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## THE FEATHER MITES OF THE FAMILY PROCTOPHYLLODIDAE (ACARI, SARCOPTIFORMES) FROM NEPALESE BIRDS\*

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**Abstract.** Eight species of birds of the families Fringillidae (3), Motacillidae (2), Prunellidae (1), Pycnonotidae (1) and Turdidae (1) were found to be parasitized by 8 species of the genus *Proctophyllodes*, 3 of them being new to science: *P. danieli* sp. n. from *Pycnonotus leucogenys*, *P. macrophallus* sp. n. from *Prunella collaris* and *P. puniceus* sp. n. from *Pyrhospiza punicea*. Other species recorded are *P. anthi*, *P. cotyledon*, *P. glandarinus*, *P. leucosticti* and *P. aff. poublani*. All hosts were collected in the region of the Barun river valley in East Nepal in the altitude of 3,600–4,900 m a. s. l.

Until now, only two determined species of this mite group have been reported from Nepalese birds: *Falculifer rostratus* Buchholz and *Montesauria leioplax* (Gaud et Mouchet), besides three *Proctophyllodes* sp. and one *Proterothrix* sp. (Mitchell and Dick 1978). Our contribution brings new data on feather mites from this territory.

### MATERIALS AND METHODS

During the Czechoslovak high-mountains Himalaya expedition to East Nepal in March–May 1973 the zoological-parasitological investigations were carried out in the region of the Barun river valley (87°22' East, 27°42' North). A detailed description of the localities and their characteristics are given in the paper by Daniel and Hanzák (1985). A total of 94 bird specimens belonging to 16 families and 28 species were collected and examined for the presence of parasites (Daniel and Hanzák, in litt.). The birds were mostly shot and only several specimens were caught in ornithological nets. Twenty three of them harboured feather mites. The mites were mounted in Swan's medium. All measurements in the descriptions are given in  $\mu\text{m}$ .

### RESULTS

The family Proctophyllodidae was represented only by 8 members of the genus *Proctophyllodes* Robin. The types of the new species are deposited in the collections of the Institute of Parasitology, Czechoslovak Academy of Sciences, České Budějovice.

#### *Proctophyllodes anthi* Vitzthum, 1922

Material examined: 28♂♂ 20♀♀ 22 NN from *Anthus sylvanus* (Hodgson), (Motacillidae), Yanle Khalka, about 3,600 m, 4. 4. 1973.

This mite is known to parasitize, among others, various members of the genus *Anthus* (Atyeo and Braasch 1966). *A. sylvanus* represents a new host species.

\* Scientific results of the Czechoslovak expeditions to the Hindu Kush and Himalaya (Communication No. 29).

***Proctophyllodes cotyledon* Trouessart, 1899**

**Material examined:** 3♂♂ 2♀♀ 2NN from *Phoenicurus frontalis* (Vigors), (Turdidae), Yanle Khalka, about 3,600 m, 10. 4. 1973; 19♂♂ 30♀♀ 9NN from the same host species, Tadosa, about 4,000 m, 18. 4. 1973; 1♂ 2♀♀ from the same host species, front of the Barun glacier, about 4,900 m, 22. 4. 1973; 5♀♀ from the same host species, near Shershon, about 4,800 m, 4. 5. 1973.

The mite is known from various members of the families Turdidae, Mimidae and Timaliidae including the genus *Phoenicurus* (Atyeo and Braasch 1966). *P. frontalis* represents a new host species.

***Proctophyllodes danieli* sp. n.**

Fig. 1

**Material examined:** Holotype (♂ — Coll. No. PaŮ ČSAV 1676) and paratypes: 7♂♂ 4♀♀ 6NN from *Pycnonotus l. leucogenys* (Gray), (Pycnonotidae), Tadosa, about 4,000 m, 19. 4. 1973; 6♂♂ 8♀♀ 6NN from the same host species, Yanle Khalka, about 3,600 m, 10. 4. 1973.

