

A new feather mite of the genus *Pteronyssoides* Hull, 1931 (Astigmata: Pteronyssidae) from thrushes (Passeriformes: Turdidae) in the New World

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Abstract A new feather mite species, *Pteronyssoides turdinus* n. sp. (Acariformes: Pteronyssidae), is described from two species of thrushes, *Turdus amaurochalinus* Cabanis (type-host) and *T. leucomelas* Vieillot (Passeriformes: Turdidae) in Minas Gerais, Brazil. The new species belongs to the *parinus* species group and most clearly differs from previously known species of this group by the following features: in both sexes of *P. turdinus*, setae *c2* are anterior to the level of the sejugal furrow; in males, the anterior margin of the hysteronotal shield has a deep trapezoidal concavity, setae *d1* are situated on the striated tegument, the adanal shield is represented by a narrow longitudinal sclerite, and tarsus and tibia of legs IV are subequal in length; in females, the opisthosomal sclerites are split into proper opisthosomal sclerites

and pygidial fragments encompassing the bases of setae *h2* and *h3*. This is the first description of a feather mite of the genus *Pteronyssoides* Hull, 1931 from birds of the family Turdidae.

Introduction

The feather mite genus *Pteronyssoides* Hull, 1931 is one of the most species-rich genera of the family Pteronyssidae Oudemans, 1941 (Acariformes: Analgoidea) and to date has included 30 species (Faccini & Atyeo, 1981; Mironov, 1989; Mironov & Wauthy, 2005). In the plumage of their avian hosts, representatives of this genus, as all pteronyssids, permanently inhabit the feathers with large and firm vanes, such as the primaries, secondaries and greater coverts of the wings. On the primaries and secondaries, these mites are located in the corridors on the ventral surface of the vane; on the greater coverts of primaries, where the corridors are much narrower and lower, they are situated openly on the ventral surface and usually clustered in dense groups (Mironov, 1985).

The genus *Pteronyssoides* was erected for pteronyssids having free epimerites I (Hull, 1931). The first revision of this genus was provided by Faccini & Atyeo (1981); however pteronyssids with very diverse appearances have been continuously incorporated. Further, Mironov (1985, 1989)

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reduced its species content by removing two species groups, *obscurus* and *truncatus*, into separate genera *Scutulanysus* Mironov, 1985 and *Sturnotrogus* Mironov, 1989, respectively. Later, Mironov (1993), based on the general structure of dorsal shields in females, established within the genus *Pteronyssoides* two subgenera, *Pteronyssoides* (*sensu stricto*) and *Holonyssoides* Mironov, 1993. Finally, Mironov & Wauthy (2005) carried out a world revision of *Pteronyssoides* that included a renewed diagnosis, descriptions of 14 new species, a key to all known species, and analysis of the phylogenetic relationships and host associations.

Representatives of the genus *Pteronyssoides* were known so far only from higher passerines (oscines) of the Old World. Most known species (21) were described from Africa and Madagascar (Gaud, 1952, 1957; Gaud & Mouchet, 1959; Gaud & Till, 1961; Mironov & Kopij, 2000; Mironov, 2001; Mironov & Wauthy, 2005), and a few species were described from Europe (Mironov, 1985, 1989), southeastern Asia (Sugimoto, 1941; Gaud & Petitot, 1948; Mironov, 1993) and New Guinea (Trouessart, 1887).

Among passerine hosts, mites of the genus *Pteronyssoides* are mainly associated with birds of the two superfamilies, Passeroidea (Emberizidae, Estrildidae, Fringillidae, Nectariniidae, Passeridae, Ploceidae, Promeropidae and Viduidae) and Sylvioidea (Bernieridae, Paridae, Pycnonotidae and Timaliidae). Only two species, *Pteronyssoides latior* (Trouessart, 1887) and *P. passeris* Gaud, 1952 are known from birds of the superfamily Corvoidea, from representatives of the families Paradisaeidae and Dicuridae, respectively (Faccini & Atyeo, 1981; Mironov & Wauthy, 2005).

The present study provides a description of a new species of *Pteronyssoides* we collected from two species of the genus *Turdus* Linnaeus examined in Minas Gerais, south-eastern Brazil. This is the first description of a species of *Pteronyssoides* from passerines of the family Turdidae. It is necessary to note that an innominate species of *Pteronyssoides* was recently reported from *Turdus amaurochalinus* Cabanis (Passeriformes: Turdidae) in Southern Brazil (Amaral et al., 2013). The material of these authors was inaccessible for our study, but we suggest that this innominate species could be conspecific with the species we describe herein.

