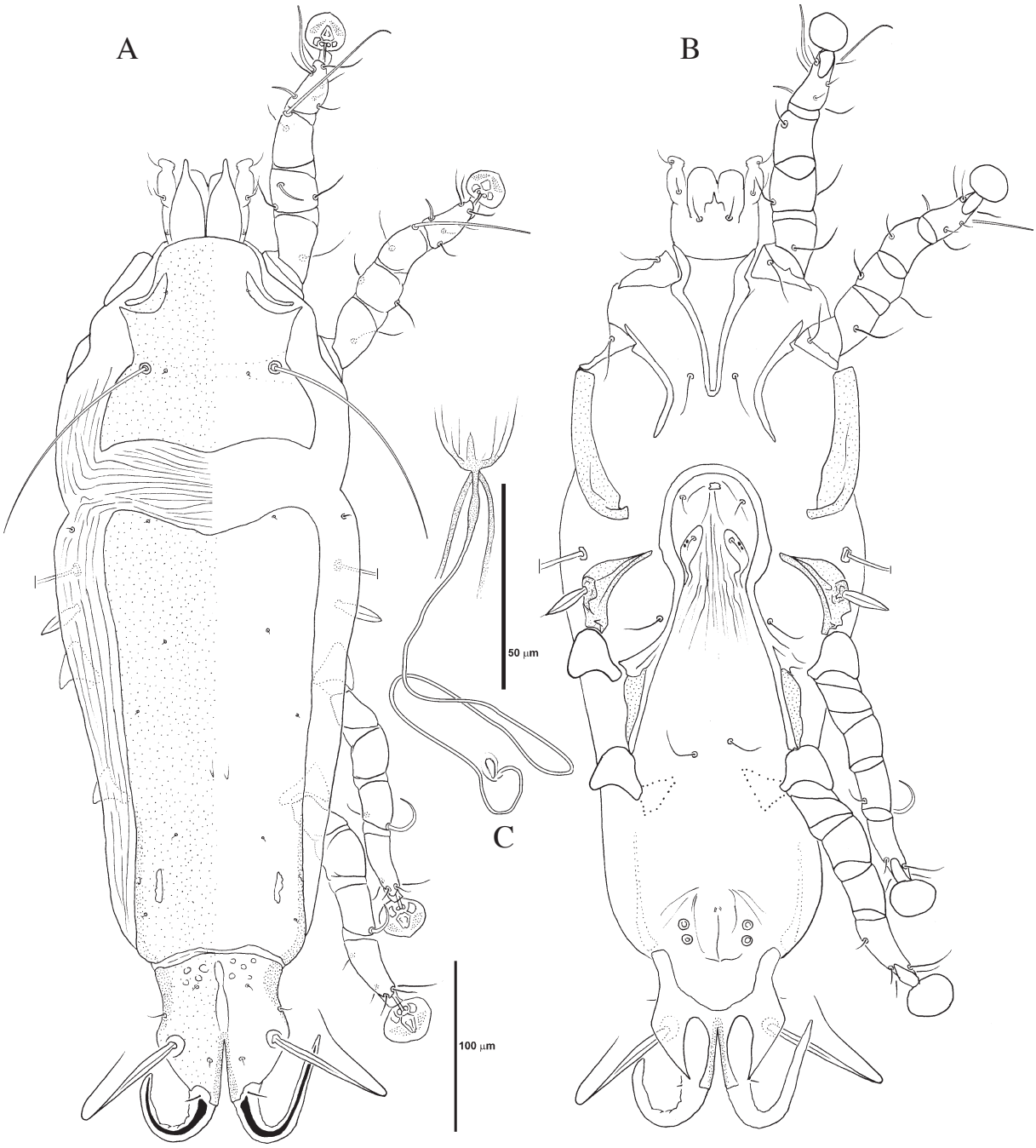

Fig. 11. *Pterodectes muticus* Banks, 1909. Female: dorsal (A) and ventral (B) views; spermatheca (C).

Distance between dorsal setae: *si–c1* 68, *c1–c2* 41, *c1–d1* 53, *d1–d2* 35, *d1–e1* 82, *d2–e1* 54, *e1–e2* 38, *e1–h1* 49, *e2–h1* 27, *h1–f2* 19, *h3–h3* 41.

Epimerites I U-shaped, coxal fields I–III open. Rudimentary epimeral sclerites rEpIIa absent. Epimerites IVa poorly sclerotized. Aedeagus relatively short, not reaching level of anal suckers, 65 in length; genital arch 17 in length and 35 in width. Distance between ventral setae: *3a–4a* 45, *4a–g* 38, *g–ps3* 53, *ps3–ps3* 57. Anal suckers 11 in diameter, separated by 33, corolla edentate. Opisthoventral shields broad and restricted only to lateral borders of opisthosoma, posterior ends reach level of setae *ps2*, posteromesal edges with inward claw-shaped projections; setae *ps3* on inner margin of opisthoventral shield, approximately at level of posterior margin of anal suckers.

Setae *cG* and *mG* of genua I and II setiform. Solenidion σ*1* of genu I stick-like, 9 long, situated at midlevel of segment. Setae *sR* on trochanter and solenidion σ on genu III absent. Tarsus IV 35 in length, without apical claw-like process; setae *d* and *e* button-like, well separated from each other, situated on proximal and distal portions of segment, respectively (Fig. 10A).

Female (Figs 11A–C) (n = 2). Length of idiosoma 506–528, width 187–204. Prodorsal shield: 128–136 in length and 128–133 in width, surface and shape, setae *ve*, scapular setae *si* and *se* as in male. Setae *se* 166–177 in length, their bases separated by 79–84; pair *si* separated by 52. Humeral shields absent. Setae *c1* on anterior hysteronotal shield, setae *c2* and *cp* on striated tegument; setae *c3* lanceolate, 27–30 in length and 8 in width.

