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Psittophagus hollandicus n. sp., a new feather mite species (Acariformes: Pterolichidae) from the cockatiel *Nymphicus hollandicus* (Kerr, 1792) (Psittaciformes: Cacatuidae) in Brazil

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ABSTRACT — A new feather mite species, *Psittophagus hollandicus* n. sp. (Acariformes: Pterolichidae), is described from the cockatiel *Nymphicus hollandicus* (Kerr, 1792) (Psittaciformes: Cacatuidae) kept in captivity in Brazil.

KEYWORDS — Acari; Psoroptidia; Pterolichoidea; systematics; household pets

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INTRODUCTION

The cockatiel *Nymphicus hollandicus* (Kerr, 1792) (Psittaciformes: Cacatuidae) is native to Australia but owing to maintaining as a household pet it distributed worldwide (Engebretson, 2006). The only other feather mite species previously described from this host is *Nymphicilichus perezae* Mironov & Galloway, 2002 (Astigmata: Pterolichidae) in New Zealand.

Pterolichid feather mites associated with parrots (Aves: Psittaciformes) are represented by three morphologically distinct generic groups: *Psittophagus* (4 genera), *Rhytidelasma* (12 genera), and *Protolichus* (24 genera) (Gaud and Mouchet, 1959; Gaud, 1980; Atyeo and Pérez, 1982, 1990; Atyeo *et al.*, 1984; Atyeo, 1985, 1988, 1989a, b, c; Atyeo and Gaud, 1987; Gaud and Atyeo, 1996; Mironov and Galloway, 2002, Mironov and Pérez, 2003; Mironov *et al.*, 2003a,b, 2005, 2011, 2014; Dabert *et al.*, 2004, 2006, 2008; Mironov and Dabert, 2007, 2010). From these, the *Psittophagus* generic group is the least diverse, comprising currently 9 species (including the new one described herein) in four genera: *Nymphicilichus* Mironov & Galloway, 2002, *Micropsittophagus* Mironov & Pérez, 2003, *Psittaculobius* Mironov, Dabert & Ehrnsberger, 2003, and *Psittophagus* Gaud & Atyeo, 1996; the three former genera include only one species each.

To date, the genus *Psittophagus* has included five species associated with Old World parrots of the family Cacatuidae (Psittaciformes) from the Australasian region: *Psittophagus ornatus* (Méglin & Trouessart, 1884) (type species), *P. obsoletus* (Méglin & Trouessart, 1884), *P. galahi* Mironov, Dabert & Proctor, 2003, *P. calyptorhynchi* Mironov, Dabert & Ehrnsberger, 2003, and *P. lacunosus* Dabert, Badek & Skoracki 2007 (Méglin and Trouessart, 1884;

Mironov *et al.*, 2003a, b; Dabert *et al.*, 2007). A table summarizing the mite-host relationships of the *Psittophagus* generic group, in addition to a key to genera and species of this group, were provided by Mironov *et al.* (2003a). In this paper, a new species of *Psittophagus* is described from the cockatiel in Brazil.

MATERIALS AND METHODS

The material was collected from a specimen of *Nymphicus hollandicus* which died in captivity and sent to the laboratory of Acari of the Department of Zoology, Universidade Estadual Paulista, Rio Claro, São Paulo, Brazil. The bird specimen was placed in a freezer and then washed with water containing detergent; the liquid was then filtered and mites were collected with a fine brush from the filter papers under stereomicroscope, cleared in 30% lactic acid for 24 h at 50°C, and mounted in Hoyer's medium (Krantz and Walter, 2009). After five days at 50 °C, the slides were sealed with varnish. Drawings and measuring of mites were made with a Leica DM3000 microscope equipped with differential interference contrast (DIC) optics and a camera lucida. Pencil sketches were scanned at 300 dpi and grayscale mode; line drawings were created with Adobe Illustrator CS6 and a Wacom Bamboo Create tablet. The idiosomal and leg chaetotaxies follow Griffiths *et al.* (1990) and Atyeo and Gaud (1966), respectively, with corrections for coxal setae proposed by Norton (1998). Type specimens are deposited at DZUnesp-RC — Collection of Acari of Department of Zoology of the Universidade Estadual Paulista, Rio Claro, São Paulo, Brazil.

