

**NEW SPECIES OF THE FEATHER MITE GENUS *PROCTOPHYLLODES*
ROBIN, 1877 (ACARI: ANALGOIDEA: PROCTOPHYLLODIDAE) FROM
EUROPEAN PASSERINES (AVES: PASSERIFORMES), WITH AN UPDATED
CHECKLIST OF THE GENUS**

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ABSTRACT: Four new species of the genus *Proctophyllodes* are described from European passerines: *Proctophyllodes microstylifer* sp. n. from *Troglodytes troglodytes* (Linnaeus) (Troglodytidae), *P. plectrophenax* sp. n. from *Plectrophenax nivalis* (Linnaeus) (Calcaridae), *P. noskovi* sp. n. from *Loxia leucoptera* (Gmelin) and *P. pinicola* sp. n. from *Pinicola enucleator* (Linnaeus) (Fringillidae). A brief overview of taxonomic history is provided and some problems in the systematics of the genus *Proctophyllodes* are discussed.

My updated World checklist of *Proctophyllodes* species includes 161 valid species and has comments for newly established synonymies and several complicated taxonomic cases. New synonymy is established for the following species: *Proctophyllodes arcticus* Dubinin, 1952 syn. n. from *Anthus cervinus* (Pallas) is a junior synonym of *P. anthi* Vitzthum, 1922; *P. mariaevallensis* De Rojas, Ubeda, Guevara et Ariza, 1989 syn. n. from *Emberiza cia* Linnaeus is a junior synonym of *P. ciae* Bauer, 1939. New questionable synonymy is proposed for the following *Proctophyllodes* species incompletely described by early authors: *Proctophyllodes profusus* Robin, 1877 from *Emberiza citrinella* Linnaeus is a questionable senior synonym of *P. ciae* Bauer, 1939; *Dermaleichus acredulinus* Koch, 1841 from *Aegithalos caudatus* (Linnaeus) as a questionable senior synonym of *P. clavatus* Fritsch, 1961; and *Analges acanthurus* Giebel, 1871 from *Carduelis carduelis* (Linnaeus) is a questionable synonym of *P. pinnatus* (Nitzsch, 1818). *Proctophyllodes sinensis* Gaud et Atyeo, 1976 stat. n., originally described as a subspecies of *P. truncatus* Robin, 1877 from *Passer montanus malaccensis* Dubois, is elevated to the species rank.

KEY WORDS: *Proctophyllodes*, new species, systematics, checklist, Passeriformes

INTRODUCTION

The feather mite genus *Proctophyllodes* Robin, 1877 (Analgoidea: Proctophyllodidae) is the most species-rich genus among all other genera of feather mites. To date it has included 157 species (Atyeo and Braasch 1966; Gaud and Fain 1990; Gaud and Atyeo 1996; Mironov and Kopij 1996; Badek et al. 2008; Mironov et al. 2012). In the plumage of their avian hosts, these mites, like other species of Proctophyllodidae, inhabit the flight feathers and greater coverts of the wings and also the tail feathers, where they are located in corridors on the ventral surface of the vanes. Mites of the genus *Proctophyllodes* are predominantly distributed on birds of the order Passeriformes and have been recorded so far from representatives of about 35 families; with a single species found on each of the orders Apodiformes, Charadriiformes and Piciformes (Atyeo and Braasch 1966). Most known species are monoxenous, i.e., associated with a single host species or oligoxenous and occur on hosts from the same genus or several closely related genera.

The present paper presents descriptions of four new *Proctophyllodes* species recorded on European passerines. Since the latest revision of the genus *Proctophyllodes* was carried out nearly fifty years ago (Atyeo and Braasch 1966) and descriptions of new species found after this revision are scattered in acarological literature, an updated

checklist of currently known species is also presented herein (Table). This checklist is provided with taxonomic comments for some newly established synonyms and some complicated taxonomic cases. A detailed historical account of the genus *Proctophyllodes* was given by Atyeo and Braasch (1966), therefore I give below only a brief historical overview.

The generic name *Proctophyllodes* with five included species was established by Robin (1868); however all these taxa were provided with formal descriptions nearly ten years later by Robin and Mégnin (1877). In the first suprageneric classification of feather mites, Trouessart and Mégnin (1884) used this genus as the base taxon for the “section” Proctophyllodeae. Until the beginning of the 20th century, the genus *Proctophyllodes* incorporated almost all known feather mites, belonging in the present taxonomic sense to the subfamily Proctophyllodinae (Canestrini and Kramer 1899; Trouessart 1916).

The first revision of the genus *Proctophyllodes* was made by Vitzthum (1922), who considered forty species in its content, including eight new species he described. It is necessary to note that Vitzthum did not have on hand nearly one third of species and relied in his work on descriptions by previous investigators; therefore about one quarter of species included by this author into *Proctophyl-*

lodes actually belonged to other proctophyllodid genera (*Monojoubertia* Oudemans, 1905, *Anisophyllodes* Atyeo, 1967, *Allodectes* Gaud et Berla, 1963) and even to other families such as Trouesartiidae, Pterolichidae and Ptiloxenidae.

The work of Frisch (1961) may be considered as the second revision of the genus *Proctophyllodes*, where he considered 23 species of this genus occurring on European hosts and, for the first time, gave a key to species. In this paper the taxonomic borders of the genus were clearly outlined and this work indeed included only *Proctophyllodes* species as recognized by modern acarologists.

The latest revision of the genus *Proctophyllodes* was carried out by Atyeo and Braasch (1966), which is still the main publication on systematics of this genus, and presently is the only key book for identification of its species. In this fundamental monograph, Atyeo and Braasch considered 121 species including 70 newly described ones. This work contains a detailed data on external morphology and ontogeny of this genus and on host-parasite associations of species known at that time. All considered species were described according to a uniform standard and provided with an exhaustive synonymy. These authors for the first time proposed a subdivision of this vast genus into ten species groups.

In subsequent fifty years, 34 new species were described from various groups of passerines, mainly from the Old World, and a validity of two previously described species was restored (Mack-Firă and Cristea-Năstăsescu 1968; Gaud 1970; Černý 1971, 1974, 1977, 1978, 1979, 1982, 1988; Putatunda, Gupta and Singh 1976; Chirov and Mironov 1981, 1983, 1984, 1987; Arutunjan and Mironov 1983; de Alzuet and Brandetti 1987; Gaud and Fain 1990, de Rojas, Ubeda, Guevara and Ariza 1989; Zullo and Manilla 1992; Mironov and Kopij 1996; Mironov 1997; Mironov and Galloway 2002; OConnor et al. 2005; Badek et al. 2008; Burdejnaja and Kivganov 2009, 2011; Mironov et al. 2012).

The systematics of the genus *Proctophyllodes*, including its subdivision into species groups and species identification, is almost exclusively based on the structure of the body terminus and genital region in males. Females of this genus, as for most proctophyllodids, have little morphological differences, and practical identification of species only from females is quite troublesome or even impossible.

In the revision of the genus *Proctophyllodes*, Atyeo and Braasch (1966) arranged all considered species in ten morphological groups. Although these authors constructed a key to groups, they provided their diagnoses in a rather free format indicating only main diagnostic features for each group instead of giving uniform diagnoses. Nevertheless they clearly acknowledged that this subdivision is utilitarian to certain extent, and some recognized groups (in particular *glandarinus*, *weigoldi* and *anthi*) are artificial, because they were based on arbitrary character states. For instance the *glandarinus* group was based only on the extremely long aedeagus extending by its tip beyond the base of the terminal lamellae. Differentiations of some groups from each other were also blurring. Thus, the *musicus* and *anthi* groups are characterized by having a relatively short genital organ and the posterior opisthogastric setae (setae *ps3* by modern nomenclature) situated on the opisthogastric shield. They could be differentiated from each by the rather uncertain discriminate features as follows: “split or poorly connected” pieces of opisthogastric shield in the *musicus* group and “broadly connected” pieces in the *anthi* group. This problem in practical determination of these character states was reflected in keys to species. Thus, several species considered by Atyeo and Braasch in the content of the *musicus* group were additionally included in the key for the *anthi* group.

Two more species groups (*mecistocaulus* and *caulifer*) have been established within the genus *Proctophyllodes* based on several species removed from the *glandarinus* group sensu Atyeo and Braasch (Gaud and Fain 1990; Mironov and Kopij 1996).

In spite of rather careful revision of the genus *Proctophyllodes* made by Atyeo and Braasch (1966), there were no any attempts to analyze phylogenetic relationships within this genus. This can be probably explained by a high morphological diversity and richness of its species. Recent preliminary study of phylogenetic relationships in the family Proctophyllodidae based on molecular data of four genes (Knowles and Klimov 2011) showed that in the current taxonomic concept the genus *Proctophyllodes* is monophyletic and most its species groups also seems to be monophyletic. However the genus appears paraphyletic in relation to two morphologically derived proctophyllodine genera *Monojoubertia* Oudemans, 1905 and *Joubertophyllodes* Atyeo et Gaud, 1971.

MATERIAL AND METHODS

The material used for descriptions of new species was mainly collected by the author at two bird banding stations in the North-West of the European part of Russia. The Biological Station Rybachy (Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia) is located on the Curonian spit (Kaliningrad Province), and the Ladoga Ornithological Station (Biological Research Institute of the Saint Petersburg State University, Russia) is situated on the east coast of the Ladoga Lake (Leningrad Province). At both ornithological stations, birds were captured by means of the Rybachy traps (a large-size modification of the funnel bird trap) for banding and subsequent release to the wild. Mites were picked up from birds placed under a stereomicroscope by means of a flattened needle and placed in tubes with 75% ethanol.

Mites were mounted on microslides in the Faure medium according to standard technique used for small mites (Krantz and Walter 2009). Drawings were made by using a Leica DM 5000B light microscope with DIC illumination and camera lucida.

Other materials (microslides) used in the present study as a comparative specimens and for solving some taxonomic questions in the course of making the checklist of *Proctophyllodes* species belong to the feather mite collection of the Zoological Institute of the Russian Academy of Sciences (Saint Petersburg, Russia).

The description of species was made according to the modern standards used for proctophyllodine mites (Hernandes et al. 2007; Badek et al. 2008; Mironov and González-Acuña 2009; Mironov et al. 2012). General morphological terms, leg and idiosomal chaetotaxy follow Gaud and Atyeo (1996), with corrections to the coxal setation proposed by Norton (1998). All measurements are in micrometers (μm). The measuring techniques used for particular structures are as follows:

i) length of idiosoma is measured from the anterior margin of the propodosoma to the bases of setae *ps1* (in males) and to the lobar apices excluding the terminal appendages (in females); width of idiosoma is measured as the widest portion of the humeral area;

(ii) hysterosoma is measured from the level of the sejugal furrow on lateral margins of the body to the bases of setae *ps1* in males and to the lobar apices in females;

(iii) distance between setae of the same pair is the direct distance between their bases, and distance between different pairs of setae is the short-

est distance between the transverse levels formed by the setae of respective pairs;

(iv) prodorsal shield length is the greatest length measured from the anterior margin along the midline (if posterior margin is convex) or to the level of the posterior angles (if posterior margin is concave), and width is the greatest width at the level of the posterior margin;

(v) hysteronotal shield length in males is the greatest length from the anterior margin to the bases of setae *ps1*; width is measured at the anterior margin;

(vi) anterior hysteronotal shield length in females is the greatest length from the anterior margin to the transverse furrow separating this shield from the lobar shield; width is measured at the anterior margin;

(vii) length of the lamellae in males is measured from bases of setae *ps1* to distal margin of lamellae; width of the lamellae is their greatest width;

(viii) length of genital sheath in males is measured from the genital arch apex to the tip of the sheath;

(ix) length of the lobar region in females is the greatest length from its anterior margin to the lobar apices (the terminal appendages are excluded), and the width is measured at the level of the lateral extensions bearing setae *h2*.

All type materials are deposited in the Zoological Institute of the Russian Academy of Sciences (Saint Petersburg, Russia). Latin names of birds and supraspecific classification follow Clements (2007) and Clements et al. (2011).

SYSTEMATICS

Family Proctophyllodidae Trouessart et Mégnin, 1884

Subfamily Proctophyllodinae Trouessart et Mégnin 1884

Genus *Proctophyllodes* Robin, 1877

Proctophyllodes plectrophenax sp. n.

Figs. 1, 2, 3A–E, 4A, B

Proctophyllodes megaphyllus (non Trouessart, 1885): Vitzthum, 1922: 55, figs. 45–50, misidentification; Atyeo and Braasch, 1966: 156, figs. 137, 138, misidentification.

Type material. Male holotype (ZISP 4899), 4 male and 4 female paratypes from *Plectrophenax nivalis* (Linnaeus, 1758) (Calcariidae), Russia, Leningrad Province, Lodeynopolsky District, Gumbaritsy, N 60°40'26", E 32°56'35", 19 August 1981, coll. S.V. Mironov.

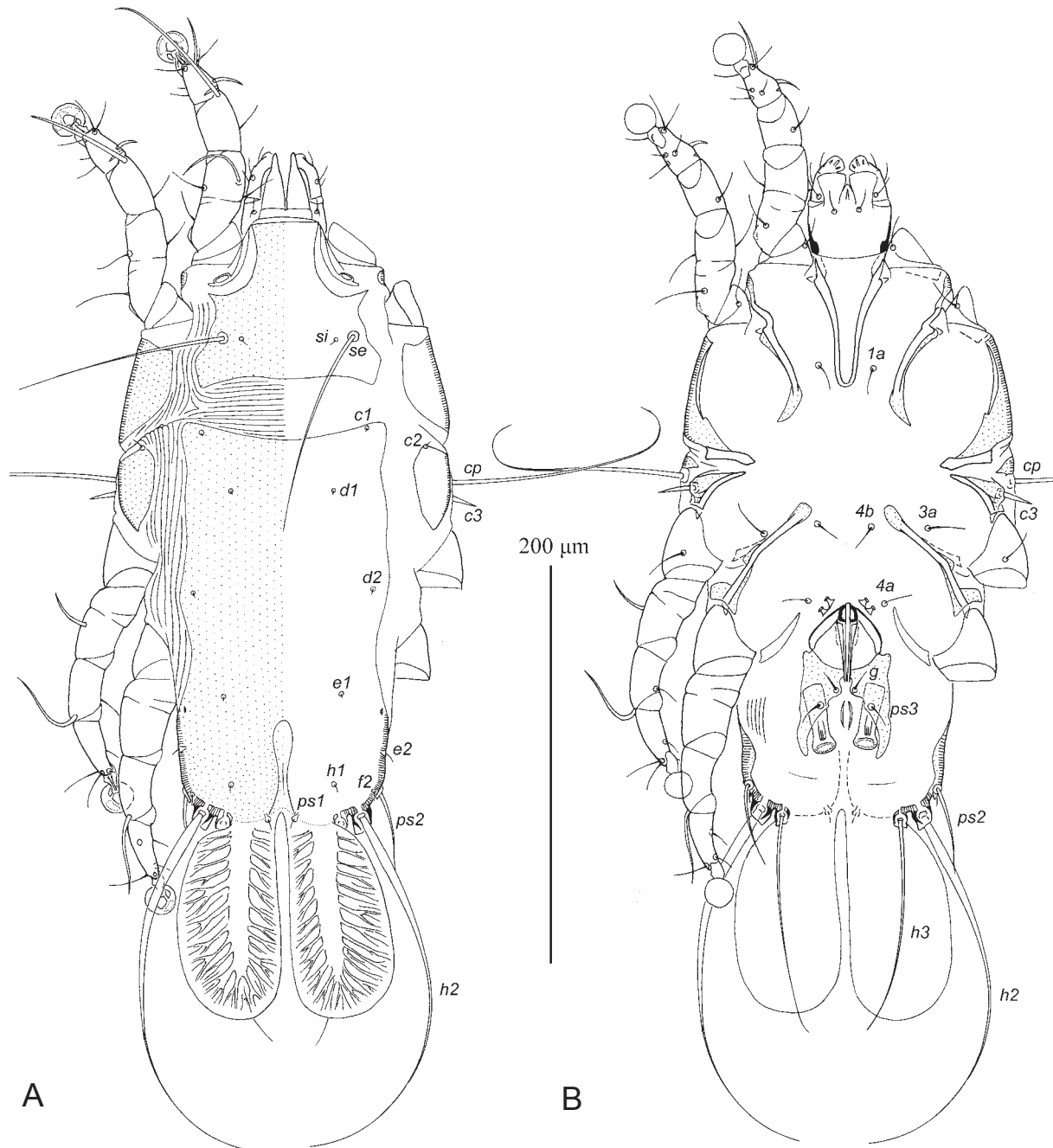


Fig. 1. *Proctophyllodes plectrophenax*, male. A — dorsal view, B — ventral view.