Materials and methods

The material used in the present study was collected by the authors in a short-term field survey of feather mites living on passerine birds in the Minas Gerais State, Brazil, in August–September 2010. The present work is the first publication based on the vast material collected in the course of this survey.

Mites were taken from live birds under dissecting microscope with a preparation needle or fine forceps and placed in tubes with 96% ethanol. After examination for the presence of ectoparasites, birds were released into the wild. Mites were mounted on slides in Hoyer's medium according to the standard technique for small acariform mites (Krantz & Walter, 2009).

The description of the new species follows the modern standards used for pteronyssid mites (Mironov, 1992, 2002, 2003; Mironov & Wauthy, 2005; Hernandes, 2012). The general morphological terms and leg chaetotaxy follow Gaud & Atyeo (1996); the idiosomal chaetotaxy follows these authors with subsequent corrections by Norton (1998). Measuring technique for particular structures in pteronyssids follows Mironov & Wauthy (2005). All measurements in the descriptions are given in micrometres. Scientific names and classification of birds follow Clements et al. (2014).

Type-material depositories are as follows: Museu de Zoologia da Universidade de São Paulo (São Paulo, SP, Brazil) (MZUSP); Collection of Acari of Department of Zoology of the Universidade Estadual Paulista (Rio Claro, São Paulo, Brazil) (DZU-NESPRC); Zoological Institute of the Russian Academy of Sciences (Saint Petersburg, Russia) (ZISP).

Superfamily Analgoidea Trouessart & Mégnin, 1884

Family Pteronyssidae Oudemans, 1941

Genus *Pteronyssoides* Hull, 1931

Pteronyssoides (*Pteronyssoides*) *turdinus* n. sp.

Type-host: *Turdus amaurochalinus* Cabanis (Passeriformes: Turdidae).

Type-locality: Moeda (20°13'05.07"S, 43°57'00.2"W, 1,267 m), Água Limpa, Nova Lima, Minas Gerais, Brazil.

Type-material: Holotype male (MZUSP svm-10-0829-1/1), 29.viii.2010, coll. S.V. Mironov, F.A.

Hernandes and M.P. Valim. Paratypes: 4 males and 10 females (MZUSP svm-10-0829-1/2 – 10-0829-1/10), 3 males and 7 females (DZUNESPRC 3200–3209), 2 males and 2 females (ZISP 6131–6134), same data as for the holotype.

Additional material: 6 males and 6 females ex *Turdus leucomelas* Vieillot (Passeriformes: Turdidae), Moeda (20°13'19.7"S, 43°56'56.6"W, 1,263 m), Água Limpa, Nova Lima, Minas Gerais, Brazil, 3.ix.2010, coll. S.V. Mironov, F.A. Hernandez and M.P. Valim.

Etymology: The specific epithet is derived from the generic name of the type-host.

Description (Figs. 1, 2, 3)

Male [Holotype, range for 4 paratypes in parentheses.] Idiosoma 320 × 215 (305–325 × 215–230). Length of hysterosoma 220 (215 × 230). Prodorsal shield: posterior angles rounded, lateral margins with incisions around setae *se*, posterior margin almost straight; length along median line 90 (88–95), width at posterior margin 105 (105–110); bases of setae *se* separated by 88 (85–93) (Fig. 1A). Setae *c2* thin filiform, *c.10* long, situated on striated tegument, anterior to level of sejugal furrow. Setae *c3* filiform,

