SIPHONAPTERA COLLECTED BY DR. M. DANIEL IN NEPAL

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Abstract. During the Third Czechoslovak Expedition to the Himalayas, in the spring of 1973, Dr. M. Daniel collected 244 specimens of fleas belonging to 19 different taxa, including four hitherto undescribed ones, from mammals and birds in the Barun Khola valley at the foot of the Makalu mountain just south-east of Mt. Everest. Data and comments are given in this paper for the fleas collected and the new taxa are described.

From mid-September to mid-October 1972, 54 specimens of fleas, representing eight species, were collected by the Fourth Yugoslav Alpine Himalayan Expedition on the Bhararate and the Khumbakarna Himal, respectively about 30 and 31 km south-east of Mt. Everest. Dr. S. Brelih’s report (1975) on these Siphonaptera is prefaced by an introduction providing very useful geological and ecological data for the upper part of the Barun valley (the region concerned). Six months later, in the period 26. III to 25. V. 1973, the Third Czechoslovak Expedition to the Himalayas, organized by the Czechoslovak Physical Training Central Committee, concentrated its activities in the same region at various altitudes in the Barun Khola [Barun river] valley (27° 47’ N 87° 10’ E) south-east of the Makalu mountain (which rises to 8,481 m), i.e. about 20 km south-east of Chomolungma (Mt. Everest), Nepal. Dr. Milan Daniel, with his wide experience in both parasitology and mountaineering, had fortunately been assigned to the expedition group in order to carry out field studies in parasitology and zoology. Under the difficult conditions which are usually encountered in such terrain, Dr. Daniel was successful in obtaining 144 mammals and 90 birds from which he removed, amongst others, 244 fleas representing 19 different forms, four of which are described below for the first time, bringing the total number of species of fleas known to occur in Nepal to 73.

The holotypes and allotypes of the new taxa are in the flea collection of the Institute of Parasitology of the Czechoslovak Academy of Sciences, Prague; paratypes in same collection and in that of the British Museum (Natural History), London.

We are most grateful to Dr. M. Daniel for having, once again, obtained material of fleas from rather inaccessible regions, thereby significantly enhancing our knowledge of faunistics, host-relationships and ecology of these potential and actual vectors of various pathoergonts.

*) Scientific results of the Czechoslovak expeditions to the Hindu Kush and Himalaya. Communication No. 23.

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COLLECTING LOCALITIES (with enumeration of trapping results)

Phematun (a native name), 3450 m, Barun Kholo valley, in a zone of humid coniferous forest with rhododendrons —

(a) terrace on right bank of river, between boulders:


(b) left bank of river, edge of wood with uprooted trees and wild roses:


(c) old small landslade in a wood, overgrown with grass and moss:


(d) terrace on left bank of river, between boulders:


Yanle Khalka, 3600 m, Barun Kholo valley, within an area of humid coniferous forest with rhododendrons and pastures —

(e) a dense fir forest forming a canopy, without undergrowth, soil completely covered with moss and rotten tree trunks:


(f) between boulders on a plateau:


10. IV — *Pitymys sikimensis* (3): 1♀ 4♂ *Amphiposylla tuta gregorii*. (Without fleas: 1 *Pitymys sikemensis*, 4 *birds*.)

(g) scree cone overgrown with shrubs and rhododendrons:


Tadosa, ± 3900 m, Barun Kholo valley, a gorge at the upper timber line with a few groves of dwarfed fires and bushy rhododendrons —

(h) shrubs in open space:


(i) rocks, overgrown with shrubs, along a small brook:
16. IV — *Pitymys sikimensis* (1): 1 ♀ *Neosylla pageae*, 1 ♀ *Genoneopsylla kunaveri*, 4 ♀ *Amphi-
psylla tuta gregorii*, 1 ♀ *Callopsylla dolabella*. (Without fleas: 2 birds.)