Family Pterolichidae Trouessart & Mégnin, 1884

Subfamily Pterolichinae Trouessart & Mégnin, 1884

Genus *Psittophagus* Gaud & Atyeo, 1996

Psittophagus hollandicus n. sp.

Zoobank: F5817710-74E3-4711-ABEF-F4A935AC21F7

Type material: holotype ♂ (DZUnesp-RC#3759), paratypes 10 ♂ and 4 ♀ (#3760–3773) ex *Nymphicus hollandicus* (Kerr, 1792) (Psittaciformes: Cacatuidae),

captivity specimen from Pedreira, São Paulo State, BRAZIL, 17 August 2007, col. David V. Boas Filho (#203).

Differential diagnosis — The new species is morphologically close to *P. lacunosus* Dabert, Badek & Skoracki, 2007 in having, in males, setae *e2* thick spiculiform, and the hysterosomal shield reaching to or close to the level of setae *c1*. *Psittophagus hollandicus* n. sp. is distinguished from that species in having, in males, the dorsal shields with weak ornamentation, the prodorsal shield split transversally at the level of scapular setae and free from the scapular shields, solenidion σ of genu III about half as long as the segment (Fig. 3C), setae *si*, *c2* filiform, and the anal suckers without indentations. Females of the new species have piliform setae *d2* and *e2*, setae *d2* being 30µm long and barely reaching the halfway to bases of piliform setae *e2*. In contrast, males of *P. lacunosus* have the dorsal shields covered with numerous rounded lacunae, the prodorsal shield entire and fused with the scapular shields, solenidion σ of genu III equal to or even longer than the segment, setae *si*, *c2* spiculiform, and the suckers with indentations; females of *P. lacunosus* have setae *d2* and *e2* long spiculiform, the former setae are much longer (100µm) and distinctly surpass the bases of corresponding setae *e2*.

Description

Male (Figures 1, 3A–E) (holotype, range for 6 paratypes in parenthesis) — Idiosoma short and wide, 252 (241–260) in length, 171 (174–190) in width. Gnathosoma 41 (41–43) × 52 (50–56). Prodorsal shield split into two pieces at the level of scapular setae, length of the anterior part along midline 47 (40–47), maximum width of posterior part 76 (74–80) (Fig. 1A). Distance between scapular setae *se-se* 58 (57–61). Setae *si* thin piliform. Scapular shields present, with poorly distinct borders, not fused with prodorsal shield. Humeral shields small, setae *c2* on soft tegument, mesal to these shields. Hysteronotal shield: greatest length 148 (142–149), width at anterior margin 110 (107–116), anterior end almost extending to level of setae *c1*, anterior margin roughly convex, surface with faint circular ornamentation. Hysteronotal gland openings *gl* situated at half distance between setae *d2* and *e2*. Setae