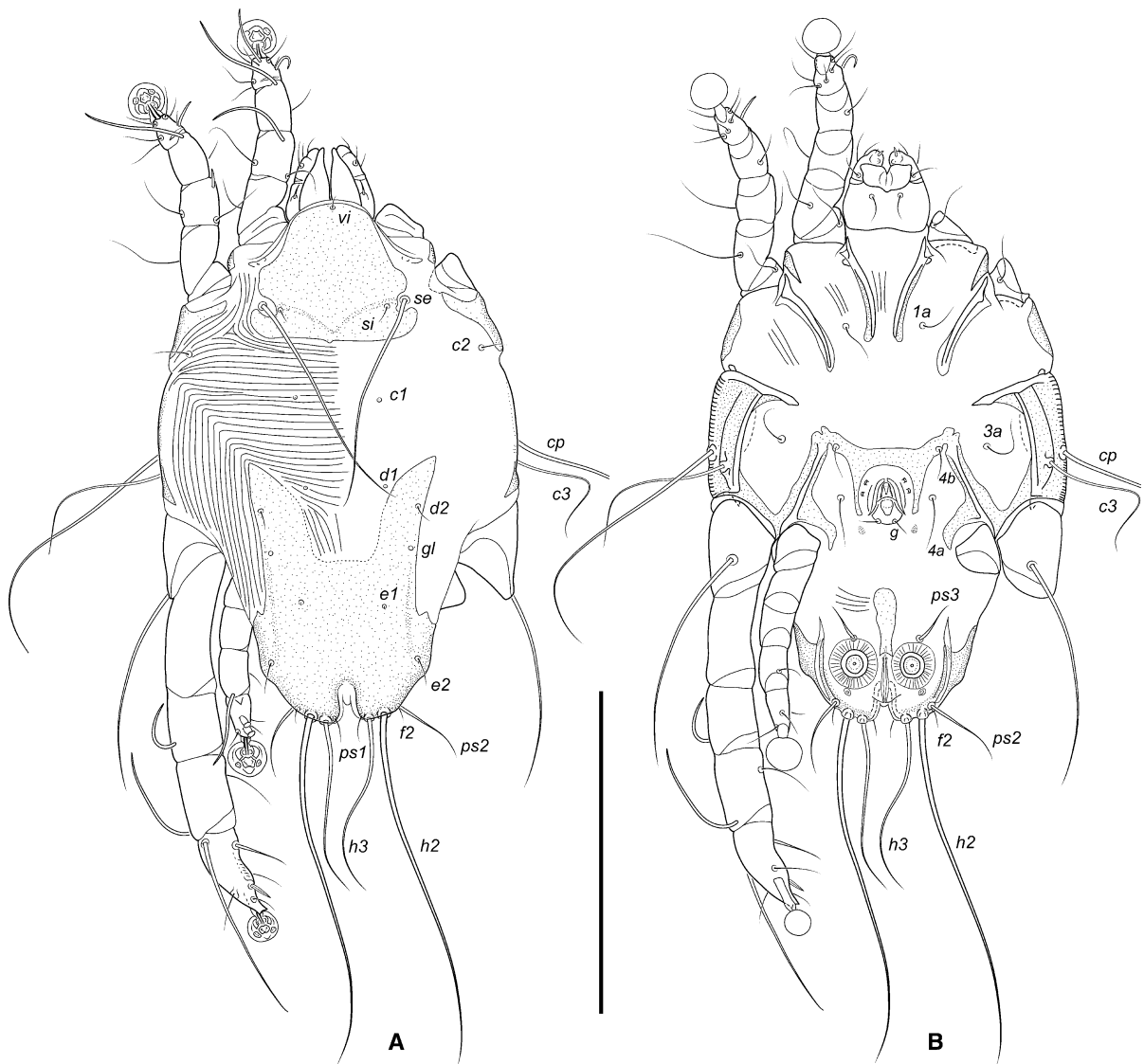


Fig. 1 *Pteronyssoides turdinus* n. sp. Male. A, Dorsal view; B, Ventral view. Scale-bar: 200 μ m