A locality at — 4000 m in the Barun Kholo valley —

(j) plateau with boulders, overgrown with clumps of grass among *Tsuga*:
17. IV — *Pitymys sikimensis* (4): 2 ♀ 12 ♂ *Amphi-
psylla tuta gregorii*. (Without fleas: 2 *Pitymys sikimensis*, 4 birds.)
18. IV — *Pitymys sikimensis* (2): 1 ♀ 3 ♂ *Amphi-
psylla tuta gregorii*. (Without fleas: 1 *Pitymys sikimensis*, 2 birds.)
19. IV — *Pitymys sikimensis* (2): 1 ♀ *Neosylla pageae*, 1 ♀ *Amphi-
psylla tuta gregorii*; bird’s nest in shrub: 1 ♀ 6 ♂ *Ceratophyllus enedae tjanschkani*. (Without fleas: 1 *Pitymys sikimensis*, 2 birds.)

Base camp at 4900 m, at the foot of a huge fossil moraine of the Upper Barun glacier; upper limit of zone of alpine meadows —

(k) moraine above camp:
21. IV — *Alticola stoliczkanus* (1): 1 ♀ *Amphi-
psylla orthogonia*, 3 ♀ 3 ♂ *Callopsylla sparsilis
sparsilis*. (Without fleas: 3 *Alticola stoliczkanus*, 1 *Upupa epops*, 5 other birds.)
22. IV — *Alticola stoliczkanus* (3): 1 ♀ 3 ♂ *Callopsylla sparsilis sparsilis*, 4 ♀ *Amphi-
psylla orthogonia*. (Without fleas: 4 birds.)
1 *Tetraogallus tibetanus aquilonifer* and 13 other birds.)

Shershon, 4500 m, between slope of Peak IV and fossil moraine —

(l) a typical zone of alpine meadows:
23. IV — *Pitymys sikimensis* (1): 1 ♀ *Neosylla pageae*, 1 ♀ 3 ♀ *Amphi-
psylla tuta gregorii*, 2 ♀ *Cal-
lopsylla dolabella*. (Without fleas: 8 birds.)

Between Shershon and base camp, 4800 m —

(m) sere below slope of Peak IV, covered with shrubs (small rhododendrons):
29. IV — *Pitymys sikimensis* (1): 1 ♀ 7 ♂ *Amphi-
psylla tuta gregorii*. (Without fleas: 1 *Pitymys sikimensis*, 14 birds.)

(n) slope against base camp, 4900 m, completely lacking any higher vegetation:
10. V — *Alticola stoliczkanus* (1): 1 ♀ *Amphi-
psylla orthogonia*. (Without fleas: 1 *Alticola stoliczkanus*,
1 *Ochotona roylei*, 2 birds.)

(o) Bunkin

**HOST — FLEA LIST** (names of fleas which occurred accidentally on the host are placed in parentheses)

*Soriculus caudatus soluensis* Gruber

*Doratopsylla coreana araea*, *Palaeopsylla tauberi makaluensis*

*Soriculus nigrescens centralis* Hinton

*Doratopsylla coreana araea*, *Hystrichopsylla synaptica*, *Palaeopsylla aporema*, *P. da-
nieli*, *P. tauberi makaluensis*

*Pitymys sikimensis* (Hodgson)

*(Amphalius clarus), Amphi-
psylla tuta gregorii, Callopsylla dolabella, Frontopsylla
spadix nepalensis, Genoneopsylla kunaveri, (Geusibia triangularis), Neosylla pageae,
(Palaepsylla aporema), (P. tauberi makaluensis), Rhadinopsylla dahurica vicina, Ste-
nonopia himalayana*

*Alticola stoliczkanus* (Blanford)

*Amphi-
psylla orthogonia*, *Callopsylla sparsilis sparsilis*

*Ochotona roylei* (Ogilby)

*Amphalius clarus, Geusibia triangularis, Rhadinopsylla sp. indet.*

*Homo sapiens* L.

*Pulex irritans*
Ithaginis cruentus cruentus (Hardwicke)
  Ceratophyllus enefdeae tjanshani
Nest of unidentified bird
  Ceratophyllus enefdeae tjanshani

Hystrichopsyllidae
Hystrichopsyllinae
Hystrichopsylla synaptica Smit, 1975

Yanle Khalka (e), 4. IV, Soricus nigrescens centralis: 1 ♀; (f), 7. IV, same host: 1 ♀.