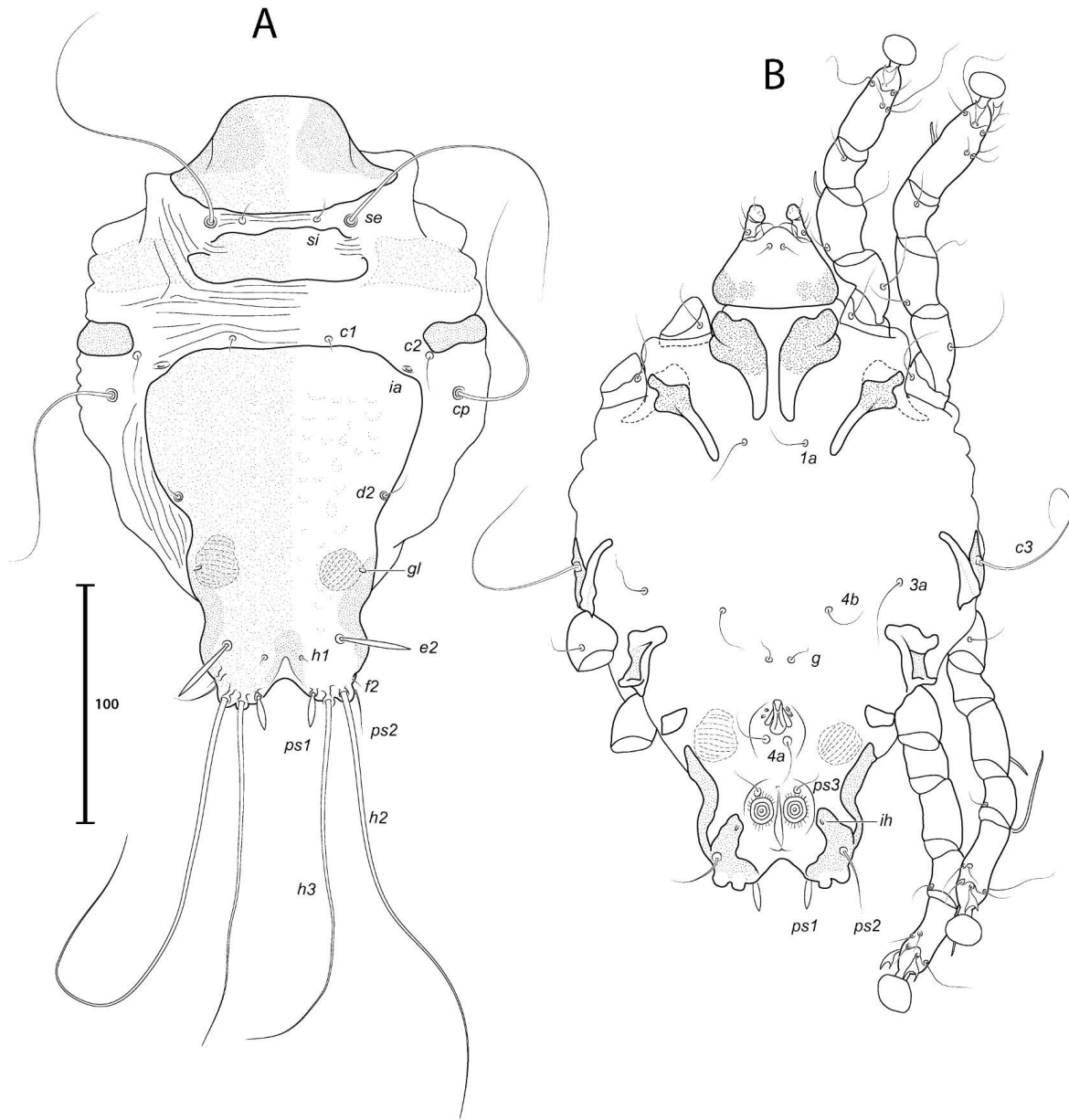


FIGURE 1: *Psittophagus hollandicus* n. sp. male: dorsal (A) and ventral (B) views.

c3 long, about half the idiosomal width. Subtegumental sclerotized structures in sejugal area absent. Opisthosomal lobes roughly rounded, with small extensions bearing bases of setae *h2*, *h3*. Terminal cleft small, as a wide-based triangle with rounded anterior end, 14 (10–14) in length. Supranal cavity semi-ovate. Setae *e2* spiculiform, noticeably thickened in distal third (somewhat shaped as base-

ball bat), 30 (28–32); setae *ps1* small, narrowly lanceolate, 15 (14–16) long. Dorsal measurements (distances between setal rows and seta bases): *c1-c1* 41 (40–46), *d2-d2* 86 (86–94), *e2-e2* 49 (49–54), *c1-d2* 66 (65–71), *d2-e2* 63 (61–63), *h2-h2* 51 (50–54), *ps1-ps1* 23 (23–26).