Distance between prodorsal and hysteronotal shields 41–46. Anterior hysteronotal and lobar shields separated by thin band of soft cuticle. Anterior hysteronotal shield: 250 in length, 122–131 in width, anterior margin concave, anterior angles rounded, surface without lacunae, with two longitudinal pale-sclerotized areas anterior to level of setae *e2*. Lobar region: 90 in length, 76–79 in width; terminal cleft as a narrow inverted V, 35–38 in length, reaching the level of setae *h2*. Lobar shield almost completely split into two longitudinal halves by narrow longitudinal band of soft tegument stretching from supranal concavity to terminal cleft, surface with circular lacunae in anterior third. Supranal concavity well expressed. Setae *h2* spindle-like, with terminal filament, 103–117 in length and 5 in width. Setae *h1* inserted posterior to supranal concavity, setae *h1* and *f2* in trapezoidal arrangement. Setae *ps1* set at midlevel of setae *h2* and *h3*. Distance between dorsal setae: *si–c1* 87–90, *c1–c2* 46–52, *c1–d1* 73, *d1–d2* 46, *d1–e1* 114, *d2–e1* 76, *e1–e2* 52–60, *e1–h1* 92–95, *e2–h1* 53, *h1–f2* 24, *f2–h2* 14–19. Setae *h3* 11 long, about 1/7 of terminal appendages.

Epimerites I U-shaped; coxal fields I and II open. Epimerites IVa present, poorly sclerotized. Distance between ventral setae: *1a–3a* 73–76, *3a–g* 24–27, *4a–ps3* 109, *g–4a* 122, *ps2–ps3* 10, *ps2–ps2* 37–41, *ps3–ps3* 38–41. Setae *ps2* and *ps3* button-like in rectangular arrangement. Spermatheca and spermaducts as in Fig. 11C. Legs I and II as in the male; setae *cG* and *mG* of genua I and II setiform. Solenidion σ*1* of genu I stick-like, 14–15 long, situated in distal part of segment. Setae *sR* on trochanter and solenidion σ on genu III absent. Genua III and IV without pronounced dorsal crests. Legs IV extending by ambulacral discs at maximum to the level of setae *h2* (Fig. 11A).

Remarks. *Pterodectes muticus* was described from two host species: "Guelph, Ontario, Canada, on vesper sparrow and phoebe" (Banks 1909: 142). Type series (syntypes from the Vesper Sparrow) is represented by many specimens mounted in Canadian balsam together with a piece of a feather. Therefore these specimens were not in good enough condition to take measurements or make drawings, which is why morphological and morphometric information was taken from the specimens recollected in Texas. The specimens used for the present redescription fit the original description presented by Banks (1909) and fit his syntypes. As the Vesper Sparrow was given first in the original description, we designate here the former bird species as the type host for *P. muticus*. Syntypes from the Eastern Phoebe (*Sayornis phoebe*) were not found in the Banks' collection in MCZ (A. Johnston, pers. comm., MCZ, Harvard University, USA).

Pterodectes banksi Valim et Hernandes, sp. n.

Figs 12–13

Pterodectes muticus: Banks, 1909: 141, pl. 10, fig. 4 (part).

Pterodectes muticus: Park, Atyeo, 1971: 56 (part).

Type host: *Sayornis phoebe* (Latham, 1790) (Tyrannidae) — the Eastern Phoebe, USA.

Type material: male holotype (NU 1178A) from *Sayornis phoebe* (Latham, 1790) (Passeriformes, Tyrannidae), 20 mi. S. Dallas, Texas, USA, 1.X.1938, coll. unknown; 1 male (NU 1178B) and 2 female paratypes (NU 1178C and D), same data. Type series is deposited in UMMZ.

Differential diagnosis. Although this species was apparently treated as *P. muticus* (Banks 1909; Park and Atyeo 1971), *P. banksi* sp. n. can be readily separated from *P. muticus* by the following characters. In both sexes, setae *c1* set off hysteronotal shield; in males, the anterior angles of hysteronotal shield are acute (rather than rounded in *P. muticus*), and opisthoventral shields have discrete inward projections (rather than claw-shaped projections in *P. muticus*); in females, setae *ps2* and *ps3* are setiform, setae *h2* are dagger-like without terminal filament, and the lobar shield is split into two longitudinal halves. In both sexes of *P. muticus*, setae *c1* are on the hysteronotal shield; in females, setae *ps2* and *ps3* are button-like, setae *h2* have terminal filament, and parts of lobar shield remain connected anteriorly.

Male holotype (Figs 12 A–B) (measurement of 1 paratype in parentheses). Length of idiosoma 336 (330), width 149 (149). Prodorsal shield: 109 (98) in length, 101 (101) in width, antero-lateral extensions acute, lateral margins entire, posterior margin with pair of shallow concavities, surface