Hitherto known from the female holotype collected at Syng Gyong, 28. 10 N 85.22 E, Nepal, from Soricus caudatus. The male still remains to be described. Whereas the genal epenodium of the holotype consists of 10 spines on each side of the head, the two females from Yanle Khalka show that there are actually 9 or 10 spines in this epenodium. Likewise, the number of spines in the pronotal epenodium of the female is now known to vary from 47—53.

Stenoponiinae
Stenoponia himalayana Brelih, 1975

(Figs. 1—3)

Phematan (a), 27. III, Pitymys sikimensis: 1 ♂.

In the original description of the species, the labial palp is stated to consist of one unit in both sexes. The male recorded above very clearly has a labial palp of two units; in this genus this would be a specific difference. However, in all other respects the male from Phematan agrees with that of S. himalayana; the important features of this male, including the hitherto not illustrated sternum VIII and aedeagus, are shown in Figs. 1—3.

This species is nearest related to S. sakneni Ioff and Tiflov, 1934 (from Tyan'-Shan') and S. ivanori Ioff and Tiflov, 1934 (from Western Siberia, Tyan'-Shan', Mongolian Altai, Zavolzh'ye [Transvolga region]*, Caucasus and Crimea. Brelih records 24 specimens, all from Pitymys sikimensis which appears to be the true host for this flea; the altitude range is from 3400—4000 m.

Neopsyllinae
Neopsylla pageae Lewis, 1971

(Fig. 4)


The type material was collected in the Solukhumbu and Nuwakot districts of Nepal at altitudes between 3350 and 4800 m, mainly from Alticola sp. As the original illustrations of the paramere of this species (Lewis 1971: Figs. 7—9) are not quite correct, a new figure of this structure is given here (Fig. 4).

*) Misprinted as Zabaykal'ye [Transbaykalia] in Ioff and Sealon 1954: 122, and quoted as such by Hopkins and Rothschild 1962: 139.
Figs. 1—3. *Stenoponia himalayana* Breligh (from Phemat). (1) Preantennal part of head, ♂; (2) sternum VIII, IX and paramere; (3) aedeagus.

**Genoneopsylla kunaveri** (Breligh, 1975)


While the males of the three species (or subspecies?) (*G. longisetosa* Wu, Wu and Liu, 1966, from eastern Tibet; *G. thysanota* Traub, 1968, from the Nepal-Tibet border region about 150 km west of the Barun valley; *G. kunaveri*) are sufficiently distinct, this cannot be said for the females. Breligh’s type-material consists of 4 ♂ 7 ♀, all taken from the Makalu at 4850–4900 m.

**Rhadinopsyllinae**

**Rhadinopsylla (Actenophthalmus) dahurica vicina** Wagner, 1930

(Figs. 5, 6)

All from *Pitymys sikimensis*: Phemat (a), 27. III: 1 ♂; (b), 29. III: 1 ♂; 30. III: 4 ♂ 1 ♀.

This flea was hitherto still known from only the male holotype, collected from "*Ptiorius sp.*" (doubtless an accidental host) in the Kam province of eastern Tibet in
Fig. 4. *Neopsylla pugne* Lewis. Paramere (Phematan).

Fig. 5. *Rhadinopsylla dahurica vicina* Wagner. Sterna VIII, IX and paramere (Phematan).
The rather short original description is accompanied by only a small sketchy figure of sterna VIII and IX of the holotype. Ioff and Tiflov (1950: fig. 75) published a more satisfactory figure of the distal arm of sternum IX of the holotype, showing setae, none of which was figured by Wagner. The specimens recorded above appear to be identical with *R. d. vicina* (allowing for some individual variation although the distal arm of sternum IX is broader in the holotype (3 1/2 times as long as wide in middle as against 4—4 1/2 times in the Nepal specimens) which, moreover, appears to lack the long ventro-basal seta) and a new figure is therefore given here of the paramere and sterna VIII and IX (Fig. 5) while the female, assumed to be that of *R. d. vicina*, is figured for the first time (Fig. 6). It will be seen that the female resembles that of other subspecies of *R. dahurica*.