Epimerites I, II with inflated and heavily sclerotized bases, epimerites I free. Genital apparatus 15

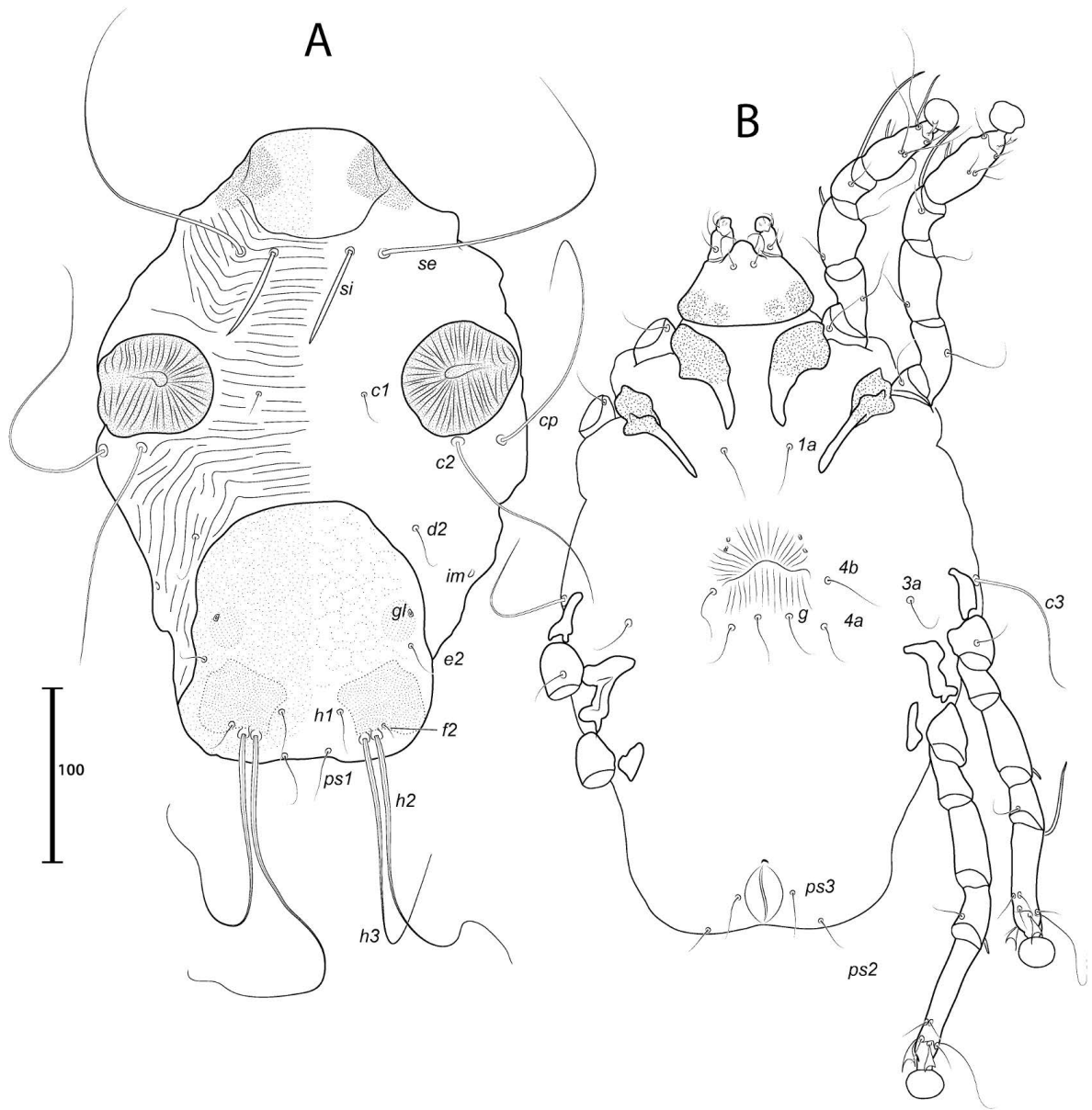


FIGURE 2: *Psittophagus hollandicus* n. sp. female: dorsal (A) and ventral (B) views