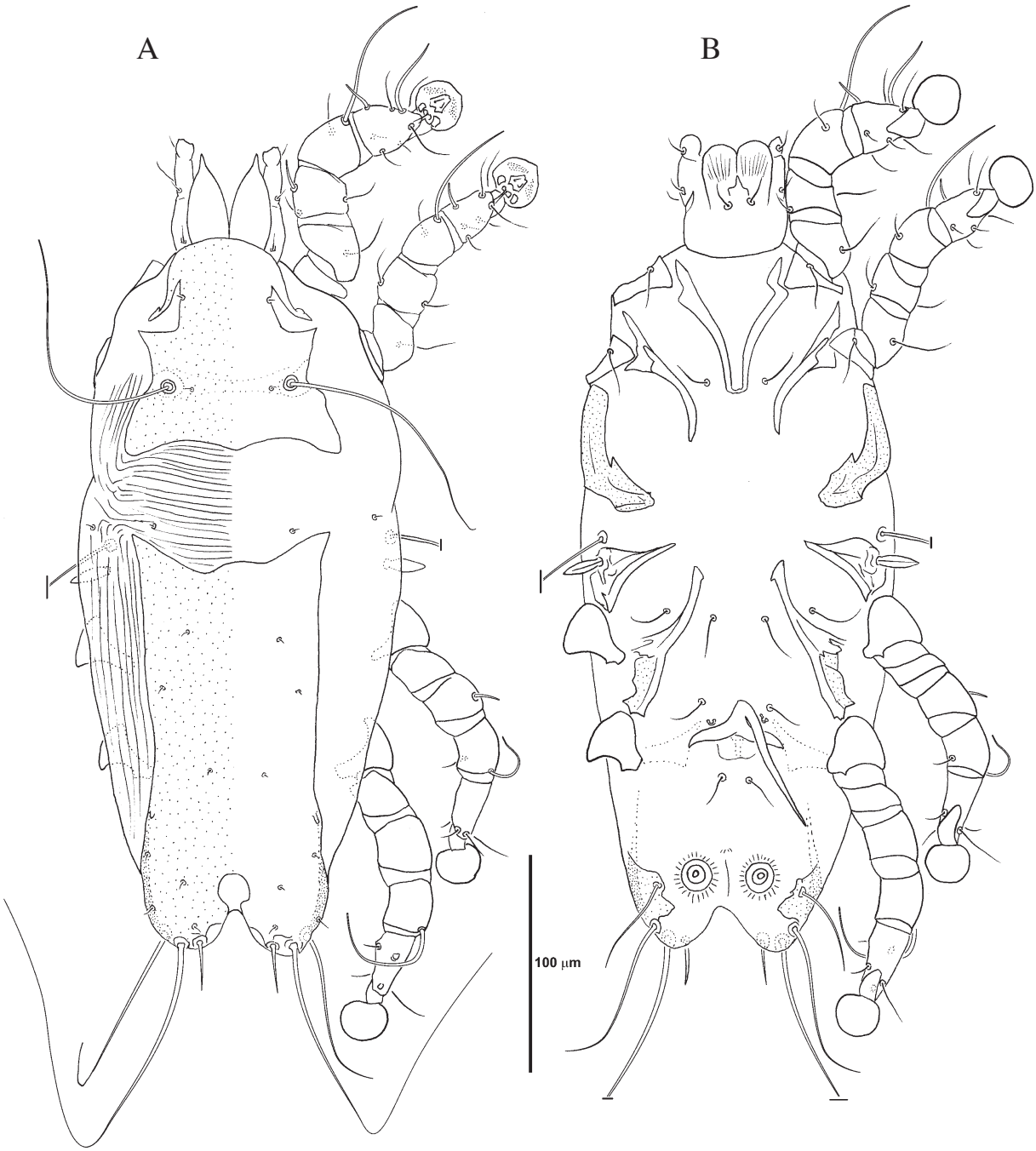

Fig. 12. *Pterodectes banksi* sp. n. Male: dorsal (A) and ventral (B) views.

monotonously punctured. Setae *ve* present. Scapular setae *si* and *se* arranged in transverse line. Setae *se* 122 in length (missed in paratype), their bases separated by 57 (57) and surrounded by a lighter sclerotized area, but still set on prodorsal shield, bases of setae *si* separated by 27 (31). Humeral shields absent. Setae *c1*, *c2* and *cp* on striated tegument, setae *c3* lanceolate, 24 (19) in length and 7 (8) in width. Distance between prodorsal and hysteronotal shields 44 (54). Hysteronotal shield: 193 (193) in length, 87 (92) in width; anterior margin deeply concave, anterior angles acute, surface monotonously punctured, without ornamentation. Terminal cleft as an inverted U with divergent branches, 19 (19) in length; supranal concavity well expressed, and circular in form. Setae *h3* short and setiform, shorter than distance between their bases. Length of setae: *ps1* 5 (5), *h3* 24 (20), *h2* 204 (missed), *ps2* 79 (71), *f2* 8 (8), *ps3* 33 (38). Distance between dorsal setae: *si–c1* 54 (68), *c1–c2* 54 (38), *c1–d1* 52 (52), *d1–d2* 33 (29), *d1–e1* 71 (65), *d2–e1* 46 (46), *e1–e2* 41 (49), *e1–h1* 49 (54), *e2–h1* 24 (22), *h1–f2* 27 (31), *h3–h3* 35 (34).

Epimerites I U-shaped, transverse connection thin; coxal fields I–III open. Rudimentary epimeral sclerites rEpIIa absent. Epimerites IVa large,