Additional material. 5 males and 5 females from *Plectrophenax nivalis*, Russia, Rostov Province, Rostov-on-Don, near Airport, N 47°16'50", E 39°48'14", 17 November 2003, coll. A. Zabashta; 6 males and 4 females, same host, Iceland, Vestmannaeyjar, Stórhöfði, N 63°23'57", W 20°17'15", 10 February 1996, coll. K. Skirnisson; 4 males and 4 females from *Calcarius lapponicus* (Linnaeus, 1758) (Calcariidae), Russia, Arkhangelsk Province, Timanskaya tundra, July 1938, coll. N.A. Gladkov.

Description. *Male* (Figs. 1, 3A–D, 4A, B) (holotype, range for 4 paratypes in parentheses). Gnathosoma length 47 (47–50), greatest width 42 (41–44). Idiosoma length 303 (300–320), width

166 (165–180), hysterosoma length 187 (185–196). Prodorsal shield: setae *vi* absent, antero-lateral extensions acute, lateral margins entire, posterior margin slightly concave, posterior angles obliquely cut, greatest length 79 (78–82), greatest width 93 (90–100), surface without ornamentation (Fig. 1A). Distances between scapular setae: *se–se* 66 (65–72). Humeral shields well developed, not fused with epimerites III, touching bases of setae *cp*. Setae *c2* on anterior margin of humeral shields. Subhumeral setae *c3* thick spiculiform, 17 (16–18) long, 3 (3–4) wide. Hysteronotal shield: anterior margin slightly concave, anterior angles rounded, length 196 (190–205), width at anterior margin

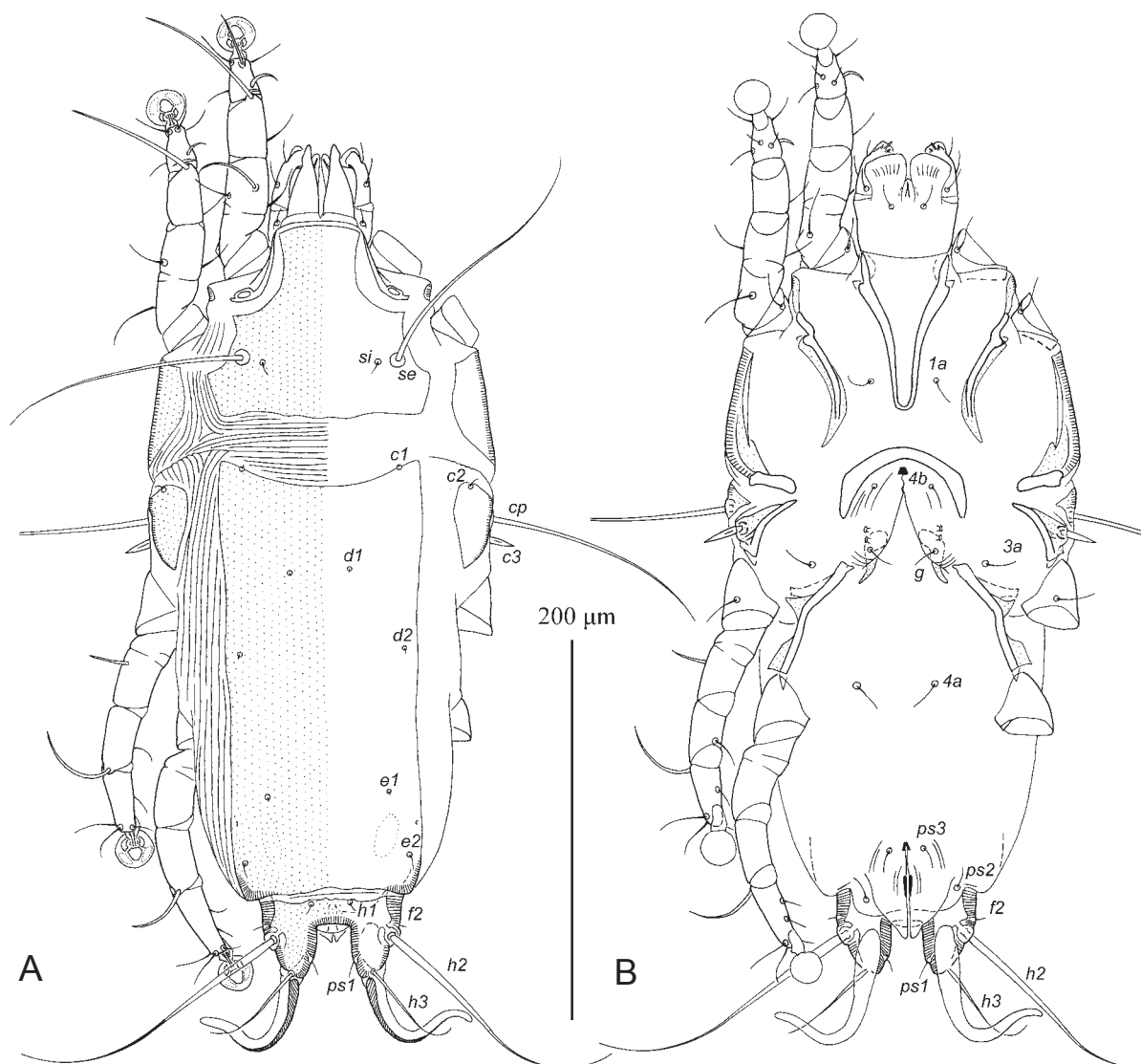


Fig. 2. *Proctophyllodes plectrophenax*, female. A — dorsal view, B — ventral view.

102 (98–106), surface without ornamentation. Supranal concavity opened terminally, anterior end not extending to level of setae *e1*, length 49 (45–50). Posterior margin of opisthosoma between setae *h2* almost straight. Terminal lamellae ovate, large, not overlapping, with pennate venation; length of lamellae 102 (100–115), maximal width 53 (50–64). Distances between hysteronotal setae: *c2:d2* 73 (70–75), *d2:e2* 71 (70–85), *e2:h3* 37 (35–40), *d1:d2* 49 (45–53), *e1:e2* 28 (24–30), *h1:h2* 20 (20–23), *h2:h3* 82 (80–85), *h3:h3* 60 (60–65), *ps2:ps2* 95 (90–98).

Epimerites I fused into a narrow U, without lateral extensions. Setae *4b* situated posterior to inner tips of epimerites IIIa. Epimerites IVa well developed, almost extending to level of setae *4a*. Genital arch large, 27 (26–30) in length, 36 (35–38) in width, its base situated at midlevel of trochanters IV. Aedeagus stylet-shaped, directed im-

mediately backward from genital arch apex; genital sheath: wedge-shaped (tapering apically), equal in length to aedeagus and completely encompassing it, supported basally with heavily sclerotized ring, not extending to level of setae *g*, 41 (40–44) in length, 9 (9–11) in width at base (Fig. 1B). Setae *4a* at level of genital arch apex. Paragenital and pregenital apodemes absent, genital papillae connected. Opisthogastric shield H-shaped, lateral margins nearly straight; transverse branch with small circular incision on posterior margin between bases of setae *g*; anterior branches adjoining to genital arch with small lateral extension; posterior branches acute and slightly curved medially. Setae *g* and *ps3* filiform, their bases arranged in low trapezium, and both situated on opisthogastric shield; distances between these setae: *g:g* 11 (9–11), *g:ps3* 7 (7–9), *ps3:ps3* 25 (23–26). Distance from genital arch apex to setae *ps1*

108 (105–110). Anal suckers cylindrical, 33 (32–34) in length, 12 (12–13) in width (at base), corolla with 11–13 small teeth (Figs. 4A, B).

Tarsus IV 33 (31–34) long, seta *d* situated closer to base of this segment (Fig. 3D). Genual solenidion σ III situated in basal half of segment (Fig. 3C). Tibial solenidion ϕ IV 35 (35–37) long. Length of genual solenidia: σ II 40 (38–42), σ III 21 (20–21).

Female (Figs. 2, 3E) (range for 4 paratypes). Gnathosoma: length 60–63, width 55–58. Idiosoma length of 395–445, width 180–206, hysterosoma length 255–300. Prodorsal shield shaped as in males, posterior margin straight or slightly sinuous, length 95–105, width 115–120. Distances between scapular setae *se* 80–85. Scapular shields narrow. Humeral shields not fused with epimerites III, encompassing bases of setae *cp*, setae *c2* on anterior margin of these shields. Subhumeral setae *c3* narrowly lanceolate, 18–22 long, 3.5–4.5 wide. Lobar region of opisthosoma distinctly separated from remaining part of hysterosoma, hysteronotal shield split dorsally into anterior and lobar parts by narrow transverse furrow, but remains connected ventrolaterally by narrow sclerotized bands. Anterior hysteronotal shield roughly rectangular, with anterior margin concave, with posterior margin slightly sinuous, surface without ornamentation, greatest length 225–240, width at anterior margin 105–110. Lobar shield entire, 44–52 in length, 72–84 in width, anterior margin slightly sinuous. Opisthosomal lobes relatively short, approximately as long as wide at base; terminal cleft U-shaped, lateral margins slightly divergent posterior to setae *ps1*, 24–26 in length, 17–22 in width in anterior part. Setae *h1* on anterior margin of lobar shields. Setae *ps1* on lateral margins of terminal cleft. Setae *h2* slightly enlarged in basal part, much longer than terminal appendages; setae *h3* 60–70 long, about 2/3 of terminal appendages. Distance between dorsal setae: *c2:d2* 85–94, *d2:e2* 110–125, *e2:h2* 44–48, *h2:h3* 20–25, *d1:d2* 35–42, *e1:e2* 33–40, *h1:h2* 17–22, *h2:ps1* 15–17, *h1:h1* 20–22, *h2:h2* 64–71.

Epimerites I shaped as in males. Epigynum almost semicircular, tips not extending to level of genital papillae, lateral extensions not developed, length 38–42, width 66–74. Copulatory opening situated on anterior wall of terminal cleft; bursa copulatrix 12–13 long, spermatheca and spermatheca as in Fig. 3E. Flaps of anal opening protruding into terminal cleft. Translobar apodemes wide, connected each other anterior to terminal cleft.

Genital setae *g* anterior to level of setae *3a*. Setae *ps2* situated at midlevel of anal opening and separated by 44–50.

Solenidion σ of genu III situated at base of segment. Length of genual solenidia: σ II 44–46, σ III 20–22. Legs IV extending by ambulacral disc to level of setae *h3*.

Differential diagnosis. *Proctophyllodes plectrophenax* sp. n. belongs to the *pinnatus* species group by having the H-shaped opisthogastric shield and wedge-shaped genital sheath supported by the heavily sclerotized basal ring (Fig. 1B). Based on the noticeably large-sized terminal lamellae and proportion of genital apparatus elements, this species is most similar to *P. megaphyllus* Trouessart, 1885 (as this mite species is interpreted in the present paper, see Remark below) and differs from that species by the following features. In males of *P. plectrophenax*, the anal suckers are longer and approximately 3 times longer than wide (32–34 \times 12–13), the genital sheath does not extend to the level of setae *g*, and the lateral margins of the opisthogastric shield are nearly straight (Figs. 1B, 4A, B); in females, setae *c2* are on the anterior margin of the humeral shields, the opisthosomal lobes are as long as wide and the terminal cleft is 17–22 long (Fig. 2A). In males of *P. megaphyllus*, the anal suckers are shorter and approximately 1.7–2.0 longer than wide (24–28 \times 14–15), the genital sheath extends to the level of setae *g*, and the lateral margins of opisthogastric shield are distinctly concave (Figs. 4G, H); in females, setae *c2* are off the humeral shields the opisthosomal lobes are two times longer than wide, and the terminal cleft is 24–26 long (Fig. 7C).

Remark. Trouessart (1885) originally described *Proctophyllodes megaphyllus* from “Accenteurs (*Accentor modularis*, etc.)” that means the Dunnock *Prunella modularis* (Linnaeus) (Prunellidae) is a type host of this species. As it was reasonably suggested by Vitzthum (1922), under other hosts Trouessart obviously meant *Prunella collaris* (Scopoli), the second species of accentors occurring in the Western Europe. Further, Vassilev (1960) recorded *P. megaphyllus* from *Prunella collaris* in Bulgaria. Vitzthum (1922) did not have in hand any *Proctophyllodes* specimens from *Pr. modularis* and referred to *P. megaphyllus* the specimens collected from the Snow Bunting *Plectrophenax nivalis* (Calcariidae) and used them for its redescription. It is necessary to add that Dubinin (1952) referred mites found on *Plectrophenax nivalis* and also on the Longspur

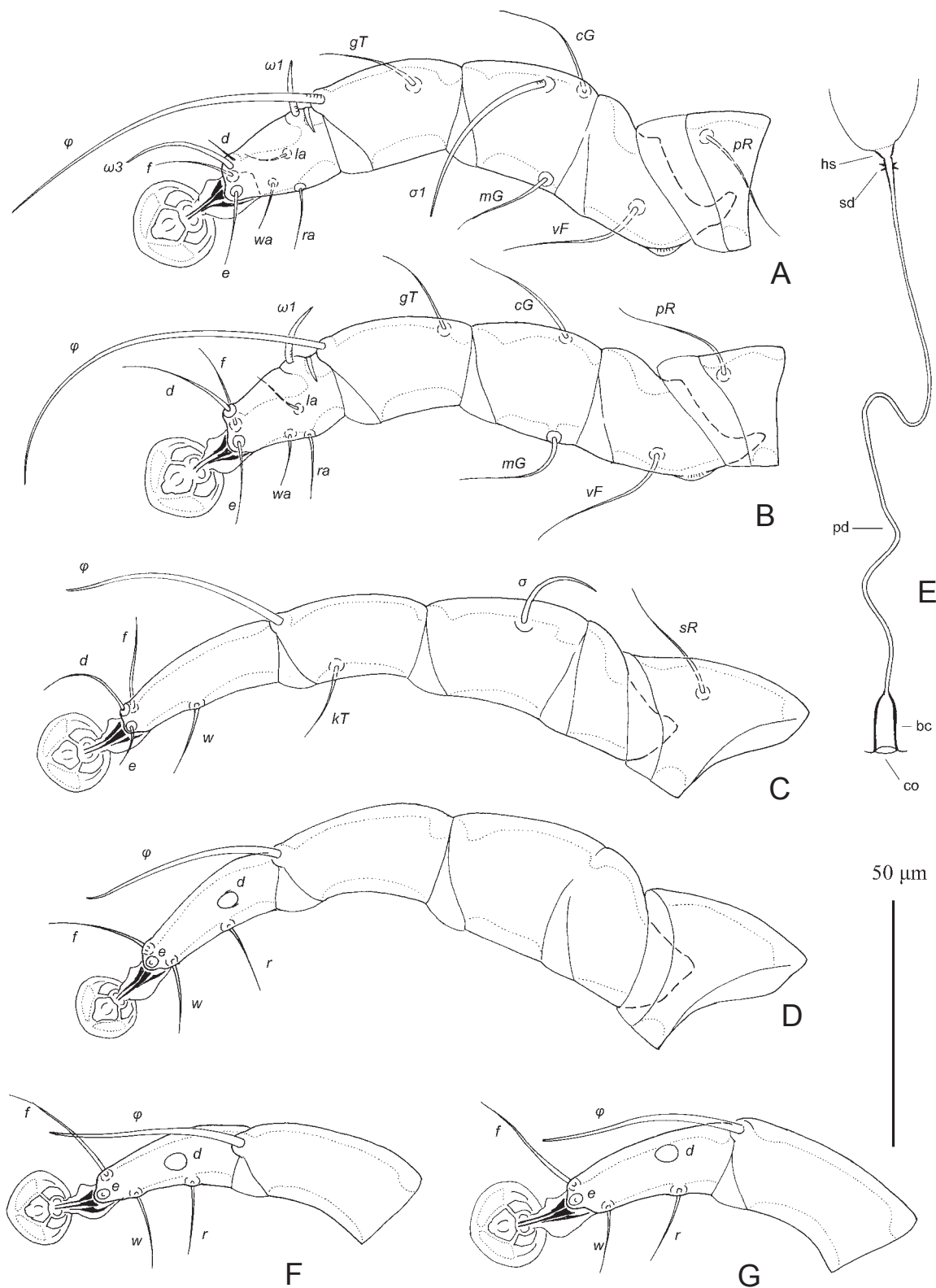


Fig. 3. *Proctophyllodes* species, details. A–D — *Proctophyllodes plectrophenax*, legs I–IV of male, E — same, head of spermatheca and spermaducts, F — *P. pinicolai*, tibia and tarsus IV of male, G — *P. noskovi*, tibia and tarsus IV of male. bc — bursa copulatrix, co — copulatory opening, hs — head of spermatheca, pd — primary spermaduct, sd — secondary spermaduct.

Calcarius lapponicus (Linnaeus) (Calcaridae) also to *P. megaphyllus*, while the samples found on *Prunella modularis* he referred to *P. pinnatus* (Nitzsch, 1818).

Atyeo and Braasch (1966) did not find type specimens of *P. megaphyllus* in the collection of Trouessart and also were not able to examine any materials from the type host or other prunellids.