(14–16) × 11 (9–12), aedeagus slightly shorter than genital arch. Setae 4a at base of genital arch. Setae 4b anterior to level of inner tips of epimerites IIIb. Adanal shields absent. Opisthoventral shields large, with projection towards anal suckers, carrying cupules *ih* and bases of setae *ps2* (Fig. 2B). Ventral measurements: 4b-3a 10 (7–10), 3a-g 31 (29–38), g-4a 34 (28–34), 4a-ps3 22 (22–24), ps3-ps3 18 (15–19).

Legs IV extending beyond opisthosoma by entire tarsus. Tarsus I with three long setae (*f*, *la*, *ra*), exceeding length of solenidion ω3, tarsus II with one long seta (*d*). Legs IV with tarsus entirely extending beyond level of lobar apices. Solenidion φ of tibia IV about ¾ the length of tarsus IV. Length of tarsi: I 30 (30–35), II 40 (39–43), III 34 (33–37), IV 37 (32–37).

Female (Figures 2, 3F–G) (range for 4 paratypes)

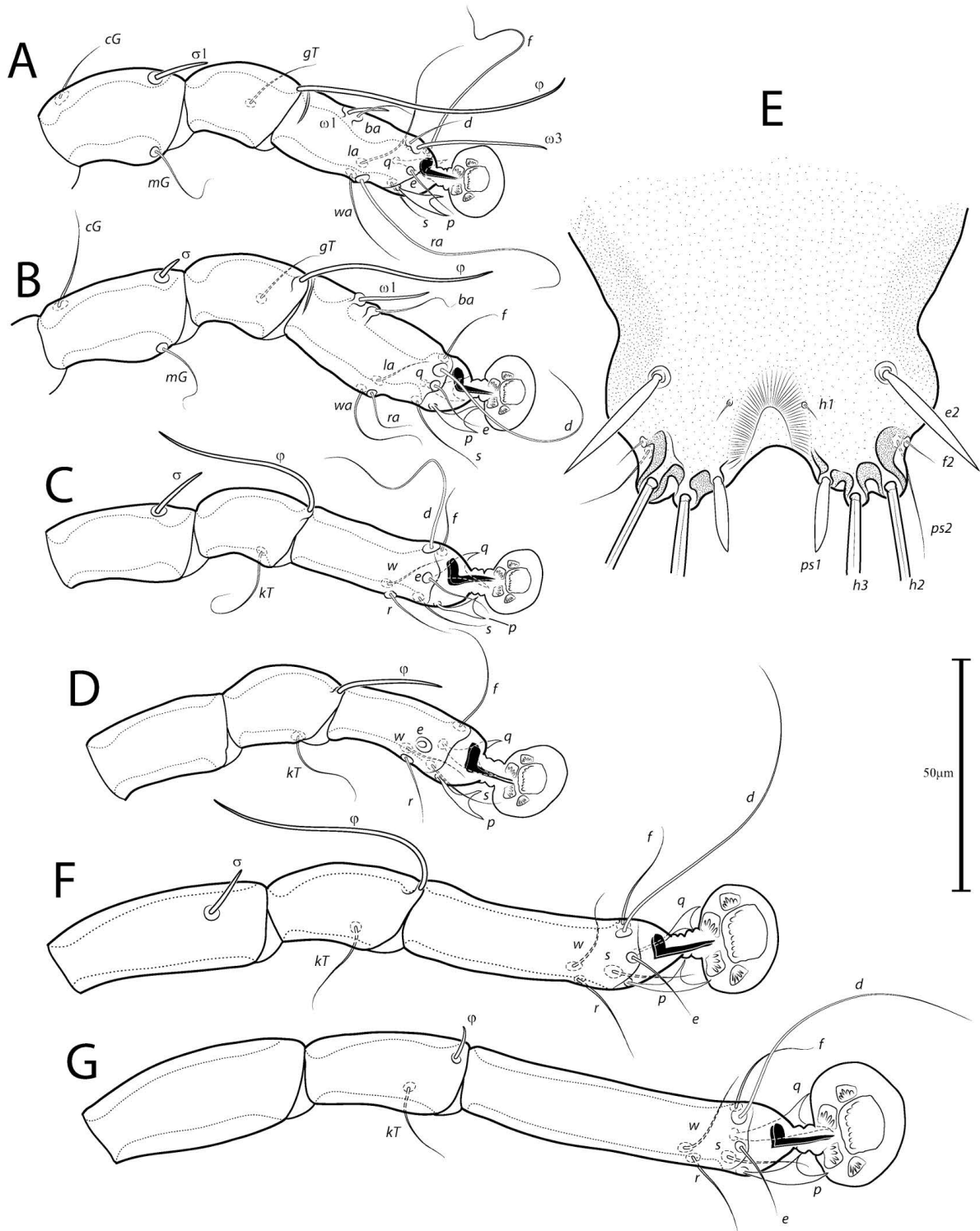


FIGURE 3: *Psittophagus hollandicus* n. sp.: dorsal view of male genua, tibiae and tarsi of legs I-IV (A-D) and opisthosoma (E); dorsal view of female genua, tibiae and tarsi III and IV (F-G).

— Idiosoma 350–386 in length, 224–250 in width. Gnathosoma 58–60 × 76–80. Prodorsal shield present only anterior to scapular setae, length along midline 54–61. Setae *si* thick spiculiform, 48–58 long. Distance between scapular setae *se-se* 76–83. Setae *si* thick spiculiform, 48–58 long. Scapular and humeral shields absent. Setae *c2* on striated tegument, slightly shorter than humeral seta *cp*. Setae *c3* long, about 1/2 of idiosomal width. Hysteronotal shield: occupying posterior half of hysterosoma, anterior margin convex, extending slightly anterior to level of setae *d2*, posterior margin indistinct, greatest length 139–148, surface with faint ornamentation. Setae *d2* piliform, about 30 long, situated on