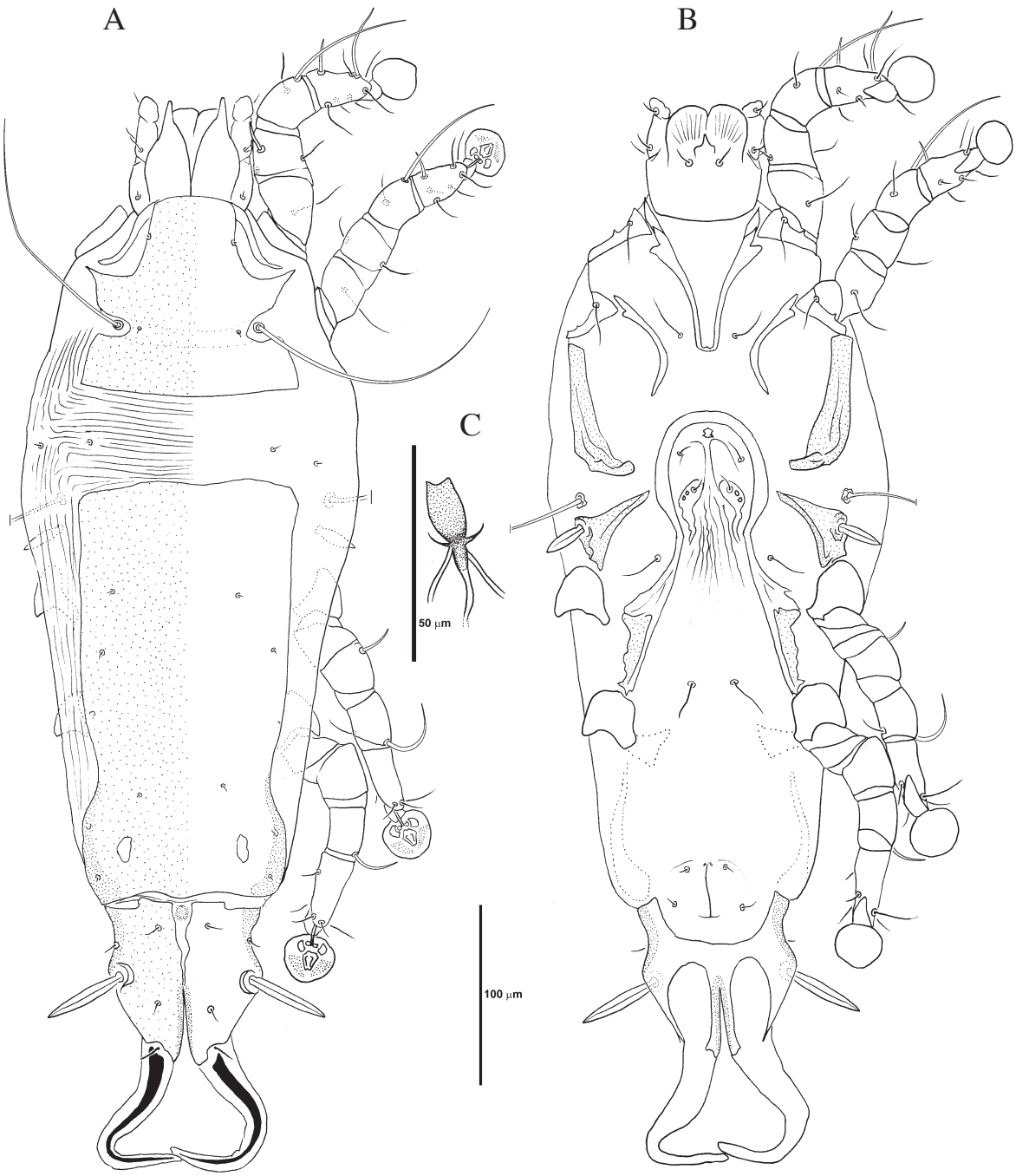

Fig. 13. *Pterodectes banksi* sp. n. Female: dorsal (A) and ventral (B) views; spermatheca (C).

extending by inner tips to genital arch, but poorly sclerotized. Aedeagus relatively short, not reaching level of anal suckers, 65 (65) in length; genital arch 13 (16) in length and 41 (44) in width. Distance between ventral setae: *3a–4a* 41 (41), *4a–g* 37 (35), *g–ps3* 63 (58), *ps3–ps3* 68 (65). Anal suckers, 14 (12) in diameter, separated by 31 (31), corolla edentate. Opisthoventral shields broad and restricted to lateral borders of opisthosoma until level of setae *ps2*, postero-mesal edges with discrete inward projections; setae *ps3* on inner margin of opisthoventral shield at level of postero-lateral margins of anal suckers (Fig. 12B).

Setae *cG* and *mG* of genua I and II setiform. Solenidion σ*1* of genu I stick-like, 12 (12) long, situated at midlevel of segment. Setae *sR* on trochanter III absent and solenidion σon genu III present. Tarsus IV 38 (35) in length, without apical claw-like process; setae *d* and *e* button-like, situated on proximal and distal portions of segment, respectively (Fig. 12A).

Female (Figs 13A–C) (measurements of 2 paratypes). Length of idiosoma 506–545, width 176–231. Prodorsal shield: 114–117 in length and 120–131 in width, shape as in male except for slightly convex posterior margin, surface, setae

ve, scapular setae *si* and *se* as in male. Setae *se* 155–158 in length, their bases separated by 79; pair *si* separated by 56. Humeral shield absent. Setae *c1, c2* and *cp* on striated tegument; setae *c3* lanceolate, 24–27 in length and 7–8 in width.

Distance between prodorsal and hysteronotal shields 49. Anterior hysteronotal and lobar shields separated by thin band of soft cuticle. Anterior hysteronotal shield: 231–234 in length, 122–125 in width; surface monotonously punctured, with one pair of postero-lateral pale-sclerotized areas anterior to setae *e2*. Lobar region 92–95 in length and 87 in width; lobar shield completely split into two longitudinal halves, surface without lacunae. Terminal cleft as a narrow inverted V, 46–49 in length, reaching level of setae *h2*. Supranal concavity well expressed. Setae *h2* dagger-like, without terminal filament, 46–52 in length and 8 in width. Setae *h1* inserted posterior to supranal concavity; setae *h1* and *f2* in low trapezoidal arrangement. Setae *ps1* set at midlevel of setae *h2* and *h3*. Distance between dorsal setae: *si–c1* 69, *c1–c2* 42, *c1–d1* 68, *d1–d2* 52, *d1–e1* 112, *d2–e1* 67, *e1–e2* 58–60, *e1–h1* 76–92, *e2–h1* 42–52, *h1–f2* 26–34, *f2–h2* 16–19. Setae *h3* 12 long, about 1/8 of terminal appendages.

Epimerites I U-shaped as described for the male. Coxal fields I and II open. Epimerites IVa present, poorly sclerotized. Distance between ventral setae: *1a–3a* 68, *3a–g* 20–26, *4a–ps3* 101, *g–4a* 112, *ps2–ps3* 11, *ps2–ps2* 35, *ps3–ps3* 38. Setae *ps2* and *ps3* setiform, disposed in trapezoidal arrangement. Spermatheca and spermaducts as in Fig. 13C. Legs I and II as in the male; setae *cG* and *mG* of genua I and II setiform. Solenidion σ*1* of genu I stick-like, 15 long, situated at midlevel of segment. Setae *sR* on trochanter III absent, solenidion σ on genu III present. Pronounced dorso-basal crests on genua IV (Fig. 13A). Legs IV extending by ambulacral discs to the level of setae *h2*.

Etymology. The epithet is in homage to Nathan Banks (1868–1953), the primary collector of this new species.

Remarks. Although Banks (1909) mentioned both the Vesper Sparrow and the Eastern Phoebe as hosts of *Pterodectes muticus* (see remarks above), we have found out that these hosts actually bear separate *Pterodectes* species. As the firstly mentioned bird was declared the type host of *P. muticus*, the latter host is chosen herein as the type host for *P. banksi* n. sp.. When N. Banks collected these mites, characters normally used to separate feather mite species were probably not enough to recognize them as separate species. Currently, the broader range of characters used in specific diagnosis can justify the placement of the Eastern Phoebe mites in a new species.

species inquirenda

Pterodectes trulla (Trouessart, 1885)

Proctophyllodes (*Pterodectes*) *mainati* var. *trulla* Trouessart, 1885: 81.
Pterodectes mainati var. *trulla*: Canestrini, Kramer: 1889, 126.
Pterodectes trulla: Gaud, 1966: 337. Mironov, 2006: 27.
Montesauria trulla: Park, Atyeo, 1971: 60.