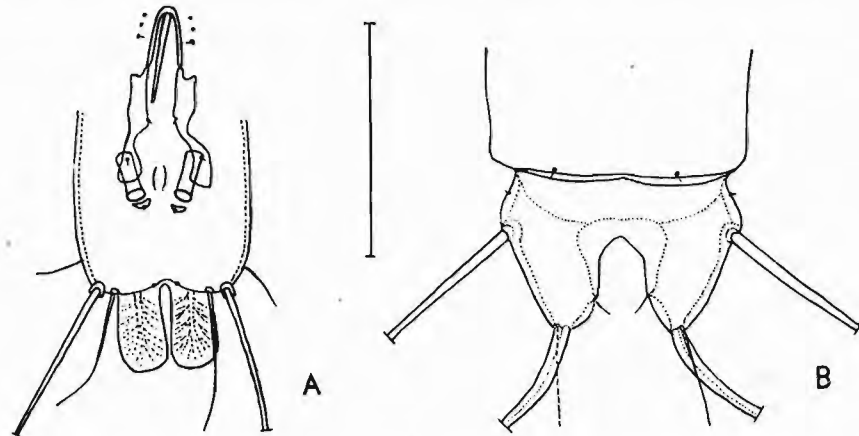


Fig. 1. *Proctophyllodes danieli* sp. n., body terminus. A — male, ventral view, B — female, dorsal view. Section equals 100  $\mu$ m.

**Male (holotype):** Length, excluding lamellae, 307, width 138. Propodosomal shield  $89 \times 111$ , lateral margins entire, without lacunae, with external vertical setae. Distance between setae *sce* 53. Humeral shields well developed and bearing setae *l*<sub>1</sub> at extreme anteromedial angles, setae *sh* lanceolate,  $16 \times 4$ . Hysterosomal shield  $191 \times 114$ , anterior margin straight, without lacunae and ventrolateral extensions, supranal concavity 50 long. Lamellae  $34 \times 21$ , internal margins approximate, with pinnate venation. Epimerites I V-shaped, without lateral extensions, epimerites without surface fields. Pregenital apodeme absent, genital arch narrow, at level of coxae IV, genital discs separate. Genital organ extending beyond tips of genital arch but not reaching anterior pair of opisthogastric setae (*c*<sub>3</sub>), genital sheath not bifid distally. Opisthogastric shields separate and bearing 2 pairs of setae. (In some specimens the opisthogastric shield may be fragmented into 2 parts). Adanal discs circular,  $22 \times 9$ . Adanal accessory glands present.

**Female (allotype):** Length, excluding terminal appendages, 459, width 170. Propodosomal shield  $103 \times 140$ , lateral margins entire, without lacunae, with external vertical setae. Distance between setae *sce* 77. Humeral shields as in male. Setae *sh* lanceolate,  $22 \times 5$ . Hysterosoma with lobes and with terminal appendages. Anterior shield

$256 \times 126$ , without lacunae, anterior margin nearly straight, lateral margins darkly coloured, supranal concavity present. Lobar region articulated with anterior region, 71 long. Conjunctiva very narrow. Setae *d*<sub>4</sub> inserted on posterior edge of anterior shield, separated by 54. Lobes normal, cleft diverging posteriorly, 41 deep. Setae *d*<sub>5</sub> about 3/4 length of terminal appendages, setae *l*<sub>5</sub> nearly equal to them. Epimerites I V-shaped but not pointed caudally, without lateral extensions, epimerites without surface fields.

The new species belongs to the *musicus* group of Atyeo and Braasch (1966) and by the presence of adanal accessory glands in males it stands close to *P. macedo* Vitzthum from motacillids. The male of *P. danieli* sp. n. differs from it in having relatively wider propodosomal shield, epimerites I V-shaped and narrower genital arch. The female differs in having relatively wider propodosomal shield, diverging cleft, setae *d*<sub>4</sub> inserted on posterior edge of anterior shield and developed supranal concavity.

Until now, only *P. stenophyllus* Gaud et Mouchet has been recorded from several *Pycnonotus* species living in Africa and Malaysia (Atyeo and Braasch 1966). It belongs to the *glandarinus* group and is morphologically quite different.

**Etymology.** The new species is dedicated to Dr. M. Daniel, D.Sc., acarologist and pioneer worker of Czechoslovak high mountains zoological-parasitological explorations.