striated tegument, barely extending to level of openings *gl*; setae *e2* piliform, 20 long. Subtegumental sclerotized structures in sejugal region very large, ball-shaped, and dark-coloured; subtegumental structures of opisthosoma roughly rectangular and less sclerotized. Hysteronotal gland openings *gl* on soft tegument at level of trochanters IV. Setae *c3* long, about 1/2 of idiosomal width. Posterior end of opisthosoma wide and bluntly rounded. Dorsal measurements: *c1-c1* 62–65, *d2-d2* 110–125, *e2-e2* 108–115, *c1-d2* 85–89, *d2-e2* 65–72, *h2-h2* 66–76.

Epimerites I, II as in the male. Oviporus anterior to level of trochanters III, folds of this opening not sclerotized, epigynum absent. Legs IV with entire tarsus extending beyond posterior margin of opisthosoma. Length of tarsi: I 41–48, II 53–57, III 61–64, IV 74–77.

Etymology — The species name is taken from the specific epithet of the type host.

Remarks — 1) In addition to *Nymphicilichus perezae* from the cockatiel in Brazil, Albuquerque *et al.* (2012) reported an undetermined *Psittophagus* species quite probably corresponding to the new species described herein. However, the SEM photo of the female applied to that undetermined species (Albuquerque *et al.*, 2012: page 577, figure 7B) seemingly depicts the female of *N. perezae*, rather than that of *Psittophagus* species. This is suggested based on the length of setae *si* and the ornamentation of the hysteronotal shield.

2) The illustrations of *P. galahi* and *N. perezae* females in Mironov *et al.* (2003) were accidentally mixed up.

The correct legend for figure 9 in that paper should actually be: Fig. 9, a – *N. perezae*, b – *P. galahi*.

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Hernandes F.A.

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