Type host: *Tauraco macrorhynchus* (Fraser, 1839) (Musophagidae) — the Yellow-billed Turaco, Gabon; **probably error.**

This species was originally described by Trouessart (1885: 81) as a variety of *Pterodectes mainati* Trouessart, 1885 from the museum skin of *Corythaix macrorhyncha* (= *Tauraco macrorhynchus*) from Gabon. Gaud (1966: 337) stated that it should not be a variety of *P. mainati* but a separate species. Nevertheless, he was not confident to place it under a correct association with a touraco host. Park and Atyeo (1971: 60) considered that species as belonging to the genus *Montesauria* Oudemans, 1905. Probably they assumed the similarities of the two varieties described by E.L. Trouessart would mean that *P. trulla* belonging to the genus *Montesauria* as well.

In a partial revision of the genus *Montesauria*, Mironov (2006: 27), based on examination of the syntypes of *P. trulla*, concluded that this species belongs to the genus *Pterodectes*. However, since its odd association with musophagids (Musophagiformes), he suggested that it might be an accidental contamination, because no other species of Proctophyllodidae are known to occur on birds of this order. Since specimens of the type series of *P. trulla* are in bad condition to allow a possible redescription (S.V. Mironov, pers. comm., Zoological Institute, Russia), and given the difficulty of correctly assigning this species to its true host, we suggest it is prudent to regard it as a *species inquirenda*.

Cotingodectes Valim et Hernandes, gen. n.

Pterodectes: Trouessart, 1899: 61 (part); *Pterodectes*: Park, Atyeo, 1971: 56 (part).

Type species: *Pterodectes interifolia* Trouessart, 1899.

Description. Both sexes. Moderately elongated pterodectines. Vertical setae *ve* absent. All hysterosomal setae present. Prodorsal shield covering most of prodorsum. Scapular shields narrow. Humeral shields present, developed dorsally. Setae *c2* situated dorsally, in anterior ends of humeral shields. Setae *cG* on legs I and II setiform. Solenidion σ*1* of genu I about 1/3 the lengh of solenidion σ*3* of tarsus I. Setae *wa* anterior to setae *la* and *ra* on tarsi I and II. Segments of legs I and II without processes or other modifications. Trochanteral seta *sR* and genual solenidion σ*1* present on legs III. Supranal concavity well developed.

Male. Epimerites I fused into a Y, posterior tip of sternum connected with medial part of epimerites II by transverse sclerotized bands. Coxal fields I closed, coxal fields II–IV open; epimerites II and IV with extensive sclerotized areas. Opisthosomal lobes longer than wide, each dissected by narrow longitudinal incision into two lobules; outer lobules longer than inner ones and bearing setae *h2* and *ps1*. Setae *h3* lanceolate or foliform, situated at base of inner lobules, anterior to level of setae *h2*. Setae *h1* at level of anterior end of supranal concavity. Setae *ps1* setiform. Genital organ slightly posterior to level of trochanters IV. Genital arch as a small inverted V, posterolateral extremities of arch not connected to any portion of surrounding sclerotizations; aedeagus much longer than genital arch. Genital papillae anterior to genital arch. Genital area bearing genital apparatus, papillae and setae *g* surrounded by long and wide paragenital apodemes, anterior parts of which formed by epimerites IVa. Setae *4a* situated on anterior end of paragenital apodemes. Pregenital sclerite present, situated anterior to setae *4a*. Opisthoventral shields well developed, occupying entire surface of opisthosomal lobes. Corolla of anal suckers edentate. Setae *ps3* on soft tegument of anal field, situated lateral to anal suckers. Adanal shields absent. Setae *g* and *ps3* in trapezoidal arrangement. Legs I and IV slightly thicker than legs II and III, which are subequal. Solenidia φ of legs III and IV subequal. Tarsi IV with apical claw-like process, setae *d* and *e* button-like.

Female. Epimerites I fused into a narrow U. Lobar region of opisthosoma separated from hysterosoma, opisthosomal lobes well developed, with long terminal appendages. Macrosetae *h2* dagger-like. Epigynium horseshoe-shaped, large. Translobar sclerites present. Legs I–IV subequal in size; solenidia φ of tibiae III and IV subequal in length.

Differential diagnosis. The new genus, *Cotingodectes* gen. n., belongs to the *Pterodectes* generic group (Park and Atyeo 1971) and is most similar to *Pterodectes* by having the following features. In both sexes, there is a complete set of hystersomal setae; in males, the genital papillae are situated anterior to the genital arch, setae *ps3* are situated lateral to the anal suckers; in females, setae *h2* are strongly enlarged, dagger-like in form. The new genus differs from *Pterodectes* by the following set of characters: in both sexes, the humeral shields are well developed dorso-laterally and encompass the bases of setae *c2*; in males, long paragenital apodemes extend from the midlevel of coxal fields IV to the level of anal suckers and encircle a large genital field, and the pregenital sclerite is present between coxal fields IV; in females, solenidia φ of tibiae III and IV are subequal. In known *Pterodectes* species, the humeral shields are either absent or rather small and do not encompass setae *c2*; in males, the paragenital and pregenital apodemes are absent; in females, solenidion φ of tibia III is usually longer than that on tibia IV.

It is necessary to note that males of *Cotingodectes* gen. n. superficially resemble those of *Dolichodectes* Park et Atyeo, 1971 in having elongated opisthosomal lobes with widely lanceolate setae *h3* and extensive sclerotization around the genital field. However, the similarity between these genera is clearly convergent, because in *Dolichodectes,* the genital papillae are situated posterior to the genital arch, setae *ps3* are posterior to the anal suckers, and sclerotization areas (shields and apodemes) around the anal and genital fields are of quite different structure.

Species content. The genus is monotypic.

Etymology. Contraction of the host family Cotingidae and *Pterodectes*.

Cotingodectes interifolius (Trouessart, 1899) comb. n.

Figs 14–16

Pterodectes interifolia Trouessart, 1899: 61; Park, Atyeo, 1971: 56.

Type host: *Rupicola peruviana* (Latham, 1790) (Cotingidae) — the Andean Cock-of-the-Rock. Peru.