***Proctophyllodes glandarinus* (Koch, 1841)**

**Material examined:** 9♂♂ 22♀♀ 11NN from *Mycerobas c. carnipes* (Hodgson), (Fringillidae), Tadosa, about 4,000 m, 17. 4. 1973.

This mite is known to parasitize a broad spectrum of hosts including the closely related *Coccothraustes coccothraustes*. *M. carnipes* represents a new host species.

***Proctophyllodes leucosticti* Chirov et Mironov, 1983**

**Material examined:** 1♂ 1♀ from *Leucosticte brandti* (Gould), (Fringillidae), near Shershon, about 4,800 m, 29. 4. 1973.

*L. brandti* is the type host of this species. It was further recorded from *L. nemoricola*, *Acanthis flavirostris* and *Emberiza calandra* (Chirov and Mironov 1983).

***Proctophyllodes macrophallus* sp. n.**

Fig. 2

**Material examined:** Holotype (♂ — Coll. No. PaŮ ČSAV 1678) and paratypes: 4♂♂ 1♀ 5NN from *Prunella collaris nipalensis* (Blyth), (Prunellidae), Shershon, about 4,600 m, 28. 4. 1973; 2♂♂ 8♀♀ 4NN from the same host species and locality, 28. 4. 1973.

**Male (holotype):** Length, excluding lamellae, 327, width 161. Propodosomal shield  $89 \times 98$ , lateral margins entire, without lacunae and setae *ve*, distance between setae *sce* 69. Humeral shields moderately developed, bearing setae *l*<sub>1</sub> at extreme anteromedial angles. Setae *sh* lanceolate,  $19 \times 4$ . Hysterosomal shield 166 long, maximal width 106 in its posterior half, anterior margin deeply concave, without lacunae and ventrolateral extensions, supranal concavity 45 long. Lamellae  $111 \times 49$ , internal margins approximate, with pinnate venation. Setae *l*<sub>5</sub> dilated. Epimerites I U-shaped, with weak connective, without lateral extensions, epimerites without surface fields. Genital discs united, broad genital arch at level of coxae IV. Setae *c*<sub>2</sub> situated on epimerites IVa. Genital sheath extremely broad, sharply tapering and extending to the level of setae *c*<sub>3</sub>. Opisthogastric shield without incision between setae *c*<sub>3</sub>, sclerotization between its anterior and lateral parts weaker. Measurements (after Atyeo

and Braasch 1966): a 11, b 7, c 32, d 108, e  $42 \times 19$  at maximal width. Genital discs  $26 \times 17$ .

**Female** (allotype): Length, excluding terminal appendages, 438, width 182. Propodosomal shield  $105 \times 116$ , lateral margins entire, without lacunae and setae *ve*, distance between setae *sce* 83. Humeral shields well developed, bearing setae *l*<sub>1</sub> at extreme anteromedial angles. Setae *sh* lanceolate,  $23 \times 4$ . Hysterosoma with lobes and terminal appendages. Hysterosomal shield  $233 \times 118$ , anterior margin concave, posterior margin with two parallel short bent sclerotizations, without lacunae and supranal concavity, with two converging elongated ellipsoidal clear fields close to posterior margin. Lobar region articulated with anterior shield, 49 long. Setae *d*<sub>4</sub> inserted on conjunctiva and separated by 26. Cleft broadly diverging, 33 long. Setae *d*<sub>5</sub> about 3/4 length of terminal appendages, setae *l*<sub>5</sub> slightly longer than terminal appendages. Epimerites as in male.