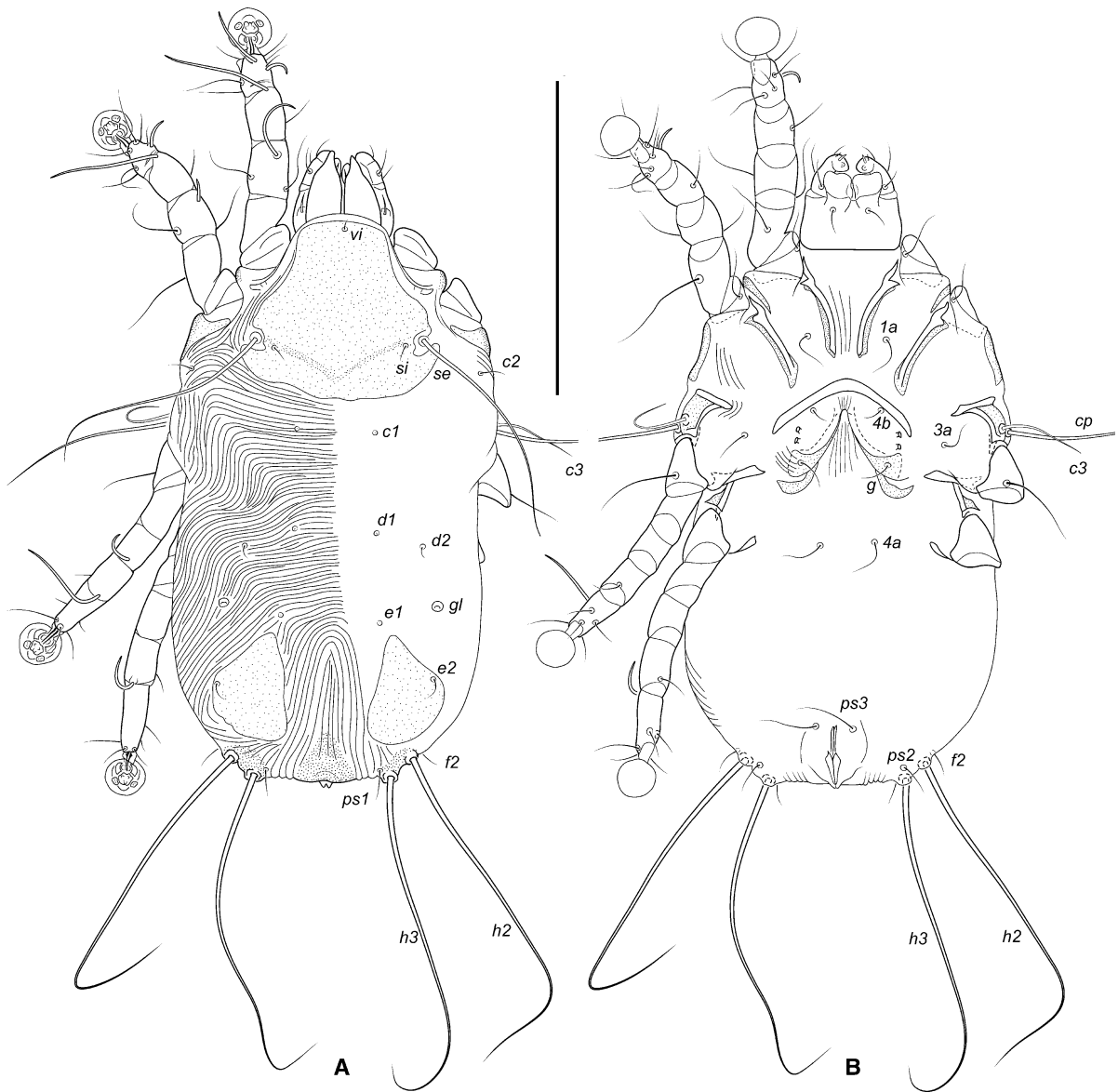


Fig. 2 *Pteronyssoides turdinus* n. sp. Female. A, Dorsal view; B, Ventral view. Scale-bar: 200 μ m

85 (80–95) long. Hysteronotal shield: greatest length 160 (150–175), width at anterior margin 116 (115–120); anterior angles acute, anterior margin with deep trapezoidal concavity extending to level of hysteronotal glands *gl*. Setae *c1*, *d1* strongly reduced, poorly visible. Distance between prodorsal shield and anterior angles of hysteronotal shield 55–65. Opisthosomal lobes short roughly rounded, with very short extensions bearing bases of setae *h2* and *h3*. Setae *f2* situated posterolaterally, near bases of setae *ps2*.

Terminal cleft small, U-shaped, length of cleft 18 (15–20), width, excluding membranous lateral margins, about 9. Dorsal measurements: *c2*:*d2* 102 (95–105); *d2*:*e2* 90 (85–100); *d2*:*gl* 25 (22–26); *gl*:*e1* 31 (22–30); *e2*:*h3* 38 (35–42); *e2*:*e2* 92 (90–98); *h2*:*h2* 48 (44–50); *h3*:*h3* 26 (26–28); *ps2*:*ps2* 65 (62–64).