Following Vitzthum (1922) and Dubinin (1952), these authors referred *Proctophyllodes* specimens from *Pl. nivalis* and *C. lapponicus* to *P. megaphyllus*, and the specimens from the latter host were used for the “redescription” of *P. megaphyllus* in the revision of the genus *Proctophyllodes*.

Numerous field collections of feather mites from *P. modularis* in the North-West of the European part of Russia (Mironov 1996) did not reveal *Proctophyllodes* specimens in this area; this host was usually infected by another proctophyllodine mite, *Joubertophyllodes modularis* (Berlese, 1895). Nevertheless, several samples from other European prunellids, *Prunella collaris* and *Pr. atrogularis* (Brandt) have been examined in the course of the present study, including the specimens collected by Vassilev (1960). It was found out that *Proctophyllodes* specimens from these *Prunella* species are distinctly different from those collected from *Plectrophenax nivalis* by the length of the genital sheath, size of anal suckers and form of opisthogastric shield in males (compare Figs. 4A, B and G, H). Therefore in the present paper I treat the specimens from prunellids as the true *P. megaphyllus*. I conclude that Vitzthum (1922) and Atyeo and Braasch (1966) misidentified *P. megaphyllus* in their revisions and redescribed under this name the species described herein as *P. plectrophenax*.

Etymology. The specific epithet is directly taken from the generic name of the type host and is a noun in apposition.

***Proctophyllodes pinicola* sp. n.**

Figs. 3F, 4C, D, 5, 7A

Type material. Male holotype (ZISP 4923), 5 male and 6 female paratypes from *Pinicola enucleator* (Linnaeus, 1758) (Fringillidae), Russia, Leningrad Province, Lodeinopolsky District, Gumbaritsy, N 60°40'26", E 32°56'35", 28 October 1981, coll. S.V. Mironov.

Description. *Male* (Figs. 3F, 4C, D, 5) (holotype, measurements for 5 paratypes in parentheses). Gnathosoma length 49 (47–50), width 42 (41–44). Idiosoma length 312 (290–315), width 177 (165–180), hysterosoma length 195 (185–195). Prodorsal shield: setae *vi* absent, antero-lateral extensions short, blunt-angular, lateral margins entire, posterior margin straight or slightly concave, posterior angles obliquely cut, greatest length 82 (79–85), greatest width 102 (95–105), surface without ornamentation (Fig. 5A). Distances between scapular setae: *se-se* 73 (65–750). Humeral shields well developed, not fused with

epimerites III, touching bases of setae *cp*. Setae *c2* on anterior margin of humeral shields (in some individuals off these shields). Subhumeral setae *c3* thick spiculiform, 15 (13–15) long, 3.5 (3–4) wide. Hysteronotal shield: anterior margin slightly concave, anterior angles rounded, length 198 (181–200), width at anterior margin 98 (95–100), surface without ornamentation. Supranal concavity opened terminally, anterior end not extending to level of setae *e1*, length 51 (46–52). Posterior margin of opisthosoma between setae *h2* straight. Terminal lamellae ovate, large, not overlapping, with pennate venation; length of lamellae 128 (95–130), maximal width 55 (50–55). Distances between hysteronotal setae: *c2:d2* 75 (65–75), *d2:e2* 84 (71–85), *e2:h3* 40 (35–40), *d1:d2* 44 (40–44), *e1:e2* 33 (26–33), *h1:h2* 25 (20–25), *h2:h2* 82 (78–82), *h3:h3* 62 (58–62), *ps2:ps2* 97 (92–97).

Epimerites I fused into a narrow U, without lateral extensions. Setae *4b* situated posterior to inner tips of epimerites IIIa. Epimerites IVa well developed, not extending to level of setae *4a*. Genital arch large, 27 (26–28) in length, 37 (35–37) in width, its base situated at midlevel of trochanters IV. Aedeagus stylet-shaped, directed immediately backward from genital arch apex; genital sheath: wedge-shaped (tapering apically), equal in length to aedeagus and completely encompassing it, supported basally with heavily sclerotized ring, extending to level of setae *g*, 45 (44–45) in length, 11 (10–11) in width at base (Fig. 4C, 5B). Setae *4a* at level of genital arch apex. Paragenital and pregenital apodemes absent, genital papillae connected. Opisthogastric shield H-shaped, lateral margins slightly concave, transverse branch with wide ovate incision on posterior margin anterior to bases of setae *g*, anterior branches adjoining to genital arch with small lateral extension, posterior branches acute and slightly curved medially. Setae *g* and *ps3* filiform, their bases arranged in low trapezium and both situated on opisthogastric shield, distances between these setae: *g:g* 13 (12–13), *g:ps3* 11 (9–11), *ps3:ps3* 32 (26–32). Distance from genital arch apex to setae *ps1* 113 (110–115). Anal suckers cylindrical, 26 (22–26) in length, 11 (11–13) in width (at base), corolla with 13–15 small teeth.

Tarsus IV 36 (33–36) long, seta *d* situated approximately at midlevel of this segment (Fig. 3F). Genual solenidion σ III approximately at midlevel of segment. Tibial solenidion ϕ IV 35 (33–36) long. Length of genual solenidia: σ I 38 (38–42), σ III 24 (22–24).

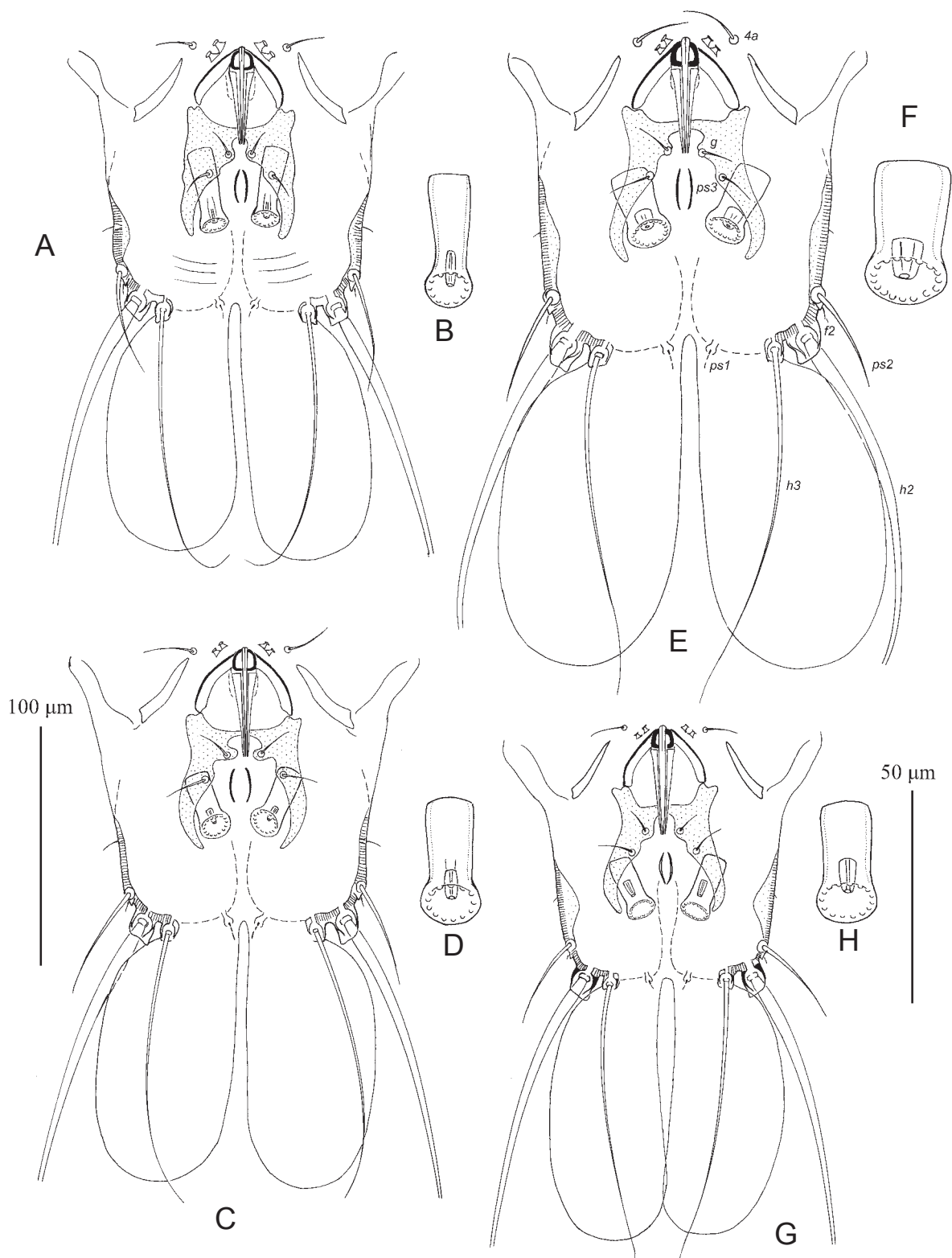


Fig. 4. Males of *Proctophyllodes* species. A — *Proctophyllodes plectrophenax*, ventral view of opisthosoma, B — same, anal sucker, C — *P. pinicolai*, ventral view of opisthosoma, D — same, anal sucker, E — *P. noskovi*, ventral view of opisthosoma, F — same, anal sucker, G — *P. megaphyllus*, ventral view of opisthosoma, H — same, anal sucker.

Female (Figs. 7A) (range for 6 paratypes). Gnathosoma: length 54–56, width 50–53. Idiosoma length of 410–440, width 185–200, hysterosoma length 280–300. Prodorsal shield shaped as in males, posterior margin straight, length 95–106,

width 115–126. Distances between scapular setae *se* 84–88. Humeral shields not fused with epimerites III, touching bases of setae *cp*, setae *c2* on anterior end of these shields (in some specimens off these shields). Subhumeral setae *c3* nar-

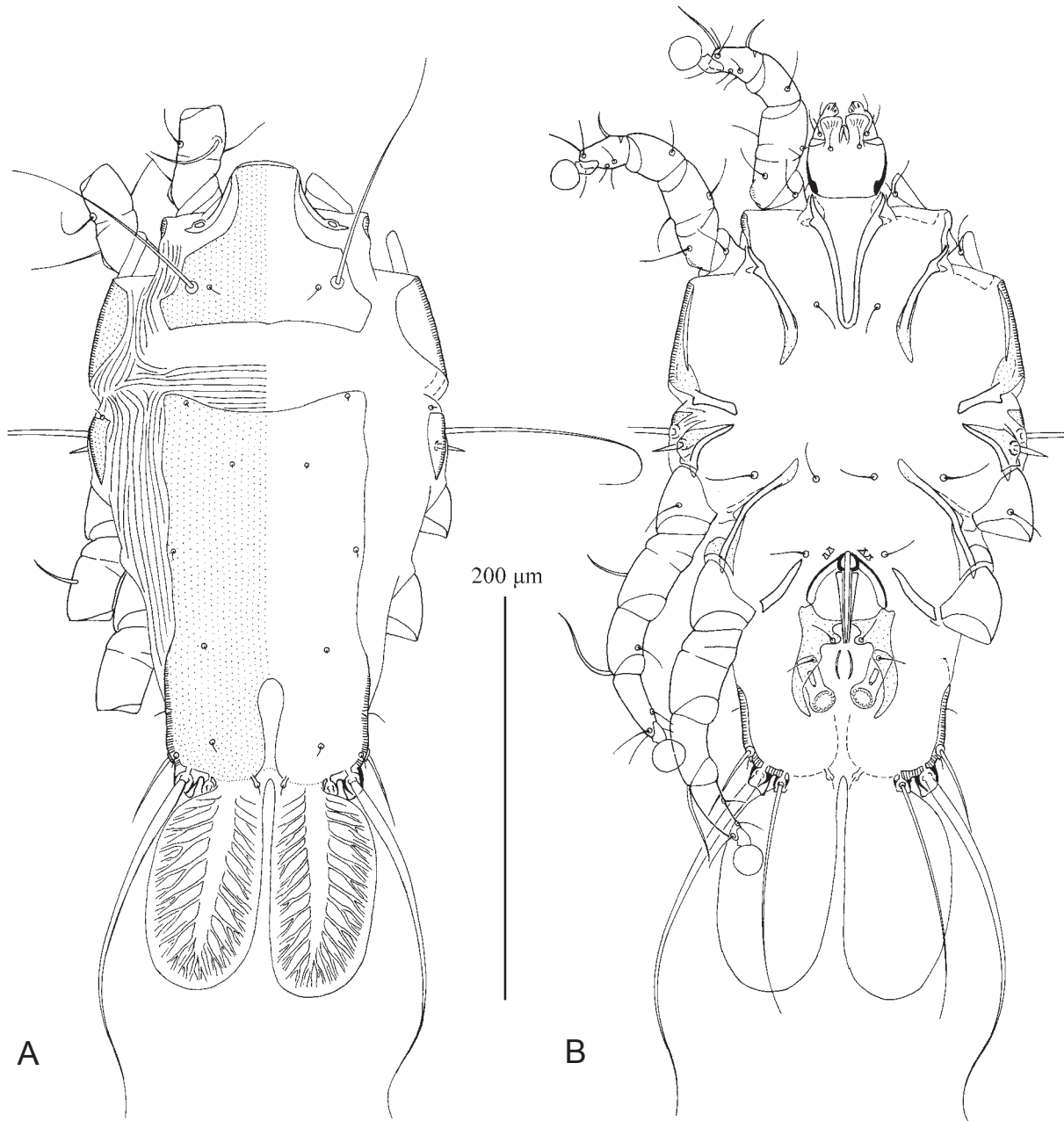


Fig. 5. *Proctophyllodes pinicolai*, male. A — dorsal view, B — ventral view.

rowly lanceolate, 17–20 long, 4.5–5 wide. Lobar region of opisthosoma distinctly separated from remaining part of hysterosoma, hysteronotal shield split into anterior and lobar parts by narrow transverse furrow, but remains connected ventrolaterally by narrow sclerotized bands. Anterior hysteronotal shield: roughly rectangular, anterior margin concave, posterior margin nearly straight with bow-shaped fold in medial part, surface without ornamentation, greatest length 220–240, width at anterior margin 100–110. Lobar shield entire, 55–65 in length, 82–94 in width, anterior margin with shallow median extensions (Fig. 7A). Opisthosomal lobes relatively short, approximately as long as wide at base; terminal cleft trapezoidal,

with lateral margins slightly divergent posteriorly, 35–44 in length, 21–24 in width in anterior part. Setae *h1* on anterior margin of lobar shields. Setae *ps1* on lateral margins of terminal cleft. Setae *h2* slightly enlarged in proximal part, much longer than terminal appendages; setae *h3* 70–85 long, about 2/3 of terminal appendages. Distance between dorsal setae: *c2:d2* 84–95, *d2:e2* 118–124, *e2:h2* 38–48, *h2:h3* 26–33, *d1:d2* 38–42, *e1:e2* 37–48, *h1:h2* 20–22, *h2:ps1* 17–22, *h1:h1* 32–34, *h2:h2* 73–84.