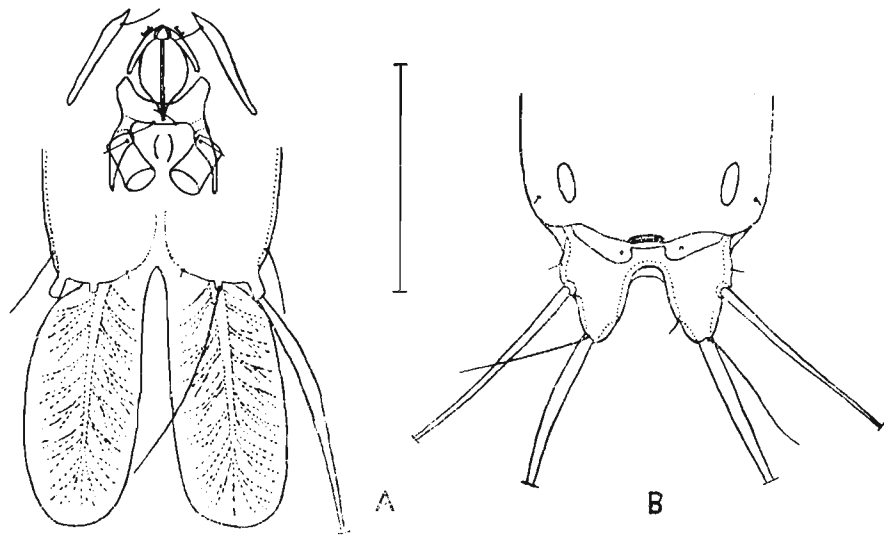


Fig. 2. *Proctophyllodes macrophallus* sp. n., body terminus. A — male, ventral view, B — female, dorsal view. Section equals 100  $\mu$ m.

The new species belongs to the *pinnatus* group to the species without incision of opisthogastric shield between setae *c*<sub>3</sub>. It differs from other members by its characteristic genital organ in males and posterior sclerotizations on hysterosomal shield in females.

*P. megaphyllus* Trt. is known from the genus *Prunella* (Atyco and Braasch 1966). Černý (1971) found on *P. collaris* the species *P. vegetans* Trt. *P. macrophallus* sp. n. differs from both species quite distinctly in the typical form of genital sheath in males.

**Etymology.** The species has been named after its very wide genital organ.

#### *Proctophyllodes* aff. *poublani* Gaud, 1957

**Material examined:** 6 ♂♂ 3 ♀♀ from *Anthus roseatus* Blyth (Motacillidae), near Shershon, about 4,800 m, 4. 5. 1973.

*P. poublani* was described from *Anthus trivialis*. Later, a similar species *P. schweri-nensis* was described from *Anthus spinoletta* by Černý (1982). Our specimens are in their characters intermediate between these two taxa. Further material is needed to know the variability of both mentioned species and to establish the correct systematic position of the mites from *A. roseatus*.

#### *Proctophyllodes puniceus* sp. n.

Fig. 3

**Material examined:** Holotype (♂ — Coll. No. PaÚ ČSAV 1677) and paratypes: 23 ♂♂ 48 ♀♀ 4 NN from *Pyrhospiza p. punicea* Blyth (Fringillidae), Shershon, about 4,600 m, 27. 4. 1973.

**Male** (holotype): Length, excluding lamellae, 353, width 183. Propodosomal shield  $89 \times 101$ , lateral margins entire, without lacunae and setae *ve*, distance between setae *sce* 69. Humeral shields weakly developed, setae *l*<sub>1</sub> at close proximity of their anteromedial angles. Setae *sh* spiculiform, 19 long. Hysterosomal shield 203 long, maximal width 117 in its posterior half, anterior margin concave, without lacunae and ventrolateral extensions, supranal concavity 51 long. Lamellae  $99 \times 59$ , internal margins approximate (slightly overlapping in some specimens), with pinnate venation.