Material examined: 4 males (FMNH 398136, BMOC 01-0102-140) and 4 females (FMNH 398136, BMOC 01-0102-140) from *Rupicola peruviana* (Latham, 1790) (Passeriformes, Cotingidae), Suecia, km 138.5 on Cuzco-Shintuya Hwy,

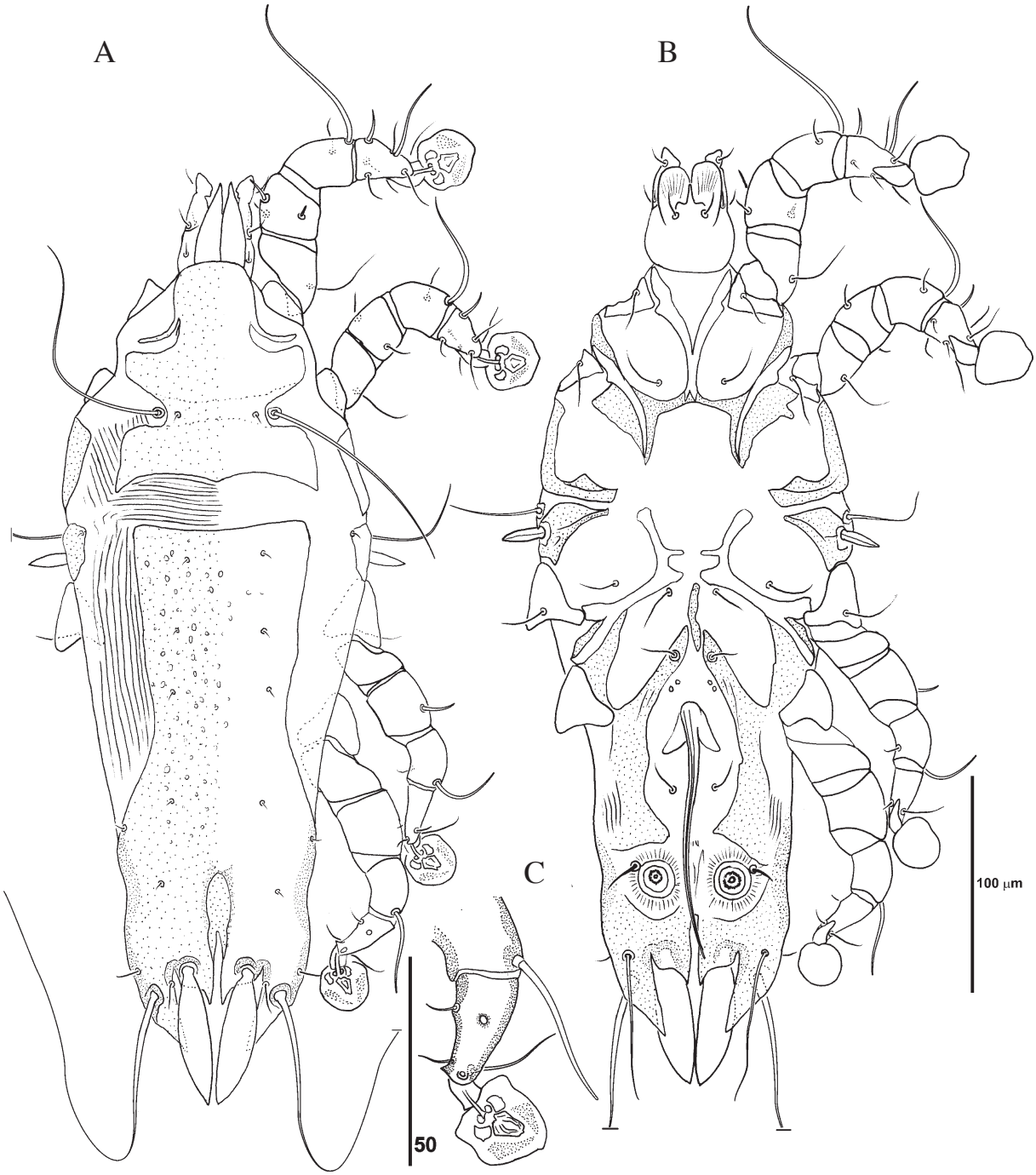

Fig. 14. *Cotingodectes interifolius* (Trouessart, 1899). Male: dorsal (A) and ventral (B) views; tarsus IV (C).

1920m, Paucartambo, Cuzco, Peru (13º05′45″ S, 71º33′36″W), 27.IX.1999, coll. D.F. Stotz (DFS 99-232).

Male (Figs 14 A–C, 15 A–B) (n = 4). Length of idiosoma 363–385, width 143–154. Prodorsal shield: 98–106 in length, 95–98 in width, anterolateral extension rounded, lateral margins with large incisions around bases of setae *se* (these setae off prodorsal shield), posterior margin with two shallow concavities, surface without lacunae or pale-sclerotized areas. Setae *ve* absent. Scapular setae *si* and *se* arranged in transverse line. External scapular setae *se* 114–131 in length, their bases separated by 56–57; bases of *si* separated by 37–38. Humeral shields present, fused to bases of epimerites III. Setae *c2* set on anterior end of humeral shields, setae *cp* set on ventral margin of humeral shields. Setae *c3* lanceolate, 20–22 in length and 5 in width. Distance between prodorsal and hysteronotal shields 23–27. Hysteronotal shield: 248–265 in length, 76–82 in width, anterior margin slightly concave; surface with circular lacunae sparsely disposed in anterior half of shield. Opisthosomal lobes dissected into inner