Epimerites I shaped as in males. Epigynum almost semicircular, tips not extending to level of genital papillae, without lateral extensions, length 35–38, width 66–78. Copulatory opening situated

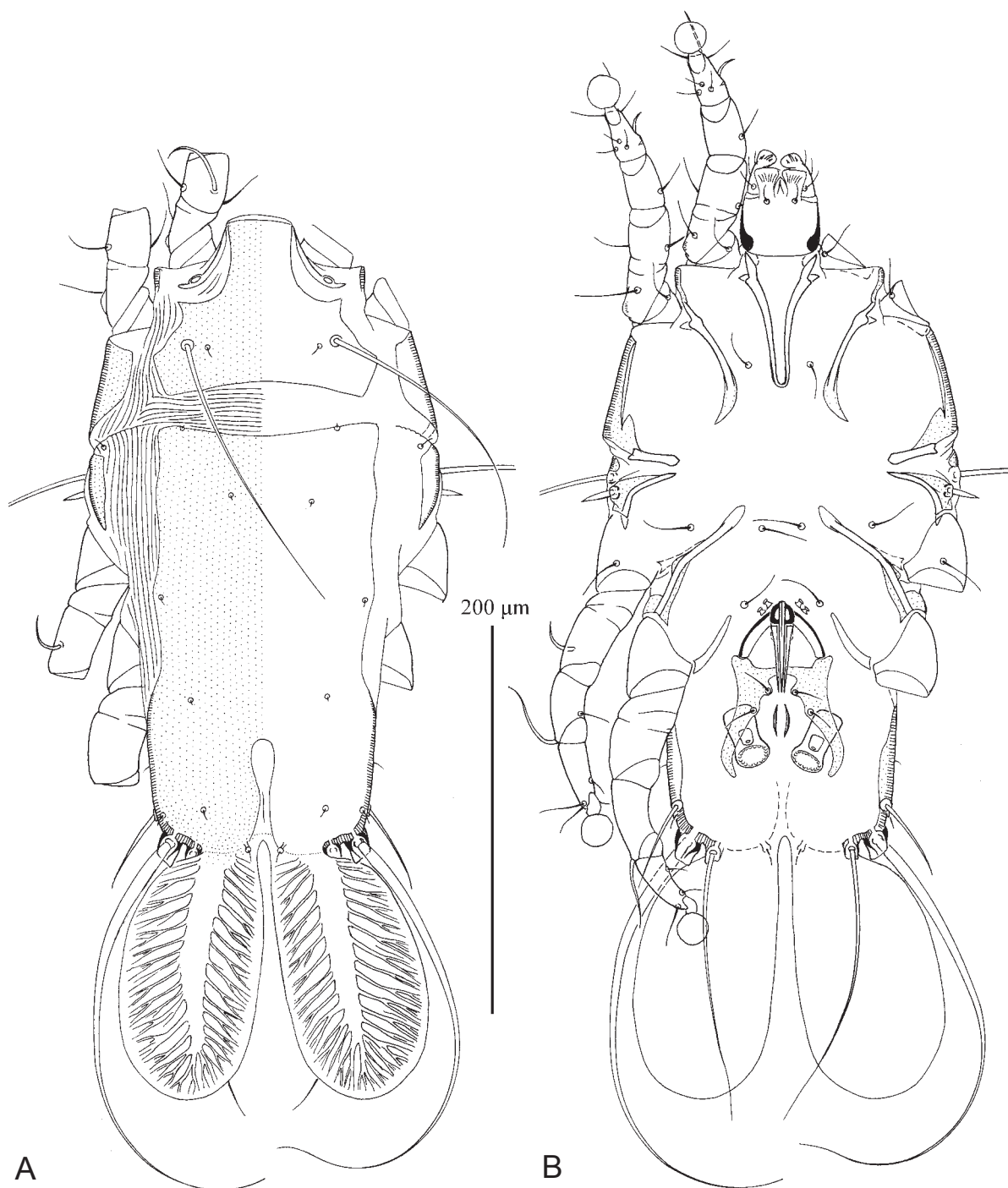


Fig. 6. *Proctophyllodes noskovi*, male. A — dorsal view, B — ventral view.

on anterior wall of terminal cleft; bursa copulatrix 12–15 long, spermatheca and spermaducts as in the previous species. Flaps of anal opening slightly protruding into terminal cleft. Translobar apodemes wide, connected each other anterior to terminal cleft. Genital setae *g* anterior to level of setae *3a*. Setae *ps2* situated at midlevel of anal opening, separated by 51–64.

Solenidion σ of genu III situated at base of segment. Length of genual solenidia: σ II 46–48, σ III 22–24. Legs IV extending by ambulacral disc to level of setae *h2*.

Differential diagnosis. Among species of the *pinnatus* species group with large-sized terminal lamellae (over 100 long), *Proctophyllodes pinicola* sp. n. is most similar to *P. paramegaphyllus* Atyeo et Braasch, 1966 from *Junco phaeonotus* Wagler (Emberizidae) by the form of opisthogastric shield having a very large incision between bases of setae *g* (Fig. 4C). Males of *P. pinicola* differ from those of *P. paramegaphyllus* by having the lesser number of teeth on the anal suckers (13–15) and the much wider idiosoma (165–180); females are distinguished by having a bow-shaped

fold on the posterior margin of hysteronotal shield and convex anterior margin of the lobar shield between setae *h1* (Fig. 7A). In males of *P. paramegaphyllus*, the anal sucker bears about 28 teeth and the idiosoma is about 146 in width; in females, the posterior margin of hysteronotal shield and the anterior margin of lobar shield are slightly sinuous (Atyeo and Braasch 1966).

Etymology. The specific epithet is directly taken from the generic name of the type host and is a noun in apposition.

***Proctophyllodes noskovi* sp. n.**

Figs. 3G, 4E, F, 6, 7B

Type material. Male holotype (ZISP 4936), 5 male and 10 female paratypes from *Loxia leucoptera* (Gmelin, 1789) (Fringillidae), Russia, Leningrad Province, Lodeinopolsky District, Gumbartsy, N 60°40'26", E 32°56'35", 11 October 1982, coll. S.V. Mironov.

Description. *Male* (Figs. 3G, 4E, F, 6) (holotype, range for 5 paratypes in parentheses). Gnathosoma: length 50 (49–52), greatest width 42 (40–44). Idiosoma length 325 (315–330), width 182 (170–182), hysterosoma length 210 (200–210). Prodorsal shield: setae *vi* absent, antero-lateral extensions short, acute, lateral margins entire, posterior margin slightly concave, posterior angles obliquely cut, greatest length 88 (84–94), greatest width 113 (104–115), surface without ornamentation. Distances between scapular setae: *se-se* 77 (72–78). Humeral shields well developed, not fused with epimerites III, touching bases of setae *cp*. Setae *c2* off humeral shields near their anterior margins. Subhumeral setae *c3* narrowly lanceolate, 16 (15–20) long, 3.5 (3–3.5) wide. Hysteronotal shield: anterior margin slightly concave, anterior angles rounded, length 214 (205–215), width at anterior margin 113 (108–115), surface without ornamentation. Supranal concavity opened terminally, anterior end not extending to level of setae *e1*, length 55 (55–62). Posterior margin of opisthosoma between setae *h2* straight. Terminal lamellae ovate, large, not overlapping, with pennate venation; length of lamellae 130 (130–140), maximal width 69 (68–72). Distances between hysteronotal setae: *c2:d2* 77 (68–77), *d2:e2* 86 (84–88), *e2:h3* 51 (45–52), *d1:d2* 44 (40–48), *e1:e2* 33 (26–34), *h1:h2* 25 (22–25), *h2:h2* 100 (96–102), *h3:h3* 71 (70–75), *ps2:ps2* 106 (105–110).

Epimerites I fused into a narrow U, without lateral extensions. Setae *4b* situated posterior to inner tips of epimerites IIIa. Epimerites IVa well

developed, almost extending to level of setae *4a*. Genital arch large, 29 (26–29) in length, 49 (42–48) in width, its base situated at midlevel of trochanters IV. Aedeagus stylet-shaped, directed immediately backward from genital arch apex; genital sheath: wedge-shaped (tapering apically), equal in length to aedeagus and completely encompassing it, supported basally with heavily sclerotized ring, extending to level of setae *g*, 48 (46–48) in length, 11 (10–11) in width at base (Fig. 4E, 6B). Setae *4a* at level of genital arch apex. Paragenital and pregenital apodemes absent, genital papillae connected. Opisthogastric shield H-shaped, lateral margins nearly straight, transverse branch with wide ovate incision on posterior margin anterior to bases of setae *g*, anterior branches adjoining to genital arch with small lateral extension, posterior branches acute and slightly curved medially. Setae *g* and *ps3* filiform, their bases arranged in low trapezium, and both situated on opisthogastric shield, distances between these setae: *g:g* 15 (15–16), *g:ps3* 9 (9–11), *ps3:ps3* 31 (31–34). Distance from genital arch apex to setae *ps1* 130 (125–132). Anal suckers cylindrical, 31 (28–32) in length, 18 (18–20) in width (at base), corolla with 16–18 small teeth.

Tarsus IV 35 (34–36) long, seta *d* situated closer to base of this segment (Fig. 3G). Genual solenidion σ III in distal part of segment. Tibial solenidion ϕ IV 36 (35–38) long. Length of genual solenidia: σ I 33 (33–38), σ III 20 (17–20).

Female (Fig. 7) (range for 6 paratypes). Gnathosoma: length 63–65, width 54–57. Idiosoma length of 435–460, width 200–210, hysterosoma length 300–320. Prodorsal shield shaped as in males, posterior margin straight, length 106–110, width 130–135. Distances between scapular setae *se* 90–95. Humeral shields not fused with epimerites III, touching bases of setae *cp*, setae *c2* on anterior margin of these shield. Subhumeral setae *c3* narrowly lanceolate, 17–20 long, 4–4.5 wide. Lobar region of opisthosoma distinctly separated from remaining part of hysterosoma, hysteronotal shield split into anterior and lobar parts by narrow transverse furrow, but remains connected ventrolaterally by narrow sclerotized bands. Anterior hysteronotal shield: roughly rectangular, anterior margin concave, posterior margin nearly straight, with bow-shaped fold in medial part, surface without ornamentation, greatest length 254–260, width at anterior margin 115–120. Lobar shield entire, 68–72 in length, 95–98 in width, anterior margin with shallowly convex extensions.

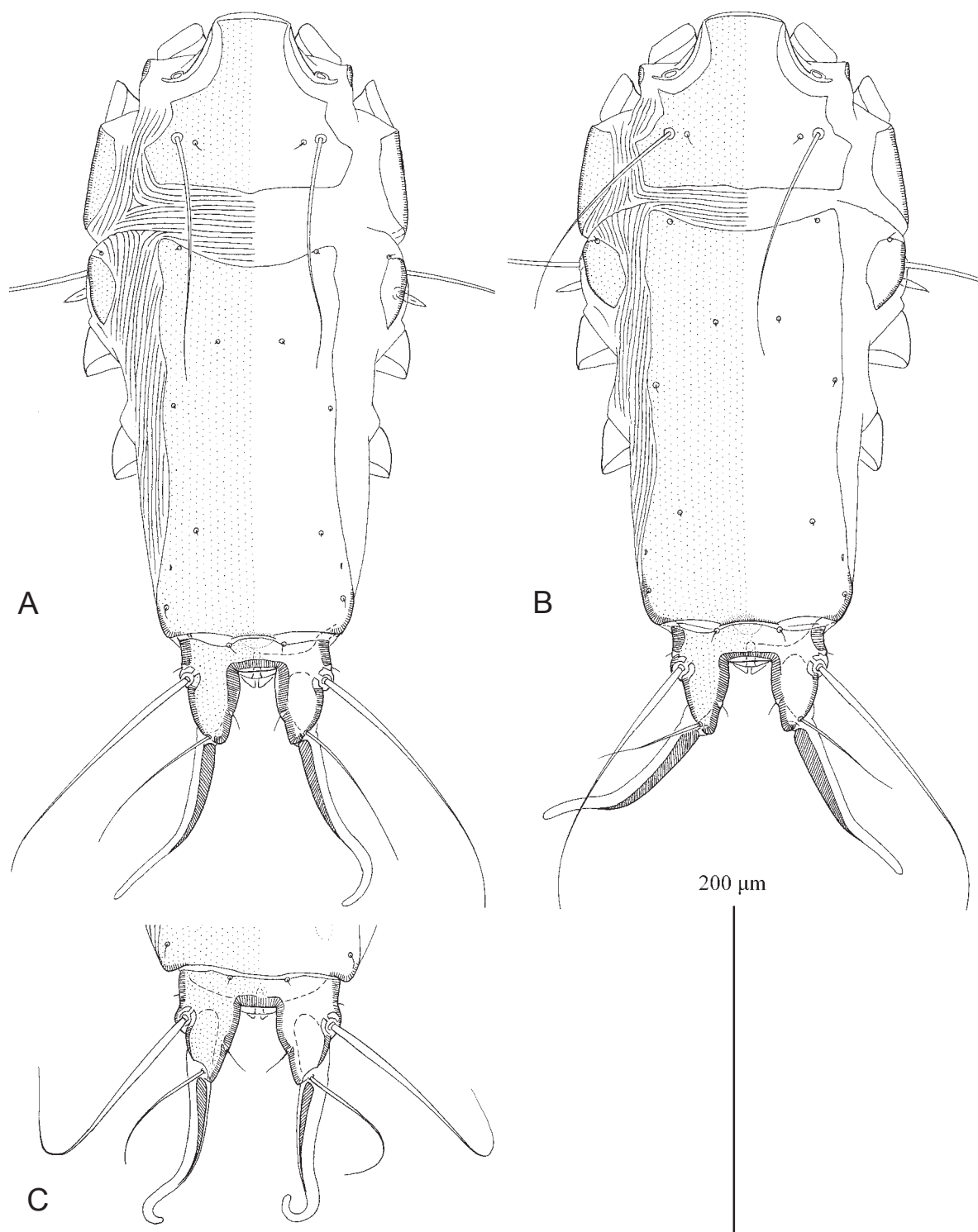


Fig. 7. Females of *Proctophyllodes* species. A — *P. pinicolai*, dorsal view of idiosoma, B — *P. noskovi*, dorsal view of idiosoma, C — *P. megaphyllus*, dorsal view of lobar region.

Opisthosomal lobes relatively short, approximately 1.5 times longer than wide at base; terminal cleft trapezoidal with lateral margins slightly divergent posteriorly, 45–49 in length, 27–30 in width in anterior part. Setae *h1* on anterior margin of lobar shields. Setae *ps1* on lateral margins of terminal cleft. Setae *h2* slightly enlarged in proximal part, much longer than terminal appendages;

setae *h3* 70–75 long, about 2/3 of terminal appendages. Distance between dorsal setae: *c2:d2* 85–95, *d2:e2* 130–138, *e2:h2* 42–45, *h2:h3* 33–38, *d1:d2* 36–40, *e1:e2* 46–50, *h1:h2* 22–26, *h2:ps1* 20–22, *h1:h1* 36–38, *h2:h2* 82–86.

Epimerites I U-shaped as in males. Epigynum semicircular, tips not extending to level of genital papillae, without lateral extensions, length 40–42,

width 75–80. Copulatory opening situated on anterior wall of terminal cleft; bursa copulatrix 16–17, spermatheca and spermaducts as in *P. plectrophenax* (Fig. 3E). Flaps of anal opening protruding into terminal cleft. Translobar apodemes wide, connected each other anterior to terminal cleft. Genital setae *g* anterior to level of setae *3a*. Setae *ps2* situated at midlevel of anal opening and separated by 60–62.

Solenidion σ of genu III situated at base of segment. Length of genual solenidia: σ II 46–48, σ III 20–24. Legs IV extending by ambulacral disc to level of setae *h2*.

Differential diagnosis. *Proctophyllodes noskovi* sp. n. belongs to the *pinnatus* species group and among its species having large-sized terminal lamellae is most close to the previous species, *P. pinicola*. Males of *Proctophyllodes noskovi* differ from that species by having the wider terminal lamellae (68–70) and larger anal suckers (30–32 × 15–16) (Figs. 4E, F), females differ by having the wider anterior hysteronotal shield (115–122) (Fig. 6). In males of *P. pinicola*, the terminal lamellae are 55–60 in width, and anal suckers are 25–26 × 11–12 (Fig. 4C, D); in females, the width of the anterior hysteronotal shield is 105–110 (Fig. 7A).

Etymology. The species is named after Prof. G.A. Noskov, the head of the Ladoga Ornithological Station and the Laboratory of Avian Ecology and Bird Protection (Biological Research Institute of the Saint Petersburg State University, Russia).

***Proctophyllodes microstylifer* sp. n.**

Figs. 6–10

Material. Male holotype (ZISP 4866), 5 male and 5 female paratypes from *Troglodytes troglodytes* (Linnaeus, 1758) (Troglodytidae), Russia, Kaliningrad Province, Rybachy, N 55°05', E 20°44', 24 September 1979, coll. S.V. Mironov.

Additional material. 9 males and 6 females from *T. troglodytes*, same location data as for the type material, 22 April 2012, coll. S.V. Mironov.

Description. *Male* (Figs. 8, 10A, B) (holotype, range for 5 paratypes in parentheses). Gnathosoma: length 37 (35–37), width 33 (33–35). Idiosoma length 243 (240–250), width 122 (120–130), hysterosoma length 148 (145–155). Prodorsal shield: setae *vi* absent, anterio-lateral extensions short, acute or bidentate, lateral margins entire, posterior margin almost straight, posterior angles rounded, length 71 (68–71), width 71 (70–74), surface of shield without ornamentation. Dis-

tances between scapular setae *se–se* 50 (50–52). Humeral shields well developed, not fused with epimerites III. Setae *c2* in anterior angle of humeral shield. Subhumeral setae *c3* lanceolate, 12 (12–13) long, 3.5 (3–3.5) wide. Hysteronotal shield: anterior margin concave, anterior angles rounded, length 153 (150–155), width at anterior margin 79 (75–82), surface without ornamentation. Supranal concavity opened terminally, anterior end extending slightly beyond level of setae *e2*, length to bases of setae *ps1* 36 (32–36). Posterior margin of opisthosoma between setae *h2* straight. Terminal lamellae almost circular, not overlapping, with pennate venation; length of lamellae 25 (22–28), maximal width 26 (24–28). Distances between hysteronotal setae: *c2:d2* 51 (48–52), *d2:e2* 62 (60–66), *e2:h3* 33 (32–35), *d1:d2* 21 (17–22), *e1:e2* 22 (20–24), *h1:h3* 20 (20–25), *h2:h2* 51 (50–52), *h3:h3* 35 (32–35), *ps2:ps2* 59 (58–62).