Hopkins and Rothschild (1962: 512) rather doubted the correctness of Ioff and Tiflov's placing *vicina* as a subspecies of *dahurica*. The specimens listed and figured here as *vicina* fit well within the complex of *R. dahurica* forms.

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**Fig. 6.** *Rhadinopsylla dahurica vicina* Wagner. Terminalia of female (Phematan.)
Rhadinopsylla (Actenophthalmus) aff. dahurica s.l.

Phematan (b), 30. 111, Ochotona roylei: 1 ♂; (c), 1. IV, same host: 1 ♀.

These specimens are related to *R. dahurica* s.l. The genal ctenidium consists of five spines which are weaker, more widely spaced and arranged less obliquely than those in most *R. dahurica* s.l. The sinus in the lowest part of the posterior margin of sternum VII is quite broad, the rounded lobe above it consequently relatively narrow. Spermatheca long and slender.

Figs. 7—9. *Doratopsylla coreana orca* sp. n. (7) Preantennal part of head, ♂ holotype; (8) same ♀ allotype; (9) sternum IX and paramere, holotype.
In view of the absence of male specimens we deem it inadvisable to describe the two females (which are in not too good a state of preservation) as a new taxon in this rather difficult genus.

Doratopsyllinae

*Doratopsylla coreana araea* ssp. n.  
(Figs. 7—10)


**Diagnosis.** Structurally and geographically this new form occupies a position between *D. coreana wissemanni* Traub and Evans, 1967 (new status) (from West Pakistan) and *D. coreana coreana* Darskaya, 1949 (new status) (from Korea and Japan). The male is separable from that of the related forms by the proportions of basimere and telomere, the latter being very slender and with a straight anterior margin. Sternum VII of female resembling that of the nominate subspecies rather than that of *D. c. wissemanni*.

**Description.** Head (Figs. 7, 8), thorax, legs and pregenital abdominal segments as those of the other subspecies.

**Male** (Fig. 9): Sternum VIII as in the other subspecies. Processus basimeres twice as long as wide (i.e., as in the nominate subspecies; in *D. c. wissemanni* the process is 3 1/2—4 times as long as wide in the middle). Telomere straight and narrow, 9—10 times as long as wide in the middle (5—6 times in *D. c. coreana*, 5 times in *D. c. wissemanni*); subapical denticule at anterior margin distinct (apparently absent in the other subspecies). Sternum IX and phallosome as in the other subspecies.

**Female** (Fig. 10): Posterior margin of sternum VII with a lateral sinus as in the nominate subspecies but with the margin above it sloping less obliquely and the margin below the sinus convex instead of concave.

Remaining parts of terminalia as shown in Fig. 10; note that the spermatheca is somewhat turned over and its true lateral aspect could not be ascertained although this would appear to be similar to that of the related forms.

**Length**: ♀ 2 mm.

**Remark.** The female allotype may have had some difficulty in breathing: only 3 of the 14 abdominal spiracles (the normally developed system on tergum VIII excepted) were functional (i.e., the ones on the right hand side of metepimeron and terga VI and VII); in the case of the others the trachea is not at all developed immediately beyond the closing apparatus (Fig. 10).

Ctenophthalminae

*Palaeopsylla tauberi makaluensis* Brelih, 1975 (new status)  
(Figs. 11, 12, 15)


This flea was described as a full species on the basis of 2 ♀ 1 ♂ collected on the Bharatpur Himal from specimens of *Soriculus nigrescens*. The female "allotype" is not
conspecific or consubspecific with the holotype and actually belongs to the first of the two new species of *Palacopsylla* described below. The true female of *P. tauberi makulenseis* is here described and in view of the easy confusion (Dr. Daniel twice found specimens of all three species of *Palacopsylla* enumerated in this paper as occurring together on one host animal), new figures of the male are also provided, with some descriptive notes.