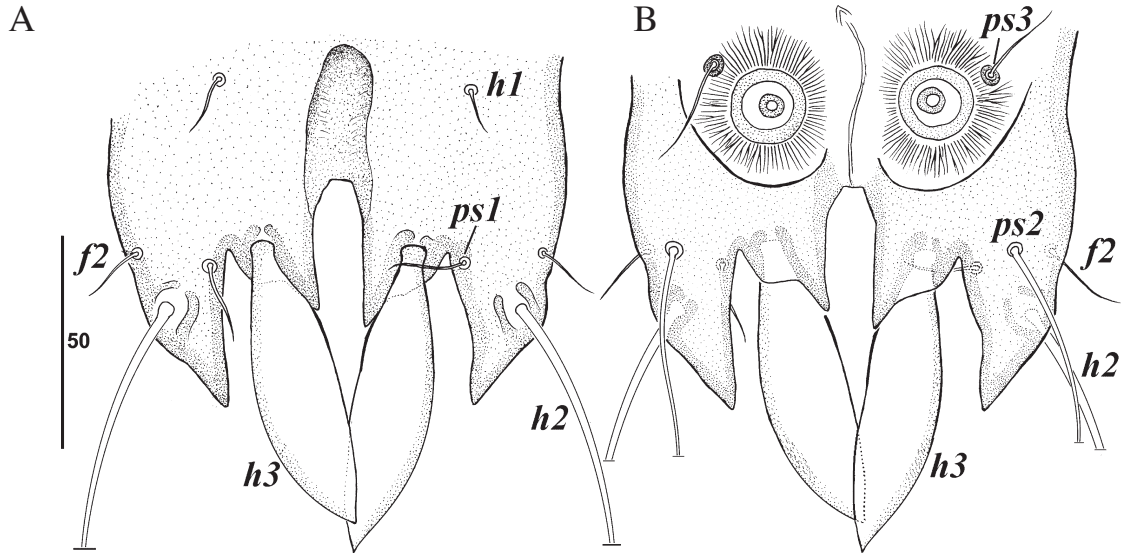

Fig. 15. *Cotingodectes interifolius* (Trouessart, 1899). Male opisthosoma: dorsal (A) and ventral (B) views.

and outer lobules with acute apices, outer lobules longer than inner ones. Total length of terminal cleft (from anterior end to apices of outer lobules) 55, greatest width (distance between apices of outer lobules) 54–58. Anterior part of terminal cleft narrow, parallel-sided, length (from anterior end to apices of inner lobules) 33–35, width 6 (Figs 15A, B). Supranal concavity narrowly ovate, open posteriorly to terminal cleft. Setae *h3* lanceolate, 68–73 in length, 14–15 in width. Setae *ps1* situated slightly anterior to level of setae *h2*. Length of other opisthosomal setae: *ps1* 16–19, *h2* 177–190, *ps2* 71–84, *f2* 14–16, *ps3* 14–16. Distance between dorsal setae: *si–c1* 63–71, *c1–c2* 41–46, *c1–d1* 37–39, *d1–d2* 27–33, *d1–e1* 78–92, *d2–e1* 50–60, *e1–e2* 27–29, *e1–h1* 41–44, *e2–h1* 29–33, *h1–f2* 41–46, *h3–h3* 29–33, *h2–h2* 58.

Epimerites I fused as a Y, posterior tip of sternum connected with medial part of epimerites II by transverse sclerotized bands; epimerites II with large sclerotized areas; epimerites IIIa long and L-shaped; epimerites IVa incorporated into paragenital apodemes. Genital arch situated at level of posterior margin of trochanters IV, 22 in length, 22–27 in width. Aedeagus strongly attenuate to apex, reaching level of bases of setae *h3*, 125–126 in length. Genital area bearing genital papillae, genital arch and setae *g* encircled by long and wide paragenital apodemes stretching from midlevel of coxal fields IV to anal suckers; anterior part of paragenital apodemes formed by epimerites IVa and bears setae *4a*. Rudimentary epimeral sclerites rEpIIa absent. Pregenital sclerite narrow stick-shaped, free from epimerites IVa, situated between levels of setae *3a* and *4a*. Distance between ventral setae: *3a–4a* 27–33, *4a–g* 57–63, *g–ps3* 41–46, *ps3–ps3* 56–63. Anal suckers 16–19 in diameter, separated by 35–37, corolla edentate. Opisthoventral shields completely covering opisthosomal lobes and flanking anal suckers from lateral sides. Setae *ps3* situated on soft tegument, antero-lateral to anal suckers.

Solenidion σ*1* of genu I as a thin spine, 11 long, situated at midlevel of segment; setae *cGI* and *cGII* setiform; seta *mGI* spine-like, 5 long, setae *mGII* setiform (Fig. 14A). Tarsus IV with apical claw-like process, 27–33 in length, seta *d* and *e* button-like, situated in midlevel of segment and near apical claw, respectively (Fig. 14C).

Female (Figs 16A–C) (n = 4). Length of idiosoma 440, width 165–176. Prodorsal shield: 109–114 in length and 112–114 in width, shape, surface and arrangement of scapular setae as in male. Setae *ve* absent. Setae *se* 133–147 in length, their bases separated by 68–71; pair *si* separated by 46–48. Humeral shields present, fused with epimerites III. Setae *c2* and *cp* on humeral shields as in male; setae *c3* lanceolate 24 in length and 7–8 in width.

Distance between prodorsal and hysteronotal shields 24–35. Anterior hysteronotal and lobar shields separated only by thin transverse furrow. Anterior hysteronotal shield: 199–204 in length, 101–109 in width; anterior margin slightly concave, anterior angles acute, surface without lacunae or pale-sclerotized areas. Lobar region: 92–103 in length, 101–109 in width; surface without lacunae; terminal cleft as a narrow U, 60–68 in length, 18 in width. Supranal concavity circular, well expressed. Setae *h2* dagger-like, 60–65 in length and 8–10 in width. Setae *h1* inserted at