Epimerites I fused into a narrow U, without lateral extensions. Setae *4b* situated posterior to level of inner tips of epimerites IIIa. Epimerites IVa poorly developed. Genital arch of moderate size, 23 (22–24) in length, 26 (25–27) in width, base situated at level of trochanters IV. Genital sheath slightly shorter than genital arch, bifurcate apically, its tips strongly divergent, length 20 (20–22), width at base 6.5 (6–6.5); aedeagus 18 (17–18) in length, not protruding into bifurcation of genital sheath (Fig. 6B, 10A). Distance from genital arch apex to level of setae *ps1* 91 (88–92). Setae *4a* at level of genital arch apex. Paragenital and pregenital apodemes absent, genital papillae not connected. Opisthogastric shield represented by pairs of narrow longitudinal sclerites widely separated from each other, anterior ends of these sclerites adjoined to genital arch tips, posterior ends of these sclerites slightly divergent. Setae *g* and *ps3* fili-form, their bases arranged in low trapezium, setae *g* on soft tegument, setae *ps3* on sclerites of opisthogastric shield, distances between these setae: *g:g* 9 (9–10), *g:ps3* 7 (7–9), *ps3:ps3* 22 (21–23). Anal suckers cylindrical, 12.5 (12–13) in length, 11 (10–11) in width, corolla with 18–20 small teeth.

Tarsus IV 23 (23–25) long, seta *d* slightly close to distal end of this segment (Fig. 10B). Genual solenidion σ III situated at midlevel of segment. Tibial solenidion ϕ IV 27 (27–30) long. Length of solenidia: σ II 25 (24–28), σ III 11 (9–11), ϕ IV 27 (26–29).

Female (Fig. 9) (range for 5 paratypes): Gnathosoma: length 52–54, width 45–47. Idiosoma length 370–388, width 150–170, hysterosoma

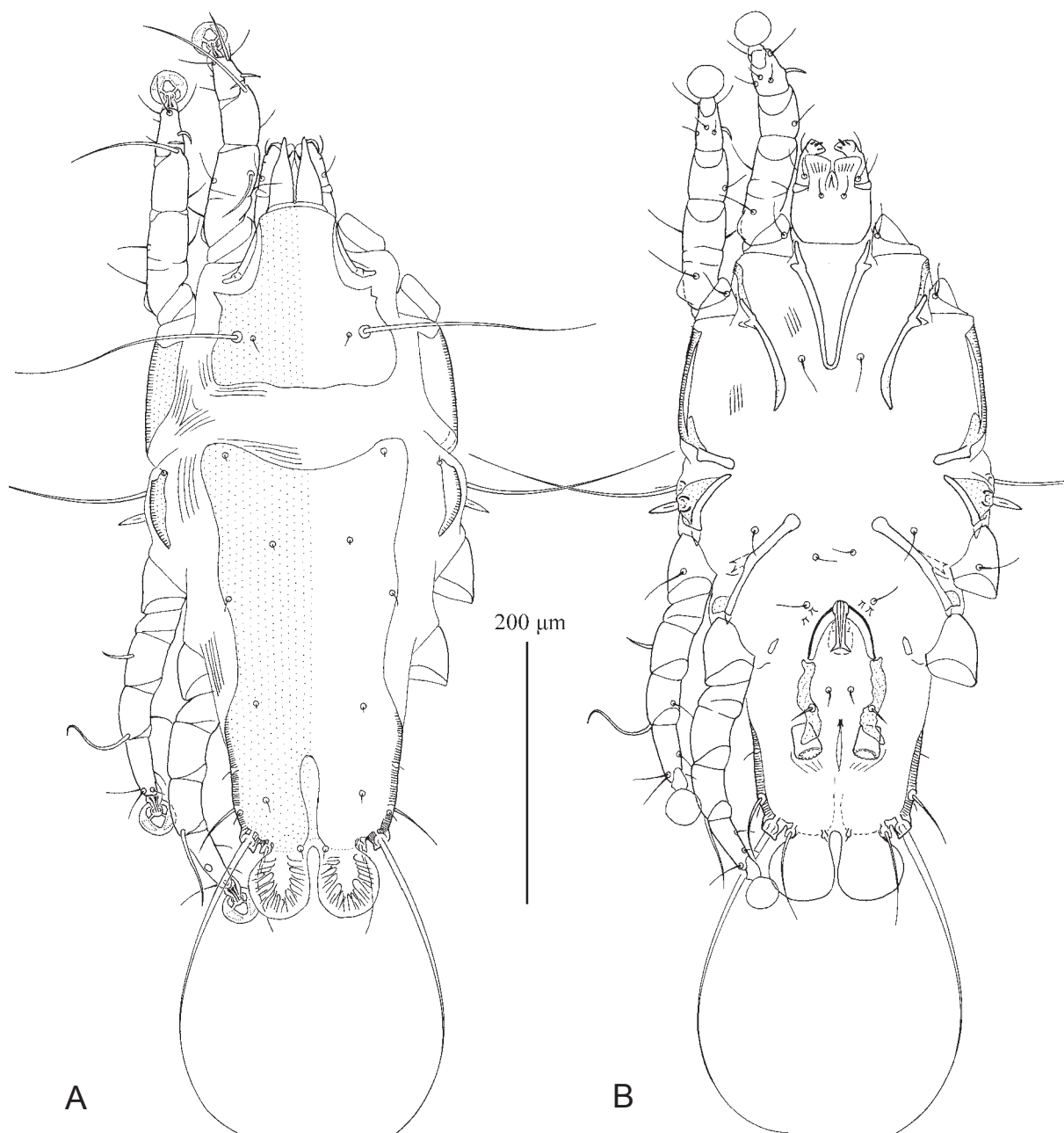


Fig. 8. *Proctophyllodes microstylifer*, male. A — dorsal view, B — ventral view.

length 250–260. Prodorsal shield: antero-lateral extensions short and acute (bidentate in some specimens), lateral margins with small angular incision anterior to level of setae *se*, posterior margin slightly convex, length 85–92, width 90–98. Distance between scapular setae *se* 64–70. Humeral shields not fused with epimerites III, touching bases of setae *cp*, setae *c2* in anteromesal angles of these shields. Subhumeral setae *c3* lanceolate, 13–15 long, 4–4.5 wide. Lobar region of opisthosoma separated from remaining part of hysterosoma; hysteronotal shield split into anterior and lobar parts by narrow transverse furrow, but remain connected ventrolaterally by narrow scler-

rotized bands. Anterior hysteronotal shield roughly rectangular, with anterior margin shallowly concave, with posterior margin slightly convex medially, posterior half of lateral margins strongly sclerotized, remaining area of this shield moderately sclerotized, surface without ornamentation, greatest length 190–210, width at anterior margin 85–90. Lobar shield entire, 60–65 in length, 80–86 in width, anterior margin slightly sinuous. Opisthosomal lobes attenuate apically, nearly twice longer than wide; terminal cleft parallel-sided, almost rectangular, 40–45 in length, 22–26 in width in anterior part. Setae *hl* on band of soft tegument between anterior hysteronotal and lobar shields. Se-

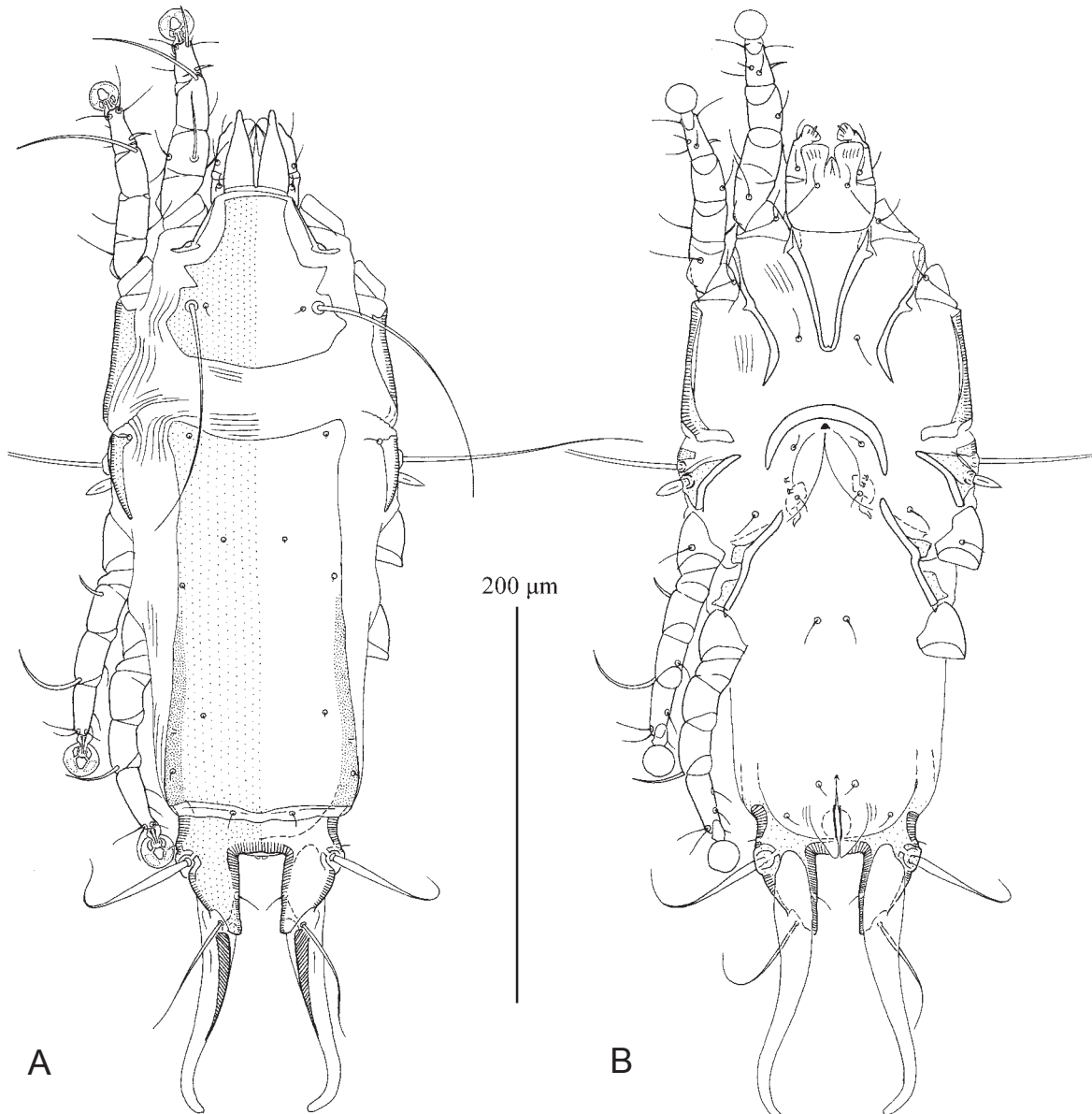


Fig. 9. *Proctophyllodes microstylifer*, female. A — dorsal view, B — ventral view.

tae *ps1* on lateral margins of terminal cleft. Setae *h2* enlarged in basal 2/3, apical part filiform, total length of these setae subequal to terminal appendages; setae *h3* 55–58 long, about 2/3 of terminal appendages. Distance between dorsal setae: *c2:d2* 66–70, *d2:e2* 100–105, *e2:h2* 44–48, *h2:h3* 30–35, *d1:d2* 22–26, *e1:e2* 30–34, *h1:h2* 24–26, *h2:ps1* 17–20, *h1:h1* 28–31, *h2:h2* 70–75.

Epimerites I shaped as in males. Epigynum semicircular, tips not extending to level of genital papillae, lateral margins without extensions, length 28–33, width 62–66. Copulatory opening situated on anterior wall of terminal cleft. Flaps of anal opening slightly extending into terminal cleft (Fig. 9B). Transobar apodemes wide, connected to each other anterior to terminal cleft. Genital setae *g* anterior to level of setae *3a*. Setae *ps2* situated at

midlevel of anal opening and widely separated from each other, 50–54.

Solenidion σ of genu III situated at base of segment. Length of genual solenidia: σ II 35–37, σ III 11–14. Legs IV extending by amblyacral disc to level of setae *h2*.

Differential diagnosis. *Proctophyllodes microstylifer* sp. n. belongs to the *stylifer* species group (Ayteo and Braasch 1966) characterized by a bifurcate genital sheath in males. By the structure and size of genital sheath this species is most close to *P. stylifer* (Buchholz, 1869) described from *Cyanistes caeruleus* (Linnaeus) (Paridae) and also occurring on various species of titmice. *Proctophyllodes microstylifer* differs from that species by the following features: in both sexes, the prodorsal and hysteronotal shield has no any

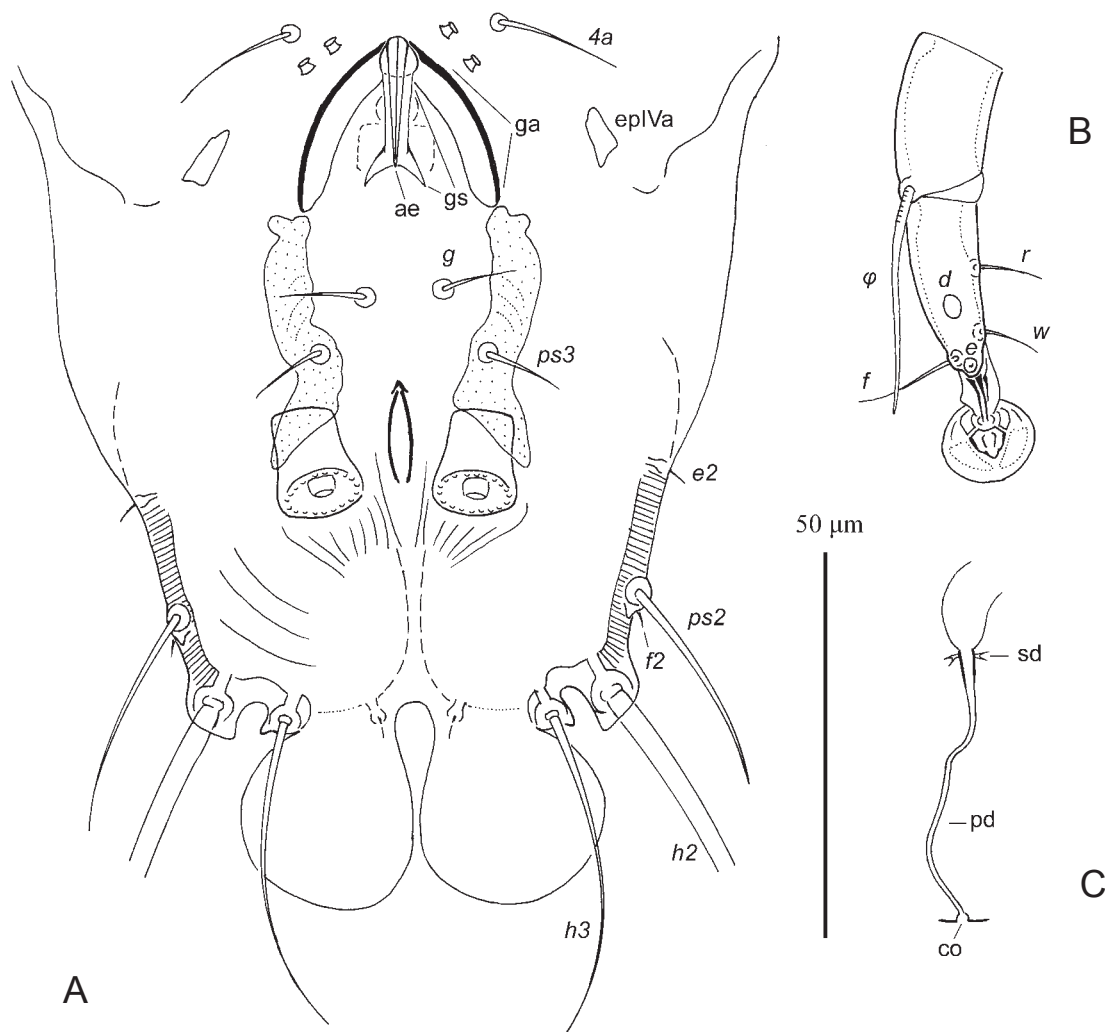


Fig. 10. *Proctophyllodes microstyliifer*, details. A — ventral view of male opisthosoma, B — tibia and tarsus IV of male, C — head of spermatheca and spermatiducts. ae — tip of aedeagus, co — copulatory opening, epIV — epimerite IVa, ga — genital arch, gs — genital sheath, pd — primary spermatid, sd — secondary spermatid.

lacunae, in males the aedeagus is not extending into the bifurcation of the genital sheath, and the anterior margin of the hysteronotal shield is concave (Figs. 8A, B, 10A); in females, the lateral margins of prodorsal shield have small angular incisions anterior to the bases of setae *se* and the anterior hysteronotal shield is sclerotized noticeably stronger than the soft striated tegument of idiosoma. In both sexes of *P. styliifer*, the prodorsal shield bears at least few lacunae; in males, the aedeagus distinctly extends between the tips of genital sheath making the end of the genital apparatus trifid, and the anterior margin of the hysteronotal shield is straight; in females, the lateral margins of prodorsal shield are entire and the most area of the anterior hysteronotal shield (except for dark-colored lateral margins) is poorly sclerotized, approximately as pale the striated tegument of idiosoma. Besides, *P. microstyliifer* is generally smaller: the idiosoma lengths are 240–250 in males and

365–380 in females versus 260–280 and 380–415, respectively, in *P. styliifer*.