Transventral sclerite 11 (9–12) in length along median line. Tips of epiandrum extend to base of genital apparatus; genital arch 22 (22–23) \times 20

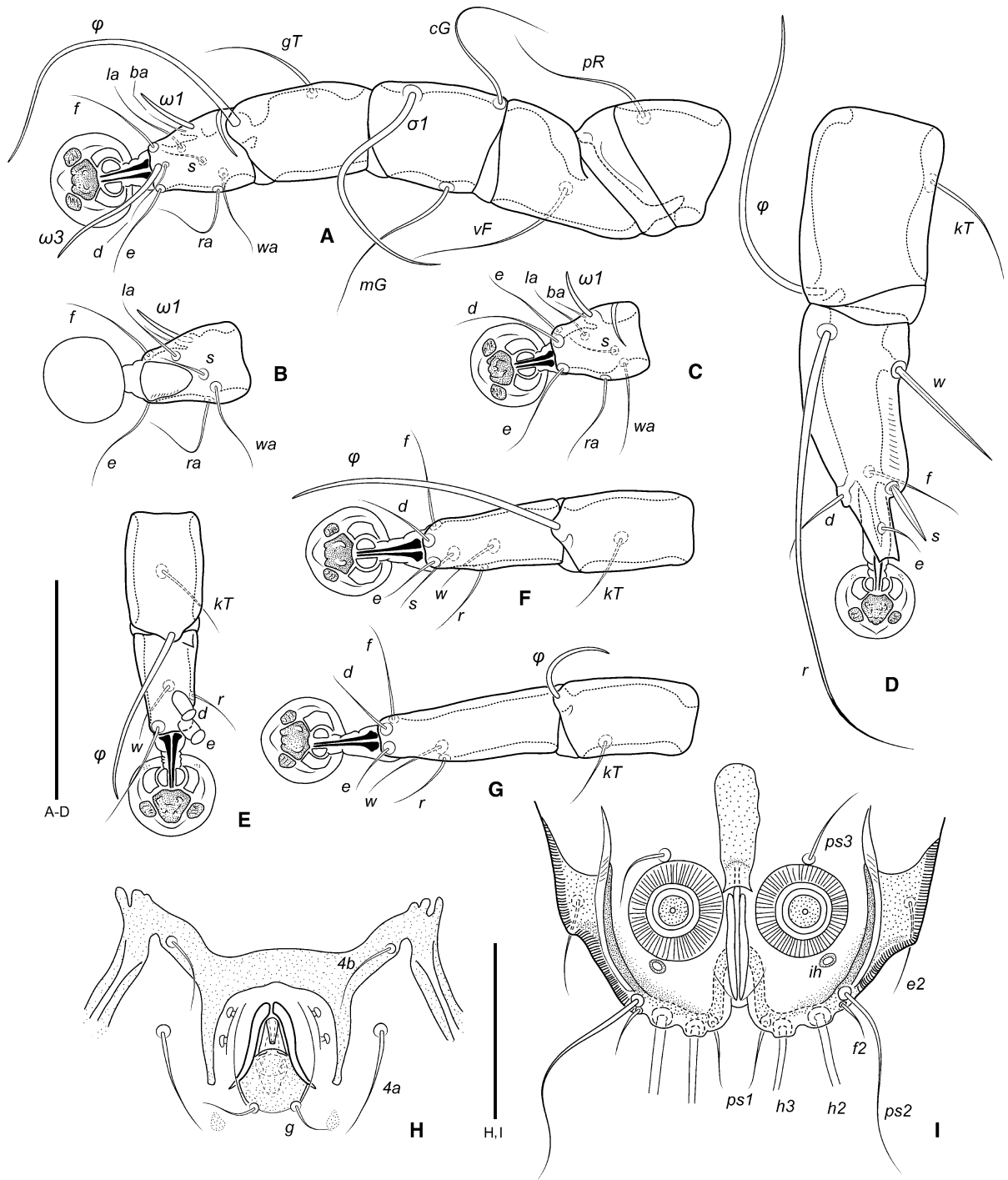


Fig. 3 *Pteronyssoides turdinus* n. sp. Details. A, Leg I of male, dorsal view; B, Tarsus I of male, ventral view; C, Tarsus II of male dorsal view; D, Tibia and tarsus III of male, dorsal view; E, Tibia and tarsus IV of male, dorsal view; F, Tarsus III of female, dorsal view; G, Tarsus IV of female, dorsal view; H, Genital apparatus of male; I, Opisthosoma of male, ventral view. Scale-bars: 50 μ m

(20–22); aedeagus minute, much shorter than genital arch. Setae *4a* at midlevel of genital apparatus. Setae *3a* and *4b* at same transverse level. Adanal shield as short longitudinal bar, not extending to level of trochanters IV (Figs. 1B, 3H, I). Adanal membranes narrow, extending slightly beyond level of setae *ps3*. Diameter of anal discs 16 (15–16). Ventral measurements: *4b:4a* 31 (30–33); *4b:g* 44 (44–48); *g:ps3* 75 (65–75); *ps3:ps3* 42 (40–42); *ps3:h3* 51 (48–53).