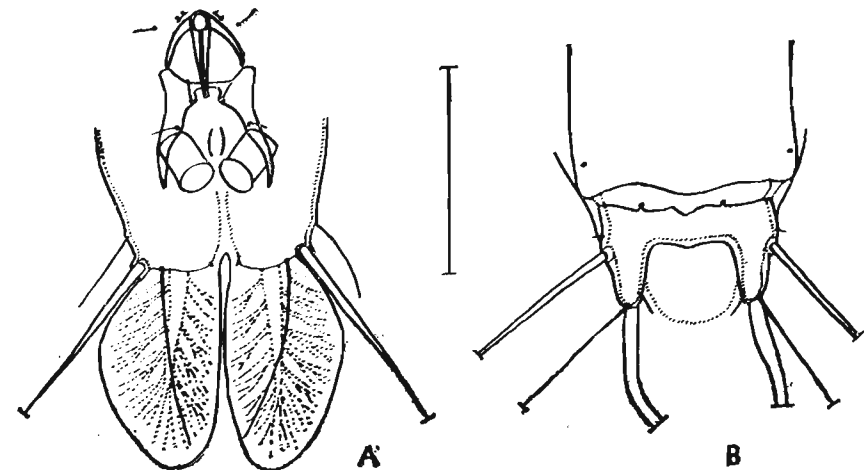


Fig. 3. *Proctophyllodes puniceus* sp. n., body terminus. A — male, ventral view, B — female, dorsal view. Section equals 100  $\mu$ m.

Epimerites I U-shaped, with weak connective, without lateral extensions, epimerites without surface fields. Genital discs united, genital arch at level of coxae IV. Genital sheath tapering and extending to the level of setae *c*<sub>3</sub> (or slightly before in some paratypes). Measurements: a 15, b 12, c 35, d 121, e  $45 \times 9$ . Adanal discs  $30 \times 20$ .

**Female** (allotype): Length, excluding terminal appendages, 492, width 117. Propodosomal shield  $106 \times 122$ , lateral margins entire, without lacunae and setae *ve*, distance between setae *sce* 88. Humeral shields well developed, bearing setae *l*<sub>1</sub> at extreme anteromedial angles. Setae *sh* narrowly lanceolate, 21 long. Hysterosoma with lobes and terminal appendages. Hysterosomal shield  $244 \times 116$ , anterior margin concave, posterior margin sinuate, without lacunae and supranal concavity. Lobar region articulated with anterior shield, 52 long. Sclerotization of lobar shield with median incision, setae *d*<sub>4</sub> protruding from its anterior margin (in some paratypes situated on conjunctiva), separated by 38. Cleft nearly parallel-sided, much broader than deep,

length 28, width at bottom 39. Setae  $d_2$  nearly as long as terminal appendages, setae  $l_1$  distinctly longer. Epimerites as in male.

The new species belongs to the *pinnatus* group and resembles *P. vegetans* Trt. and *P. pinnatus* (Nitzsch) as keyed in Atyeo and Braasch (1966). The male of *P. puniceus* sp. n. differs from both species in having short and wide adanal discs and greater distance between rows of opisthogastric setae. *P. vegetans* has lamellae more slender and genital organ extending beyond setae  $c_3$ , *P. pinnatus* has shorter lamellae. The female of *P. puniceus* sp. n. has differently formed lobar region with broad and short cleft. *P. vegetans* is known to parasitize several species of *Carpodacus* from the USA and China (Atyeo and Braasch 1966) and *P. puniceus* sp. n. may be considered as closely related to it. *C. mexicanus* has been reported as host of *P. pinnatus* by the same authors.

Another species of the *pinnatus* group, *P. carpodacinus*, was recently described from *C. erythrinus* by Chirov and Mironov (1984). *P. puniceus* sp. n. differs from it in spiculiiform setae  $sh$ , longer lamellae and shorter genital sheath in males and in shorter lobar region with cleft broader than long in females.

**Etymology.** The new species has been named after its host.

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#### ПЕРЬЕВЫЕ КЛЕЩИ СЕМЕЙСТВА PROCTOPHYLLODIDAE (ACARI, SARCOPTIFORMES) ПТИЦ НЕПАЛА

В. Черны

**Резюме.** С 8 видов непальских птиц относящихся к семействам Fringillidae (3), Motacillidae (2), Prunellidae (1), Ruyonotidae (1) и Turdidae (1) собрано 8 видов клещей рода *Proctophylloides*. Три вида описываются как новые для науки: *P. danieli* sp. n. с *Ruyonotus leucogenys*, *P. macrophallus* sp. n. с *Prunella collaris* и *P. puniceus* sp. n. с *Pyrrhospiza punicea*. Обнаружены также виды *P. anthi*, *P. cotyledon*, *P. glandarinus*, *P. leucosticti* и *P. aff. roubilani*. Все хозяева были отловлены в области долины реки Барун во Восточном Непале на высоте 3600—4900 м н. у. м.

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