Etymology. The specific epithet is formed from *mikrós* (Gr., small) and *P. styliifer* to indicate its smaller size in relation to the latter species.

THE CHECKLIST OF PROCTOPHYLLODES SPECIES

The checklist (Table) includes valid names of *Proctophyllodes* species, new and previously established synonyms, and type hosts according to the recent list of the birds of the world (Clements 2007, Clements et al. 2011). Species groups of mites are indicated according to Atyeo and Brasch (1966) with taking in account subsequent establishing of two more groups (Gaud and Fain 1990; Mironov and Kopij 1996). Comments given below discuss newly established synonyms and some questionable taxonomic cases. Names treated as synonym are given in Table in the original

format, i.e. with an original generic name. Numbers of comments below correspond to numbers in bold font given after names of mite species. Atyeo and Braasch (1966) gave exhaustive synonymy and references to all species described up to the middle 1960s; therefore the "Reference" column in Table includes only references to corresponding original descriptions.

1. *Proctophyllodes ampelidis* (Buchholz, 1869). Although this species described from *Bombycilla garrulus* (Linnaeus) (Bombycillidae) was considered by Vitzthum (1922) as a distinct species, Atyeo and Braasch (1966) synonymized it with *P. glandarinus* (Koch, 1841). *Proctophyllodes ampelidis* (Buchholz, 1869) was restored a valid species by Mironov (1997).

2. *Proctophyllodes arcticus* Dubinin, 1952 **syn. n.** This species was described by Dubinin (1952) from *Anthus cervinus* (Pallas) (Motacillidae) from Wrangel Island. Atyeo and Braasch (1966) did not have any *Proctophyllodes* species from this host. Therefore these authors did not re-describe this species and, based only on the original description, provisionally referred this mite to the *weigoldi* species group. The study of the type specimen deposited in the Zoological Institute has shown that the original description of *P. arcticus* was made quite inaccurately. The male specimen is actually curled around the longitudinal axis that gives a false impression of a very long and narrow idiosoma. Besides, Dubinin (1952) erroneously depicted much longer aedeagus than it actually is. Based on the study of the type material, I synonymize here *Proctophyllodes arcticus* Dubinin, 1952 **syn. n.** with *Proctophyllodes anthi* Vitzthum, 1922.

3. *Proctophyllodes armatus* (Banks, 1909). This species, originally described in the genus *Pterodectes* Robin, 1877, was not mentioned by Atyeo and Braasch (1966) in the revision of *Proctophyllodes*. In the generic revision of the subfamily Pterodectinae, Park and Atyeo (1971) referred this species without comments to the genus *Proctophyllodes*. The original description of the male (Banks, 1909: 141, Fig. 24) displays quite strange features never occurring in *Proctophyllodes*: "a rounded hyaline plate" on the posterior margin of opisthosoma (instead of a pair of terminal lamellae) and three pair of short setae between two long setae (setae *h2*) arising from the posterior angles of the opisthosoma. It is possible that among three pairs of short setae only the lateral pair actually represent setae (setae *h3*), while two

other could be misidentified lateral margins of terminal lamellae. The mentioned "rounded hyaline plate" could possibly be just a layer of cuticle on the ventral part of opisthosoma, which accidentally peeled off during mounting. The drawing of the female having the epigynum distinctly separated from coxal elements of idiosoma clearly indicates that this mite belongs to the subfamily Proctophyllodinae.

Banks (1909) listed ten species of North American passerines belonging to the families Emberizidae, Turdidae, and Parulidae as hosts of *P. armatus*. Since the type host was not indicated, the first mentioned host "the song sparrow" *Melospiza melodia* Wilson (Emberizidae) should be treated as a type host. The set of hosts represented by different passerine families allows one to suggest that Banks either dealt with several different *Proctophyllodes* species, which he could not discriminate, or with a species which was able to disperse among rather different hosts. Based on the structure of the genital apparatus, *P. armatus* could be referred to the *anthi* group and looks most similar to *P. polyxenus*. In *P. armatus*, the aedeagus is equal in length to the genital arch, while in *P. polyxenus*, it extends beyond the base of the genital arch at least by one third of its length. The latter species is known as a quite polyxenus species, occurring on 36 passerine species from the families Cardinalidae, Emberizidae, Motacillidae Parulidae, Thraupidae, and Turdidae, and *M. melodia* was mentioned is among them (Atyeo and Braasch, 1966). However later on, Gaud and Atyeo (1996: 65) noted that *P. polyxenus* is obviously a complex of sibling species.

4. *Proctophyllodes bruniceps* Putatunda, Gupta et Singh, 1976. This species was very shortly described by Putatunda et al. (1976) from *Emberiza bruniceps* Brandt (Emberizidae) in India. Based on the description it is practically impossible to discriminate it from *P. ciae* Bauer, 1939 (see below). Although it is quite probably that *P. bruniceps* could appear a junior synonym of *P. ciae*, I retain it here as a valid species.

5. *Proctophyllodes cettioides* Dubinin (in Dubinina and Kulakova, 1960). This species mentioned in the paper by Dubinina and Kulakova (1960: 361) as "*Proctophyllodes cettioides* Dubinin in litt." form *Cettia cetti* (Temminck) (Cettiidae) has never been described and is a nomen nudum. Badek and coauthors (2008) noted that *P. cettioides* quite probably corresponds to *P. cetti*

Badek, Mironov et Dabert, 2008 they described from the same host from Kazakhstan.

6. *Proctophyllodes ciae* Bauer, 1939. This species, described from *Emberiza cia* Linnaeus (Emberizidae) by Bauer (1939), was the only species missed by Atyeo and Braasch (1966) in their revision of the genus *Proctophyllodes*. The type specimen of *P. ciae* deposited in the Zoological Institute has been examined in the course of the present study. This mite was also recorded on *E. citrinella* Linnaeus and *E. leucocephala* Gmelin in the European part of Russia and Central Europe (Mironov 1996, 1997). *Proctophyllodes ciae* is very close to *P. miliariae* Gaud, 1957 originally described from *Emberiza (Miliaria) calandra* Linnaeus by Gaud (1957) and also recorded from other buntings, *E. (Emberiza) citrinella*, *E.(E.) cirrus* Linnaeus and *E.(E.) hortulana* Linnaeus, by Atyeo and Braasch (1966). This species differs from *P. miliariae* only by having slightly concave lateral margins of the opisthogastric shield in males and the narrower terminal cleft in females. My study of materials from *Emberiza* species used by these authors (Gaud 1957; Atyeo and Braasch 1966) showed that all mentioned *Emberiza* species other than *E. miliaria* actually host *P. ciae*, while only the latter hosts *P. miliariae*.

7. *Proctophyllodes profusus* Robin, 1877. This species was firstly mentioned by Robin (1868) when he proposed the generic name *Proctophyllodes*. Further, Robin (in: Robin and Mégnin 1877) provided it with a formal description without illustrations and gave the following host list of European passerines: *Emberiza cintrinella* (Emberizidae), *Carduelis cannabina* (Linnaeus), *C. carduelis* (Linnaeus) (= *C. elegans*) (Fringillidae), *Lanius minor* Gmelin (Laniidae), *Anthus trivialis* (Linnaeus) (= *A. arboreus*), *Anthus pratensis* (Linnaeus) (Motacillidae), *Pica pica* (Linnaeus) (Corvidae) and “sparrows”. The latter hosts meant *Passer domesticus* (Linnaeus) and *Pas. montanus* (Linnaeus) (Passeridae) as it is possible to understand from the subsequent paragraphs of that paper. Although the description was rather lengthy, it was not much helpful to clear determinate this species and assuredly correlate it with some species presently known from these hosts. From the recent point of view, if that material reliably derived from listed hosts and there were not cases of contaminations, it certainly included several different mite species, among which at least four could belong to the *pinnatus* species group. Thus, mites from two *Passer* species were quite definite-

ly *P. truncatus*, mites from *Anthus* species could probably be *P. poubhani*, and mites from *Carduelis* species could be *P. pinnatus*.

Atyeo and Braasch (1966) declared *E. citrinella*, the first host species mentioned by Robin and Mégnin, as a type host of *P. profusus*. However, for the unknown reason these authors considered this species as a questionable synonym of *P. pinnatus*, which is usual on *Carduelis* species. It could be more reasonable to correlate it with any mite of the *pinnatus* group associated with *Emberiza* species, for instance to *P. miliariae*, which was also considered by these authors in the revision. It is quite probable that mites collected by Robin and Mégnin (1877) from *E. citrinella* corresponds to *P. ciae* (see comments above), which has been recorded from various *Emberiza* species in Europe, including *E. citrinella*. Therefore in the present paper I place *P. profusus* in a questionable synonym of *P. ciae*.

8. *Proctophyllodes mariaevalensis* DeRojas, Ubeda, Guevara et Ariza, 1989. This species was described from *Emberiza cia* in Spain (De Rojas et al. 1989). I consider *P. mariaevalensis* **syn. n.** as a junior synonym of *P. ciae* Bauer, 1939 described from the same host in the Caucasus (Bauer, 1939).

9. *Dermaleichus acredulinus* Koch, 1841. This *Proctophyllodes* species was described from *Aegithalos caudatus* (Linnaeus) (Aegithaliidae) (“Schwanzmeise” in the original paper) in the genus *Dermaleichus* Koch 1841. Although Koch (1841) described a “male” and “female”, Oudemans (1937) reasonably indicated that the described stages actually represented a tritonymph and protonymph, respectively, and suggested that this species could correspond to *P. stylifer* (Buchholz, 1869), a common parasite of some titmice species of the genus *Parus* Linnaeus (Paridae) (Buchholz 1869; Mironov 1996; Dabert 1997). The latter suggestion of Oudemans looks doubtful and probably was based just on the fact that the Long-tailed Tit *A. caudatus* in that time also belonged to the family Paridae. Atyeo and Braasch (1966) did not see the original work and following Oudemans (1937) treated this mite as a possible synonym of *P. stylifer* (Buchholz, 1869).

There are no objective reasons to treat it as a synonym of *P. stylifer*, because extensive subsequent investigations of feather mites in Europe have never recorded this species from *A. caudatus*. At the same time, two *Proctophyllodes* species are recently known from this host — *Proctophyllodes clavatus* Fritsch, 1961 in Europe and *P.*

valchukae Mironov, Dabert J. et Dabert M., 2012 in the Russian Far East (Fritsch 1961; Černý 1977, Dabert 1997; Mironov et al. 2012). Based on these data I consider *Dermaleichus acredulinus* Koch, 1841 as a questionable synonym of *P. clavatus* Fritsch, 1961.

10. *Proctophyllodes cotyledon* Trouessart, 1899. This species was formally described from *Toxostoma redivivum* (Mimidae) (Trouessart 1899). This mite has never been recollected from this host and Atyeo and Braasch (1966) came to the conclusion that this host association was the result of accidental contamination. Later on, this mite species was found on various muscicapids of the genera *Phoenicurus* Forster and *Saxicola* Bechstein in Europe and Africa (Vitzthim 1922; Gaud 1957). Further, two authors (Vassilev 1958; Fritsch 1961) independently described two new *Proctophyllodes* species from *Phoenicurus ochruros* (Gmelin) (Muscicapidae), — *P. dontschevi* Vassilev, 1958 and *P. cardifolius* Fritsch, 1961. Atyeo and Braasch (1966) examined type materials of all aforementioned species and synonymized *P. dontchevi* and *P. cardifolius* with *P. cotyledon*. The redescription of *P. cotyledon* in the revision of *Proctophyllodes* was based on the type material of *P. dontschevi*.

11. *Proctophyllodes arcuaticaulis* Trouessart, 1887. This species was described from the Linnet *Carduelis cannabina* (Fringillidae) (“*Linota, Acanthis*” in the original paper), and based on the description there is no doubts that it is a species of the *glandarinus* group. Poppe (1888) synonymized this species with *P. ampelidis* (Buchholz, 1869). In turn, Atyeo and Braasch (1966) synonymized it with *P. glandarinus* (Koch, 1841). Atyeo and Braasch (1966) had a very wide concept of *P. glandarinus* and, based to significant extent on reference data, gave a long list of rather various hosts as follows: *Garrulus glandarinus* (Linnaeus) (Corvidae) (the type host), two species of the genus *Bombycilla* Vieillot (Bombycillidae), two species of the genus *Emberiza* (Emberizidae) and 13 species from the genera *Carduelis*, *Coccothraustes* Brisson, *Eophona* Gould, *Fringilla* Linnaeus, *Loxia* Linnaeus, and *Pyrrhula* Brisson (Fringillidae).

Although some of these records could be results of contaminations (for instance those from *Emberiza* and *Fringilla* species), subsequent studies showed that at least some of the listed hosts actually bear separate species of the *glandarinus* group. Thus, mites from *Pyrrhula pyrrhula* (Linnaeus) were described as a separate species *P. simillimus* Černý, 1974, and mites from *Cocco-*

thraustes coccothraustes (Linnaeus) — as *P. fuchsi* Mironov, 1997, and the validity of *P. ampelidis* associated with *Bombycilla* species was restored (Černý 1974, Mironov 1997). It is also possible that other fringillid genera (*Carduelis*, *Eophona*, and *Loxia*) can bear separate species of the *glandarinus* group. In the course of the present study, I did not find in accessible collections any *Proctophyllodes* mite of the *glandarinus* group from *Carduelis cannabina* or related *Carduelis* species. Therefore I retain here *P. arcuaticaulis* Trouessart, 1886 as a synonym of *P. glandarinus*.

12. *Proctophyllodes miliariae* Gaud, 1957. This species was originally described from *Emberiza (Miliaria) calandra* (Emberizidae) in Morocco (Gaud 1957). Atyeo and Braasch (1966) collected *Proctophyllodes* specimens from three more buntings of the genus *Emberiza* in Western Europe, *E. citrinella*, *E. cia*, and *E. hortulana*, and also referred them to this species. As it was mentioned above, the re-investigation of materials from *Emberiza* species used by these authors (Gaud 1957; Atyeo and Braasch 1966) has shown that only *E. miliaria* bears *P. miliariae* while other *Emberiza* species actually bear *P. ciae*.

13. *Analges acanthurus* Giebel, 1871 **syn. n.** This species was described by Giebel (1871) from *Carduelis carduelis* (“*Stieglitz*” in the original paper) in the genus *Analges* Nitzsch, 1818. The description of this species is short and inaccurate and even mentions such features as “a pair of conically protruded ends” (opisthosomal lobes?), which are not observed in the genus *Proctophyllodes* at all. Haller (1877) synonymized this species with *P. truncatus* Robin, 1877, a common inhabitant of sparrows of the genus *Passer* (Passeridae). Atyeo and Braasch (1966) did not see the original description and did not know the type host; relying on the paper by Haller, these authors placed this species into a questionable synonym of *P. truncatus*. It is necessary to say that based on the original description it is even difficult to refer this species to any species group rather than to a particular species. Therefore, based only on the type host I treat here *P. acanthurus* (Giebel, 1871) **syn. n.** as a questionable synonym of *P. pinnatus* (Nitzsch, 1818), the common species associated with *Carduelis carduelis*, rather than *P. truncatus*, which is associated with sparrows.

14. *Proctophyllodes sinensis* Gaud et Atyeo, 1976 **stat. n.** This species was described as a subspecies of *P. truncatus* by Gaud and Atyeo (1976). Although it did not get a full description, morpho-

logical features given in that paper are suitable enough to consider it as a separate species. In males of *P. sisnensis*, the anal suckers are 1.2–1.5 times longer than wide, the aedeagus does not extend to the level of setae *g*; in females, the lobar region and terminal appendage are always normally developed and never display polymorphism in the structure of the opisthosoma. In *P. troncatus*, the anal suckers are two times longer than wide, the aedeagus extends to or slightly beyond the level of setae *g*; in females, the lobar region usually has strongly reduced opisthosomal lobes and terminal appendage; in some individuals, the terminal appendages can be completely lost and, in this case, setae *h3* are represented by macrosetae as *h2* (individuals with fully developed terminal appendages are quite rare).