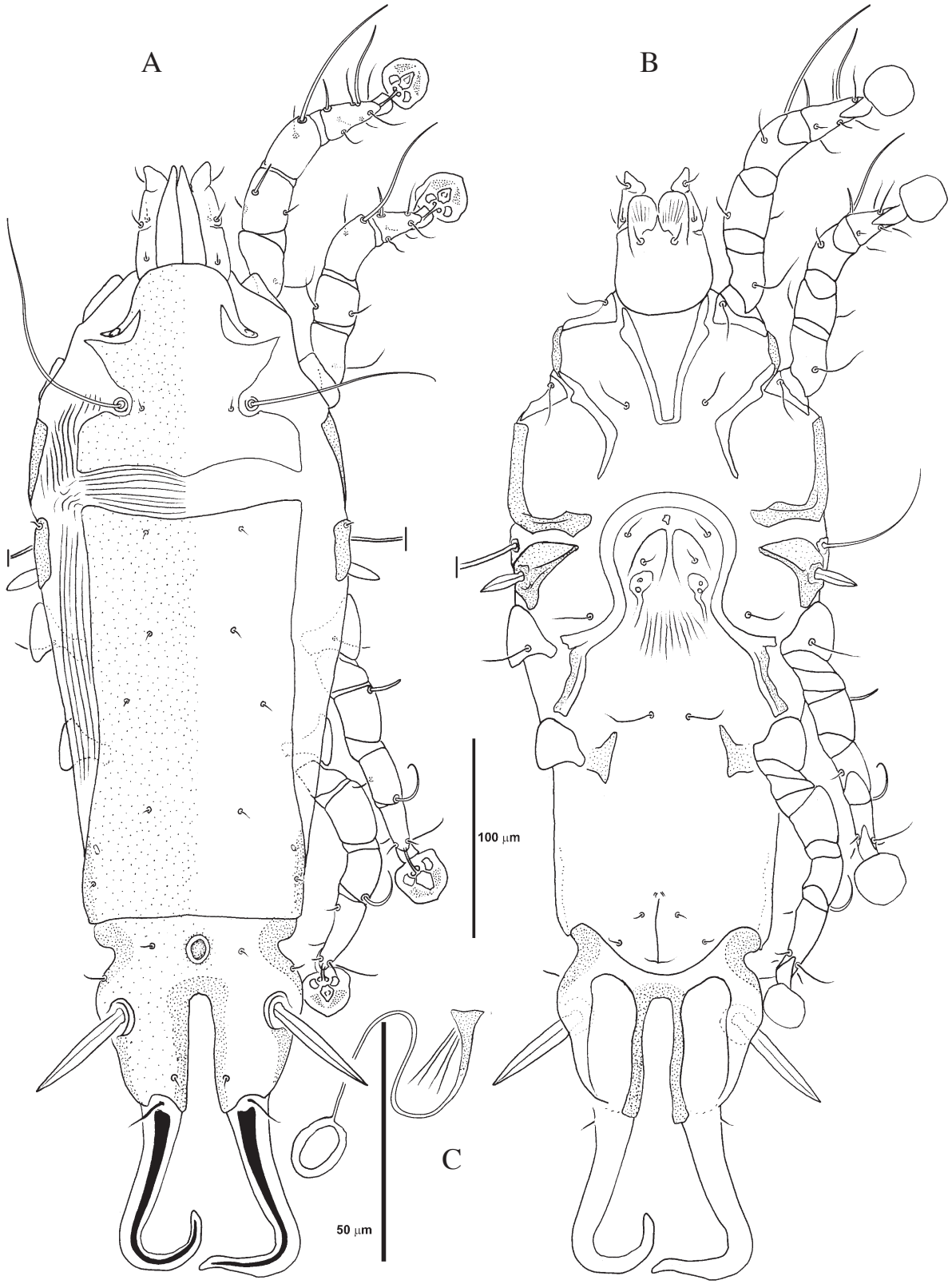

Fig. 16. *Cotingodectes interifolius* (Trouessart, 1899). Female: dorsal (A) and ventral (B) views; spermatheca (C).

level of supranal concavity opening, forming with setae *f2* a low trapezoid arrangement. Setae *ps1* close to margins of terminal cleft. Distance between dorsal setae: *si–c1* 65–79, *c1–c2* 49–60, *c1–d1* 53–57, *d1–d2* 35–39, *d1–e1* 84–92, *d2–e1* 53–82, *e1–e2* 44–49, *e1–h1* 71–73, *e2–h1* 44–54, *h1–f2* 30–33, *f2–h2* 22–24, *h2–h2* 80. Setae *h3* 19–20 long, about 1/6 of terminal appendages.

Epimerites I fused as a U. Coxal fields I and II open. Epimerites IVa present. Distance between

ventral setae: *1a–3a* 69–76, *3a–g* 14–16, *4a–ps3* 98–103, *g–4a* 79–87, *ps2–ps3* 16–19, *ps2–ps2* 44–52, *ps3–ps3* 19–24. Setae *ps2* and *ps3* setiform, disposed in trapezoidal arrangement at level of anal opening. Spermatheca and spermaducts as in Fig. 16C; secondary spermaducts 15 long.

Legs I and II as in the male. Solenidion σ*1* of genu I as thin spine, 17 long, situated at midlevel of segment; setae *cGI* and *cGII* setiform; seta *mGI* setiform 8 long, setae *mGII* setiform (Fig. 14A). Genua III and IV without dorsal crests. Legs IV extending by ambulacral discs at maximum to the level of setae *h2*.

DISCUSSION

With the exception of *Cotingodectes interifolius* comb. n., the remainder species described by the late nineteenth and early twentieth centuries (Robin 1868; Trouessart 1885, 1899; Stoll 1893; Banks 1909) are true representatives of the genus *Pterodectes* (*sensu* Park and Atyeo 1971). With the proposal of a new separate genus for *C. interifolius*, the placement of *Pterodectes trulla* as a *species inquirenda*, and the description of a new species from *Sayornis phoebe*, the genus *Pterodectes* currently comprises 19 valid species. We believe that by bringing all the known species to the same level of information is the first step to more extensive study of this species-rich genus, apparently with a broad occurrence in Neotropical Passeriformes.

With a wider set of characters becoming available for specific diagnosis of the feather mite genus *Pterodectes*, a deeper knowledge should be incorporated in future descriptions of new species. In addition to the characters already mentioned by Valim and Hernandes (2006), new ones now come into light: for both sexes: (1) presence and position of humeral shield, (2) arrangement of scapular setae *se* and *si*, (3) place of insertion of seta *c1* and *c2*; in females: the (4) shape and arrangement of setae *ps2* and *ps3*, (5) position of setae *ps1* in relation to *h2* and *h3*, (6) a relative depth of the terminal cleft, and (7) the shape of opisthosomal lobes and region between the anterior hysteronotal and lobar shields.

This is the second paper of a series that has the goal of redescribing all the known and valid species of the genus *Pterodectes* (*sensu* Park and Atyeo 1971). In the first paper (Valim and Hernandes 2006), we redescribed four species originally described by Berla (1958, 1959, 1973). The final step would be to bring into current grounds the remainder six species described by Černý (1974), after which new species would be described and, perhaps, a comprehensive review of this prevalent feather mite genus of the Neotropical Region would be carried out.

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