Inflated ventral membrane of tarsus I half as long as segment (Fig. 3A, B). Tarsus III 60 (60–62) long, with bidentate apex, with narrow membrane on inner margin; setae *w* spiculiform, 29 (27–31) long; setae *s* narrowly lanceolate, 14 (13–15) long; setae *r* approximately 2× as long as tarsus III (Fig. 3D). Tarsus IV subequal in length to tibia IV, with 1 dorsobasal spine; modified seta *d* situated at midlevel of segment (Fig. 3E).

Female [Range for 10 paratypes.] Idiosoma 360–405 × 210–235. Length of hysterosoma 250–285. Prodorsal shield: posterior angles rounded, lateral margins with incisions around setae *se*, posterior margin slightly convex; length along median line 110–120, width at posterior margin 130–135; bases of setae *se* separated by 105–115 (Fig. 2A). Setae *c2* short filiform, *c*.10 long, situated on striated tegument anterior to sejugal furrow. Setae *c3* long filiform, 60–70 long. Arrangement of hysteronotal shields: a pair of opisthosomal sclerites, a pair of pygidial sclerites, and terminal sclerite (Fig. 2A). Opisthosomal sclerites roughly triangular, 65–70 long, 50–55 wide, with anterior ends not extending to level of hysteronotal gland openings, with setae *e2* on lateral margins. Distance from anterior ends of opisthosomal sclerites to setae *h3* 95–105. Pygidial sclerites represented by small sclerotised areas at bases of setae *h2* and *h3*. Terminal sclerite a small medial triangle with poorly outlined margins. Posterior margin of opisthosoma between setae *h3* almost straight. Setae *c1*, *d1*, *d2*, *e1* and openings *gl* situated on striated tegument; setae *e1* posterior to level of openings *gl*; setae *e2* on lateral margins of opisthosomal sclerites. Setae *ps1* situated near bases of setae *h3*. Dorsal measurements: *c2:d2* 90–115; *d2:e2* 85–105; *d2:gl* 40–50; *gl:e1* 9–12; *e2:h3* 50–70; *d1:d2* 10–12; *e1:e2* 33–40; *h2:h2* 120–135; *h3:h3* 88–105. Epigynum bow-shaped, close to posterior tips of epimerites II, 33–38 long, 88–100 wide (Fig. 2B). Ventral measurements: *4b:g*

35–42; *g:4a* 50–56. Tarsi III 31–37 long, tarsi IV 44–48 long.

Remarks

The new species, *Pteronyssoides turdinus* n. sp., resembles *P. parinus* (Koch, 1841) described from *Parus caeruleus* (Passeriformes: Paridae) in Europe by the presence of a pair of opisthosomal sclerites and the absence of the central sclerite in females. *Pteronyssoides turdinus* differs from this and other species of the *parinus* species group (see Mironov & Wauthy, 2005) by the following features: in both sexes of *P. turdinus*, setae *c2* are situated anterior to the level of the sejugal furrow and setae *c3* are filiform and not enlarged; in males, the anterior margin of the hysteronotal shield has a deep trapezoidal concavity, setae *d1* are situated on the striated tegument, the adanal shield is represented by a narrow longitudinal sclerite, and tarsi and tibiae IV are subequal in length; in females, the opisthosomal sclerites are split into proper opisthosomal sclerites and pygidial fragments at bases of setae *h2* and *h3*, and the rudimentary lateral sclerites are absent. In both sexes of *P. parinus*, setae *c2* are situated posterior to the level of sejugal furrow and setae *c3* have a distinct spindle-shaped enlargement in basal part; in males, the anterior margin of the hysteronotal shield is straight, setae *d1* are situated on the hysteronotal shield, the adanal shield is shaped as a cross, and tarsus IV is approximately half as long as tibia IV; in females, the opisthosomal sclerites are entire and extend to bases of setae *h2* and *h3*, and the rudimentary lateral sclerites are present.

Additionally, the position of setae *c2* anterior to the level of the sejugal furrow in both sexes of *Pteronyssoides turdinus* and the deep trapezoidal concavity of the anterior margin of hysteronotal shield in males clearly differ this mite from all previously known species of *Pteronyssoides*.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All applicable institutional, national and international guidelines for the care and use of animals were followed. All capturing and collections were made according to the conditions and rules of the “Expedição Científica” project [Expedição científica CNPq Proc. AEX n° 591/2010-6, Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA) collection license #24789-1].

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