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Table. Checklist of *Proctophyllodes* species

	Species	Species group	Type host	Host family	Original Reference
1	<i>P. acanthicaulus</i> Gaud, 1957	<i>stylifer</i>	<i>Muscicapa striata</i> (Pallas)	Muscicapidae	Gaud 1957
2	<i>P. africanus</i> Gaud, 1953	<i>pinnatus</i>	<i>Passer griseus</i> (Vieillot)	Passeridae	Gaud 1953
3	<i>P. ampelidis</i> (Buchholz, 1869) (1)	<i>glandarinus</i>	<i>Bombycilla garrulus</i> (Linnaeus)	Bombycillidae	Buchholz 1869
4	<i>P. analogus</i> Gaud et Fain, 1990	<i>mecistocaulus</i>	<i>Arizelocichla tephrolaemus</i> (Gray, GR)	Pycnonotidae	Gaud and Fain 1990
5	<i>P.anaxiphus</i> Atyeo et Braasch, 1966	<i>stylifer</i>	<i>Dicrurus adsimilis</i> (Bechstein)	Dicruridae	Aty eo and Braasch 1966
6	<i>P. antisogamus</i> Gaud et Mouchet, 1957	<i>weigoldi</i>	<i>Picathartes oreas</i> Reichenow	Picathartidae	Gaud and Mouchet 1957
7	<i>P. anthi</i> Vitzthum, 1922	<i>anthi</i>	<i>Anthus trivialis</i> (Linnaeus)	Motacillidae	Vitzthum 1922
	= <i>P. arcticus</i> Dubinin, 1952 syn. n. (2)	<i>anthi</i>	<i>Anthus cervinus</i> (Pallas)	Motacillidae	Dubinin 1952
8	<i>P. armatus</i> (Banks, 1909) (3)	<i>anthi</i>	<i>Melospiza melodia</i> (Wilson, A)	Emberizidae	Banks 1909
9	<i>P. aphyllus</i> Gaud et Mouchet, 1957	<i>stylifer</i>	<i>Dicrurus atripennis</i> (Swainson)	Dicruridae	Gaud and Mouchet 1957
10	<i>P. ateri</i> Fritsch, 1961	<i>stylifer</i>	<i>Periparus ater</i> (Linnaeus)	Paridae	Fritsch 1961
11	<i>P. attenuatus</i> Trouessart, 1899	<i>weigoldi</i>	<i>Psarocolius montezuma</i> (Lesson)	Icteridae	Trouessart 1899
12	<i>P. atyeoi</i> Černý, 1974	<i>caulifer</i>	<i>Chrysomus icterocephalus</i> (Linnaeus)	Icteridae	Černý 1974
13	<i>P. balati</i> Černý, 1978	<i>pinnatus</i>	<i>Panurus biarmicus ruscicus</i> (Brehm, CL)	Panuridae	Černý 1978
14	<i>P. balashovi</i> Chirov et Mironov, 1981	<i>weigoldi</i>	<i>Pyrrhonorax pyrrhonorax</i> (Linnaeus)	Corvidae	Chirov and Mironov 1981
15	<i>P. batis</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Batis capensis</i> (Linnaeus)	Platysteiridae	Aty eo and Braasch 1966
16	<i>P. breviquadratus</i> Atyeo et Braasch, 1966	<i>quadratus</i>	<i>Vireo solitarius</i> (Wilson, A) (Gmelin)	Vireonidae	Aty eo and Braasch 1966
17	<i>P. bruniceps</i> Putatunda, Gupta et Singh, 1976 (4)	<i>pinnatus</i>	<i>Emberiza bruniceps</i> Brandt	Emberizidae	Putatunda et al. 1976
18	<i>P. buettikeri</i> Černý, 1971	<i>musicus</i>	<i>Pyrrhonorax graculus</i> (Linnaeus)	Corvidae	Černý 1971
19	<i>P. caffer</i> Mironov et Kopij, 1996	<i>caulifer</i>	<i>Cossypha caffra</i> (Linnaeus)	Muscicapidae	Mironov et Kopij 1996
20	<i>P. calamospizae</i> Atyeo et Braasch, 1966	<i>pinnatus</i>	<i>Calamospiza melanocorys</i> Stejneger	Emberizidae	Aty eo and Braasch 1966
21	<i>P. canadensis</i> Atyeo et Braasch, 1966	<i>pinnatus</i>	<i>Sitta canadensis</i> Linnaeus	Sittidae	Aty eo and Braasch 1966
22	<i>P. capensis</i> Atyeo et Braasch, 1966	<i>glandarinus</i>	<i>Motacilla capensis</i> Linnaeus	Motacillidae	Aty eo and Braasch 1966
23	<i>P. capitatus</i> Atyeo et Braasch, 1966	<i>caulifer</i>	<i>Anthreptes malacensis</i> (Scopoli)	Nectarinidae	Aty eo and Braasch 1966
24	<i>P. carpodacinus</i> Chirov et Mironov, 1984	<i>pinnatus</i>	<i>Carpodacus erythrinus</i> (Pallas)	Fringillidae	Chirov and Mironov 1984
25	<i>P. cathari</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Catharus aurantirostris</i> (Hartlaub)	Turdidae	Aty eo and Braasch 1966
26	<i>P. caulifer</i> Trouessart, 1887	<i>caulifer</i>	<i>Luscinia svecica</i> (Linnaeus)	Muscicapidae	Trouessart 1887
27	<i>P. ceratophyllus</i> Atyeo et Braasch, 1966	<i>tricetratus</i>	<i>Zosterops conspicillatus</i> (Kittlitz)	Zosteropidae	Aty eo and Braasch 1966

28	<i>P. cetti</i> Badek, Mironov et Dabert, 2008 ?= <i>P. cettioides</i> Dubinin in: Dubinina and Kulakova, 1960 nom. nud. (5)	<i>pinnatus</i>	<i>Cettia cetti</i> (Temminck)	Cettiidae	Badek et al. 2008
29	<i>P. chichkanensis</i> Chirov et Mironov, 1983	<i>weigoldi</i>	<i>Myophonus caeruleus</i> (Scopoli)	Muscicapidae	Chirov and Mironov 1983
30	<i>P. chlorurae</i> Atyeo et Braasch, 1966 <i>P. ciae</i> Bauer, 1939 (6)	<i>pinnatus</i> <i>pinnatus</i>	<i>Pipilo chlorurus</i> (Audubon) <i>Emberiza cia</i> Linnaeus	Emberizidae Emberizidae	Atyeo and Braasch 1966 Bauer 1939
31	?= <i>P. profusus</i> Robin, 1877 (in: Robin and Mégnin) (7) = <i>P. mariaevallensis</i> De Rojas, Ubeda, Guevara et Ariza, 1989 syn. n. (8)	<i>pinnatus</i> <i>pinnatus</i>	<i>Emberiza citrinella</i> Linnaeus <i>Emberiza cia</i> Linnaeus	Emberizidae Emberizidae	Robin and Mégnin, 1877 De Rojas et al. 1989
32	<i>P. clavatus</i> Fritsch, 1961 = <i>P. robustipennis</i> Černý, 1961 ?= <i>Dermaleichus acredulinus</i> Koch, 1841 (9)	<i>pinnatus</i> <i>pinnatus</i> (?)	<i>Sylvia curruca</i> (Linnaeus) <i>Sylvia nisoria</i> (Bechstein) <i>Aegithalos caudatus</i> (Linnaeus)	Sylviidae Sylviidae Aegithalidae	Fritsch 1961 Černý 1961 Koch 1841
33	<i>P. coerebae</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Coereba flaveola</i> (Linnaeus)	Coerebidae	Atyeo and Braasch 1966
34	<i>P. corvinellae</i> Atyeo et Braasch, 1966	<i>stylifer</i>	<i>Corvinella melanoleuca</i> (Jardine)	Laniidae	Atyeo and Braasch 1966
35	<i>P. corvorum</i> Vitzthum, 1922	<i>weigoldi</i>	<i>Corvus corone</i> Linnaeus	Corvidae	Vitzthum 1922
36	<i>P. coyledon</i> Trouessart, 1899 (10) = <i>P. dontschevi</i> Vassilev, 1958 = <i>P. cardifolius</i> Fritsch, 1961	<i>caulifer</i> <i>caulifer</i> <i>caulifer</i>	<i>Toxostoma redvivium</i> (Gambel) <i>Phoenicurus ochruros</i> (Gmelin, SG) <i>Phoenicurus ochruros</i> (Gmelin, SG)	Mimidae Muscicapidae Muscicapidae	Trouessart 1899 Vassilev 1958 Fritsch 1961
37	<i>P. cribratus</i> De Alzuet et Brandetti, 1987	<i>musicus</i>	<i>Mimus saturninus modulator</i> (Gould)	Mimidae	De Alzuet and Brandetti 1987
38	<i>P. curtiglandarinus</i> Atyeo et Braasch, 1966	<i>glandarinus</i>	<i>Passer melanurus</i> (Muller, PLS)	Passeridae	Atyeo and Braasch 1966
39	<i>P. curtiphyllus</i> Atyeo et Braasch, 1966	<i>caulifer</i>	<i>Malacopteron cinereum</i> Eyton	Pellorneidae	Atyeo and Braasch 1966
40	<i>P. cyanerpis</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Cyanerpes cyaneus</i> (Linnaeus)	Thraupidae	Atyeo and Braasch 1966
41	<i>P. cyclarhis</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Cyclarhis gujanensis</i> (Gmelin)	Vireonidae	Atyeo and Braasch 1966
42	<i>P. danieli</i> Černý, 1988	<i>musicus</i>	<i>Pycnonotus leucogenys</i> (Gray, JE)	Pycnonotidae	Černý 1988
43	<i>P. dasyxiphus</i> Atyeo et Braasch, 1966	<i>musicus</i>	<i>Oriolus larvatus</i> Lichtenstein	Oriolidae	Atyeo and Braasch 1966
44	<i>P. dendroicae</i> Atyeo et Braasch, 1966	<i>quadratus</i>	<i>Setophaga castanea</i> (Wilson, A)	Parulidae	Atyeo and Braasch 1966
45	<i>P. detruncatus</i> Oudemans, 1905 = <i>P. separatifolius</i> Vitzthum, 1922	<i>detruncatus</i> <i>detruncatus</i>	<i>Corvus corone</i> Linnaeus <i>Corvus corone</i> Linnaeus	Corvidae Corvidae	Oudemans 1905 Vitzthum 1922
46	<i>P. dicurri</i> Atyeo et Braasch, 1966	<i>caulifer</i>	<i>Dicurus ludwigii</i> (Smith, A)	Dicuridae	Atyeo and Braasch 1966
47	<i>P. diglossae</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Diglossa baritula</i> Wagler	Emberizidae	Atyeo and Braasch 1966
48	<i>P. doleophyes</i> Gaud, 1957	<i>caulifer</i>	<i>Muscicapa striata</i> (Pallas)	Muscicapidae	Gaud 1957

49	<i>P. egglestoni</i> Spory, 1965	<i>anthi</i>	<i>Agelaius phoeniceus</i> (Linnaeus)	Icteridae	Spory 1965
50	<i>P. elegans</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Niltava sundara</i> Hodgson	Muscicapidae	Aty eo and Braasch 1966
51	<i>P. emberizae</i> Atyeo et Vassilev, 1964	<i>anthi</i>	<i>Emberiza melanocephala</i> Scopoli	Emberizidae	Aty eo and Vassilev 1964
52	<i>P. empidonax</i> Atyeo et Braasch, 1966	<i>stylifer</i>	<i>Empidonax hammondi</i> (Xantus de Vesey)	Tyrannidae	Aty eo and Braasch 1966
53	<i>P. euryurus</i> Atyeo et Braasch, 1966	<i>pinnatus</i>	<i>Alauda arvensis</i> Linnaeus	Alaudidae	Aty eo and Braasch 1966
54	<i>P. fuchsii</i> Mironov, 1997	<i>glandarinus</i>	<i>Coccothraustes coccothraustes</i> (Linnaeus)	Fringillidae	Mironov 1977
55	<i>P. gerigoniae</i> Mironov et Galloway, 2002	<i>stylifer</i>	<i>Gerygone igata</i> (Quoy et Gaimard)	Acanthizidae	Mironov and Galloway 2002
	<i>P. glandarinus</i> (Koch, 1841) *	<i>glandarinus</i>	<i>Garrulus glandarius</i> (Linnaeus)	Corvidae	Koch 1835–1844
56	?= <i>P. arcuaticaulis</i> Trouessart, 1887 (11)	<i>glandarinus</i>	<i>Carduelis cannabina</i> (Linnaeus)	Fringillidae	Trouessart 1887
	= <i>P. mirus</i> Černý, 1961	<i>glandarinus</i>	<i>Garrulus glandarius</i> (Linnaeus)	Corvidae	Černý 1961
57	<i>P. gularis</i> Atyeo et Braasch, 1966	<i>musicus</i>	<i>Icterus gularis</i> (Wagler)	Icteridae	Aty eo and Braasch 1966
58	<i>P. gymnomystacis</i> Atyeo et Braasch, 1966	<i>caulifer</i>	<i>Gymnomystax mexicanus</i> (Linnaeus)	Icteridae	Aty eo and Braasch 1966
59	<i>P. habiae</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Habia rubica</i> (Vieillot)	Cardinalidae	Aty eo and Braasch 1966
61	<i>P. helenae</i> Chirov et Mironov, 1984	<i>pinnatus</i>	<i>Montifringilla nivalis</i> (Linnaeus)	Passeridae	Chirov and Mironov 1984
60	<i>P. hippoideros</i> Gaud, 1958	<i>musicus</i>	<i>Saxicola rubetra</i> (Linnaeus)	Muscicapidae	Gaud 1958
62	<i>P. huitzilopochtlii</i> Atyeo et Braasch, 1966	<i>caulifer</i>	<i>Lampornis clemenciae</i> (Lesson)	Trochilidae	Aty eo and Braasch 1966
63	<i>P. hylocichlae</i> Atyeo et Braasch, 1966	<i>stylifer</i>	<i>Catharus guttatus</i> (Pallas)	Turdidae	Aty eo and Braasch 1966
64	<i>P. icteri</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Cacicus cela</i> (Linnaeus)	Icteridae	Aty eo and Braasch 1966
65	<i>P. icterina</i> Zullo et Manilla, 1992	<i>musicus</i>	<i>Hippolais icterina</i> (Vieillot)	Acrocephalidae	Zullo and Manilla 1992
66	<i>P. ischnocaulis</i> Gaud, 1953	<i>anthi</i>	<i>Lamprotornis chalybaeus</i> Ehrenberg	Sturnidae	Gaud 1953
67	<i>P. kratochvili</i> Černý, 1974	<i>detruncatus</i>	<i>Turdus leucomelas</i> Vieillot	Turdidae	Černý 1974
68	<i>P. legaci</i> Gaud, 1953	<i>stylifer</i>	<i>Chalcomitra senegalensis</i> (Linnaeus)	Nectariniidae	Gaud 1953
69	<i>P. leptocaulis</i> Gaud, 1953	<i>musicus</i>	<i>Lanius senator</i> Linnaeus	Laniidae	Gaud 1953
70	<i>P. leptodiscus</i> Mironov et Koptij, 1996	<i>pinnatus</i>	<i>Serinus gularis</i> (Smith, A)	Fringillidae	Mironov and Koptij 1996
71	<i>P. leucosticti</i> Chirov et Mironov, 1983	<i>glandarinus</i>	<i>Leucosticte brandti</i> Bonaparte	Fringillidae	Chirov and Mironov 1983
72	<i>P. locustellae</i> Chirov et Mironov, 1987	<i>stylifer</i>	<i>Locustella naevia</i> (Boddaert)	Locustellidae	Chirov and Mironov 1987
73	<i>P. longiphylus</i> Atyeo et Braasch, 1966	<i>caulifer</i>	<i>Icterus galbula</i> (Linnaeus)	Icteridae	Aty eo and Braasch 1966
74	<i>P. longiquadratus</i> Atyeo et Braasch, 1966	<i>quadratus</i>	<i>Setophaga striata</i> (Forster, JR)	Parulidae	Aty eo and Braasch 1966
75	<i>P. lordocaulis</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Caryothraustes polioaster</i> (Du Bus de Gisignies)	Cardinalidae	Aty eo and Braasch 1966
76	<i>P. ludovicianus</i> Atyeo et Braasch, 1966	<i>pinnatus</i>	<i>Lanius ludovicianus</i> Linnaeus	Laniidae	Aty eo and Braasch 1966
77	<i>P. luscinae</i> Burdejnaja et Kivanov, 2009	<i>caulifer</i>	<i>Luscinia luscinia</i> (Linnaeus)	Muscicapidae	Burdejnaja and Kivanov 2009
78	<i>P. macedo</i> Vitzthum, 1922	<i>musicus</i>	<i>Motacilla flava</i> Linnaeus	Motacillidae	Vitzthum 1922

79	<i>P. macrophallus</i> Černý, 1988	<i>pinnatus</i>	<i>Prunella collaris nipalensis</i> (Blyth)	Prunellidae	Černý 1988
80	<i>P. mclurei</i> Atyeo et Braasch, 1966	<i>thraupis</i>	<i>Garrulax erythrocephalus</i> (Vigors)	Leiothrichidae	Atyeo and Braasch 1966
81	<i>P. mecostocaulus</i> Gaud et Mouchet, 1957	<i>mecistocaulus</i>	<i>Chlorocichla simplex</i> (Hartlaub)	Pycnonotidae	Gaud and Mouchet 1957
82	<i>P. megaphyllus</i> Trouessart, 1885	<i>pinnatus</i>	<i>Prunella modularis</i> (Linnaeus)	Prunellidae	Trouessart 1885
83	<i>P. megathraupis</i> Atyeo et Braasch, 1966	<i>thraupis</i>	<i>Anisognathus igniventris tumulatus</i> (Du Bus)	Thraupidae	Atyeo and Braasch 1966
84	<i>P. melopyrrhae</i> Atyeo et Braasch, 1966	<i>musicus</i>	<i>Melopyrrha nigra</i> (Linnaeus)	Emberizidae	Atyeo and Braasch 1966
85	<i>P. mesocaulus</i> Mack-Fira et Cristea-Năstăsescu, 1968	<i>musicus</i>	<i>Phoenicurus phoenicurus</i> (Linnaeus)	Muscicapidae	Mack-Fira and Cristea-Năstăsescu 1968
86	<i>P. mexicanus</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Quiscalus mexicanus</i> (Gmelin)	Icteridae	Atyeo and Braasch 1966
87	<i>P. microcaulus</i> Gaud, 1957	<i>trictetratus</i>	<i>Galerida cristata</i> (Linnaeus)	Alaudidae	Gaud 1957
88	<i>P. microstylifer</i> Mironov sp. n.	<i>stylifer</i>	<i>Troglodytes troglodytes</i> (Linnaeus)	Troglodytidae	Present study
89	<i>P. miliariae</i> Gaud, 1957 (12)	<i>pinnatus</i>	<i>Emberiza calandra</i> Linnaeus	Emberizidae	Gaud 1957
90	<i>P. minlae</i> Atyeo et Braasch, 1966	<i>trictetratus</i>	<i>Minla cyanouroptera</i> (Hodgson)	Leiothrichidae	Atyeo and Braasch 1966
91	<i>P. mitophyllus</i> Gaud et Fain, 1990	<i>mecistocaulus</i>	<i>Eurillas latirostris</i> Strickland	Pycnonotidae	Gaud and Fain 1990
92	<i>P. motacillae</i> Gaud, 1953	<i>anthi</i>	<i>Motacilla aguimp</i> Dumont	Motacillidae	Gaud 1953
	= <i>P. motacillae</i> Fritsch, 1961	<i>anthi</i>	<i>Motacilla alba</i> Linnaeus	Motacillidae	Fritsch 1961
93	<i>P. musicus</i> Vitzthum, 1922	<i>musicus</i>	<i>Turdus philomelos</i> Brehm, CL	Turdidae	Vitzthum 1922
94	<i>P. myadestis</i> Atyeo et Braasch, 1966	<i>musicus</i>	<i>Myadestes obscurus</i> (Gmelin)	Turdidae	Atyeo and Braasch 1966
95	<i>P. neopinnatus</i> Atyeo et Braasch, 1966	<i>pinnatus</i>	<i>Loxia curvirostra</i> Linnaeus	Fringillidae	Atyeo and Braasch 1966
96	<i>P. noskovi</i> Mironov sp. n.	<i>pinnatus</i>	<i>Loxia leucoptera</i> (Gmelin)	Fringillidae	Present study
97	<i>P. occidentalis</i> Atyeo et Braasch, 1966	<i>pinnatus</i>	<i>Aphelocoma coerulescens</i> (Bosc)	Corvidae	Atyeo and Braasch 1966
98	<i>P. orientalis</i> Gaud, 1953	<i>pinnatus</i>	<i>Passer montanus malaccensis</i> Blyth	Passeridae	Gaud 1953
99	<i>P. orioli</i> Burdejnaja et Kivganov, 2011	<i>musicus</i>	<i>Oriolus oriolus</i> (Linnaeus)	Oriolidae	Burdejnaja and Kivganov
100	<i>P. ornatus</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Euplectes axillaris</i> (Smith, A)	Ploceidae	Atyeo and Braasch
101	<i>P. orthocaulus</i> Gaud, 1953	<i>weigoldi</i>	<i>Dicrurus adsimilis</i> (Bechstein)	Dicruridae	Gaud 1953
102	<i>P. pachycaulus</i> Gaud et Mouchet, 1957	<i>pinnatus</i>	<i>Chlorocichla simplex</i> (Hartlaub)	Pycnonotidae	Gaud et Mouchet
103	<i>P. pachynotus</i> Gaud et Mouchet, 1957	<i>detruncatus</i>	<i>Muscicapa comitata</i> (Cassin)	Muscicapidae	Gaud et Mouchet
104	<i>P. paramegaphyllus</i> Atyeo et Braasch, 1966	<i>pinnatus</i>	<i>Junco phaeonotus</i> Wagler	Emberizidae	Atyeo and Braasch 1966
105	<i>P. pari</i> Atyeo et Braasch, 1966	<i>stylifer</i>	<i>Baeolophus bicolor</i> (Linnaeus)	Paridae	Atyeo and Braasch 1966
106	<i>P. parisomae</i> Atyeo et Braasch, 1966	<i>caulifer</i>	<i>Myioparus plumbeus</i> (Hartlaub)	Muscicapidae	Atyeo and Braasch 1966
107	<i>P. parvilamellatus</i> Černý, 1974	<i>musicus</i>	<i>Philydor pyrrhodes</i> (Cabanis)	Furnariidae	Černý 1974
108	<i>P. paspalevi</i> Vassilev, 1959	<i>detruncatus</i>	<i>Cinclus cinclus aquaticus</i> (Bechstein)	Cinclidae	Vassilev 1959

109	<i>P. pennifer</i> Trouessart et Neumann, 1888	<i>caulifer</i>	<i>Cinclidium leucurum</i> (Hodgson)	Muscicapidae	Trouessart and Neumann 1888
110	<i>P. petroniae</i> Atyeo et Braasch, 1966	<i>tricetratus</i>	<i>Petronia supercilialis</i> (Blyth)	Passeridae	Atyeo and Braasch 1966
111	<i>P. pheuctici</i> Atyeo et Braasch, 1966	<i>pinnatus</i>	<i>Pheucticus melanocephalus</i> (Swainson)	Cardinalidae	Atyeo and Braasch 1966
112	<i>P. picae</i> (Koch, 1840)	<i>musicus</i>	<i>Pica pica</i> (Linnaeus)	Corvidae	Koch 1840
	?= <i>Acarus picae</i> Schrank, 1803 = <i>P. aquaticus</i> Vitzthum, 1922	(?) <i>musicus</i>	<i>Pica pica</i> (Linnaeus) <i>Anas acuta</i> Linnaeus	Corvidae Anatidae	Schrank 1803; Oudemans, 1937 Vitzthum 1922
113	<i>P. pinicola</i> Mironov sp. n.	<i>pinnatus</i>	<i>Pinicola enucleator</i> (Linnaeus)	Fringillidae	Present study
114	<i>P. pinnatus</i> (Nitzsch, 1818)	<i>pinnatus</i>	<i>Carduelis carduelis</i> (Linnaeus)	Fringillidae	Nitzsch 1818
	?= <i>Analges acanthurus</i> Giebel, 1871 syn. n. (13)	(?)	<i>Carduelis carduelis</i> (Linnaeus)	Fringillidae	Giebel 1871
115	<i>P. pittae</i> Atyeo et Braasch, 1966	<i>detruncatus</i>	<i>Pitta brachyura</i> (Linnaeus)	Pittidae	Atyeo and Braasch 1966
116	<i>P. plectrophenax</i> Mironov sp. n.	<i>pinnatus</i>	<i>Plectrophenax nivalis</i> (Linnaeus)	Calcariidae	Present study
117	<i>P. plegmatocaulus</i> Gaud, 1970	<i>caulifer</i>	<i>Myiagra caledonica</i> Bonaparte	Monarchidae	Gaud 1970
118	<i>P. polyandrius</i> Vitzthum, 1922	<i>pinnatus</i>	<i>Lanius excubitor</i> Linnaeus	Laniidae	Vitzthum 1922
119	<i>P. polyxenus</i> Atyeo et Braasch, 1966	<i>anthi</i>	<i>Passerella iliaca</i> (Merrem)	Emberizidae	Atyeo and Braasch 1966
120	<i>P. poubilani</i> Gaud, 1957	<i>pinnatus</i>	<i>Anthus trivialis</i> (Linnaeus)	Motacillidae	Gaud 1957
121	<i>P. psomocolaxis</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Molothrus oryzivorus</i> (Gmelin)	Icteridae	Atyeo and Braasch 1966
122	<i>P. pullizonatus</i> Atyeo et Braasch, 1966	<i>tricetratus</i>	<i>Dolichonyx oryzivorus</i> (Linnaeus)	Icteridae	Atyeo and Braasch 1966
123	<i>P. puniceus</i> Černý, 1988	<i>pinnatus</i>	<i>Carpodacus puniceus</i> (Blyth)	Fringillidae	Černý 1988
124	<i>P. quadratus</i> Atyeo et Braasch, 1966	<i>quadratus</i>	<i>Oreothypis peregrina</i> (Wilson, A)	Parulidae	Atyeo and Braasch 1966
125	<i>P. quadrisetosus</i> Atyeo et Braasch, 1966	<i>quadratus</i>	<i>Setophaga coronata</i> (Linnaeus)	Parulidae	Atyeo and Braasch 1966
126	<i>P. reguli</i> Gaud, 1957	<i>stylifer</i>	<i>Regulus ignicapilla</i> (Temminck)	Regulidae	Gaud 1957
127	<i>P. remizicola</i> Černý, 1979	<i>pinnatus</i>	<i>Remiz pendulinus</i> (Linnaeus)	Remizidae	Černý 1979
128	<i>P. rhynchocaulus</i> Gaud et Mouchet, 1957	<i>stylifer</i>	<i>Platysteira cyanea</i> (Muller, PLS)	Platysteiridae	Gaud and Mouchet 1957
129	<i>P. rubeculinus</i> (Koch, 1841)	<i>caulifer</i>	<i>Erethacus rubecula</i> (Linnaeus)	Muscicapidae	Koch 1835–1844
	= <i>P. mandulovi</i> Vassilev, 1960	<i>caulifer</i>	<i>Erethacus rubecula</i> (Linnaeus)	Muscicapidae	Vassilev 1960
130	<i>P. saltatoris</i> Atyeo et Braasch, 1966	<i>musicus</i>	<i>Saltator coerulescens</i> Vieillot	Thraupidae	Atyeo and Braasch 1966
131	<i>P. schoenicli</i> Atyeo et Braasch, 1966	<i>pinnatus</i>	<i>Emberiza schoeniclus</i> (Linnaeus)	Emberizidae	Atyeo and Braasch 1966
132	<i>P. schwerinensis</i> Černý, 1982	<i>pinnatus</i>	<i>Anthus spinoletta</i> (Linnaeus)	Motacillidae	Černý 1982
133	<i>P. scolopacinus</i> (Koch, 1842)	<i>weigoldi</i>	<i>Scolopax rusticola</i> Linnaeus	Scolopacidae	Koch 1835–1844
	= <i>P. scolopacis</i> Vitzthum, 1922	<i>weigoldi</i>	<i>Scolopax rusticola</i> Linnaeus	Scolopacidae	Vitzthum 1922
134	<i>P. serini</i> Atyeo et Braasch, 1966	<i>pinnatus</i>	<i>Serinus canicollis</i> (Swainson)	Fringillidae	Atyeo and Braasch 1966
135	<i>P. sialiae</i> Atyeo et Braasch, 1966	<i>musicus</i>	<i>Sialia mexicana</i> Swainson	Turdidae	Atyeo and Braasch 1966

136	<i>P. similimus</i> Černý, 1971	<i>glandarinus</i>	<i>Pyrrhula pyrrhula</i> (Linnaeus)	Fringillidae	Černý 1971
137	<i>P. sinensis</i> Gaud et Atyeo, 1976 stat. n. (14)	<i>pinnatus</i>	<i>Passer montanus malaccensis</i> Dubois, AJC	Passeridae	Gaud and Atyeo 1976
138	<i>P. spini</i> Atyeo et Braasch, 1966	<i>pinnatus</i>	<i>Spinus tristis</i> (Linnaeus)	Fringillidae	Aty eo and Braasch 1966
139	<i>P. sporophylae</i> Atyeo et Braasch, 1966	<i>anthi</i>	<i>Sporophila torqueola</i> (Bonaparte)	Emberizidae	Aty eo and Braasch 1966
140	<i>P. stachyris</i> Atyeo et Braasch, 1966	<i>tricetratus</i>	<i>Stachyris poliocephala</i> (Temminck)	Timaliidae	Aty eo and Braasch 1966
141	<i>P. stenophyllus</i> Gaud et Mouchet, 1957	<i>mecistocaulus</i>	<i>Pycnonotus barbatus</i> (Desfontaines)	Pycnonotidae	Gaud and Mouchet 1957
142	<i>P. stoddardi</i> Atyeo et Braasch, 1966	<i>caulifer</i>	<i>Vireo olivaceus</i> (Linnaeus)	Vireonidae	Aty eo and Braasch 1966
143	<i>P. stylifer</i> (Buchholz, 1869)	<i>stylifer</i>	<i>Cyanistes caeruleus</i> (Linnaeus)	Paridae	Buchholz 1869
144	<i>P. sylviae</i> Gaud, 1957	<i>pinnatus</i>	<i>Sylvia atricapilla</i> (Linnaeus)	Sylviidae	Gaud 1957
145	<i>P. tanagrae</i> Atyeo et Braasch, 1966	<i>stylifer</i>	<i>Euphonia musica</i> (Gmelin)	Fringillidae	Aty eo and Braasch 1966
146	<i>P. tchagrae</i> Atyeo et Braasch, 1966	<i>caulifer</i>	<i>Tchagra senegalus</i> (Linnaeus)	Malacoctidae	Aty eo and Braasch 1966
147	<i>P. tenericaulus</i> Atyeo et Vassilev, 1964	<i>musicus</i>	<i>Turdus viscivorus</i> Linnaeus	Turdidae	Aty eo and Vassilev 1964
148	<i>P. thraupis</i> Atyeo et Braasch, 1966	<i>thraupis</i>	<i>Thraupis abbas</i> (Deppe)	Thraupidae	Aty eo and Braasch 1966
149	<i>P. tiaris</i> Atyeo et Braasch, 1966	<i>musicus</i>	<i>Tiaris olivaceus</i> (Linnaeus)	Emberizidae	Aty eo and Braasch 1966
150	<i>P. tricetratus</i> Atyeo et Braasch, 1966	<i>tricetratus</i>	<i>Spiza americana</i> (Gmelin)	Cardinalidae	Aty eo and Braasch 1966
151	<i>P. trisetosus</i> Ewing et Stover, 1915	<i>quadratus</i>	<i>Sturnella magna</i> (Linnaeus)	Icteridae	Ewing and Stover 1915
152	<i>P. troglodytis</i> Atyeo et Braasch, 1966	<i>musicus</i>	<i>Thryomanes bewickii</i> (Audubon)	Troglodytidae	Aty eo and Braasch 1966
153	<i>P. truncatus</i> Robin, 1877 (in: Robin and Mégnin) = <i>P. passeris</i> Vitzthum, 1922	<i>pinnatus</i> <i>pinnatus</i>	<i>Passer domesticus</i> (Linnaeus) <i>Passer domesticus</i> (Linnaeus)	Passeridae Passeridae	Robin and Mégnin 1877 Vitzthum 1922
154	<i>P. valchukae</i> Mironov, Dabert J et Dabert M, 2012	<i>tricetratus</i>	<i>Aegithalos caudatus</i> (Linnaeus)	Aegithalidae	Mironov et al. 2012
155	<i>P. vassilevi</i> Atyeo et Braasch, 1966	<i>caulifer</i>	<i>Acrocephalus palustris</i> (Bechstein)	Acrocephalidae	Aty eo and Braasch 1966
156	<i>P. vegetans</i> Trouessart, 1899	<i>pinnatus</i>	<i>Carpodacus erythrinus</i> (Pallas)	Fringillidae	Trouessart 1899
157	<i>P. vesca</i> Atyeo et Braasch, 1966	<i>stylifer</i>	<i>Sialia currucoides</i> (Bechstein)	Turdidae	Aty eo and Braasch 1966
158	<i>P. vitzthumi</i> Fritsch, 1961 = <i>P. sittae</i> Černý, 1961	<i>detruncatus</i> <i>detruncatus</i>	<i>Sitta europaea</i> Linnaeus <i>Sitta europaea</i> Linnaeus	Sittidae Sittidae	Fritsch 1961 Černý 1961
159	<i>P. volgini</i> Arutunjan et Mironov, 1983	<i>glandarinus</i>	<i>Montifringilla nivalis</i> (Linnaeus)	Passeridae	Arutunjan and Mironov 1983
160	<i>P. weigoldi</i> Vitzthum, 1922	<i>weigoldi</i>	<i>Turdus merula</i> Linnaeus	Turdidae	Vitzthum 1922
161	<i>P. xenopsis</i> Atyeo et Braasch, 1966	<i>weigoldi</i>	<i>Xenops minutus</i> (Sparrman)	Furnariidae	Aty eo and Braasch 1966

* — type species, “=” — synonym, “?=” — questionable synonym