This taxon differs in the male from the nominate subspecies (likewise a parasite of shrews) by a straight telomere and a differently shaped pseudohamulus, in the female by the sinus in sternum VII being consistently narrower.

Head, thorax, legs and pregenital abdominal segments as in *P. t. tauberi* Lewis, 1973. Male (Figs. 11, 12): Sterna VIII and IX and basimere similar to that of *P. t.*

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Fig. 10. *Doratopsylla coreana araca* ssp. n. Terminalia of female allotype.
tauberi. Telomere straight, widest in apical half but dorso-apically not expanded (Fig. 11, cf. Fig. 13). Apical margin of aedeagal palliolum (Fig. 12) not markedly slanting (cf. Fig. 14); Ford’s selerite somewhat shorter and pseudohamulus broader than that of the nominate subspecies — moreover, the dorsal and posterior margin of the pseudohamulus meet at a very obtuse angle (Fig. 12), not at a right angle (Fig. 14).

Figs. 11, 12. *Paleoapsylla tauberi makaluensis* Brelih (♀, Yanlo Khalka), (11) sternum VIII, IX and paramere; (12) aedeagus.
Figs. 13, 14. *P. t. tauberi* Lewis (Dhorpatan, Nepal), (13) paramere; (14) aedeagus.
Description of female (Fig. 15). The oblique sinus of sternum VII is quite variable, as is shown in the figure, but always narrow or even slit-like (specimens without a trace of the sinus will very likely occur); in *P. t. tauberi* the sinus also varies a good deal but is usually much wider than in this new form. In other respects the terminalia are like those of the nominate subspecies.

Fig. 15. *Palaeopsylla tauberi mokaluensis* Brelil (♀, Phemat), sternum VII and spermatheca of ncaaltotype (a) and outline of sternum VII of 3 ♀ (b–d).

Figs. 16, 17. *Palaeopsylla aporema* sp. n. (16) Head of ♂, paratype; (17) preantennal part of head, ♀ allotype.
Palaeopsylla aporema sp. n. (Figs. 16–20)

♂ Holotype, Yanle Khalka (f), 3600 m, Barun Khola valley, Nepal, 7, IV. 1973, Soriculus nigrescens centralis, leg. M. Daniel; ♀ allotype, Yanle Khalka (c), 4, IV. 1973, same host and collector. Parasites: 2 ♂, same data as holotype; 1 ♀, same data as allotype; 1 ♂, Phematian (b), 30, III. 1973, Pitymys sikimensis; 2 ♂, Phematian (c), 1, IV. 1973, Soriculus nigrescens centralis; 1 ♀, same data but 2, IV. 1973.

Diagnosis. This species is closely related to P. tauberi s.l., differing from it in the male by the slender telomere with a rounded oblique apical margin and in the female by the absence of a lateral sinus in the posterior margin of sternum VII.

Description. Head (Figs. 16, 17), thorax, legs and pregenital abdominal segments as in P. tauberi s.l.

Male (Figs. 18, 19): Sterna VIII and IX not very distinctive, similar to those of P. tauberi s.l. Basimere without striarium. Telomere straight, about 5 1/2 times as long as wide in middle, its apical half only very slightly wider than basal half, with

Figs. 18, 19. Palaeopsylla aporema sp. n., ♂ holotype, (18) sternum VIII, IX and paramere; (19) phalosome.
a rounded and oblique apical margin. Phallosome (Fig. 19) resembling that of P. l. tauberi (Fig. 14) but its pseudohamulus as broad as that of P. l. makaluensis (Fig. 12).

**Female** (Fig. 20): Posterior margin of sternum VII with a preventral obtuse lobe, without a lateral sinus. In other respects the terminal abdominal segments and genitalia are similar to those structures in *P. tauberi* s. 1.

![Figure 20](image)

*Fig. 20. Palacopsylla aporema* sp. n. Terminalia of female allotype.

**Remarks.** This species occurs together with *P. tauberi makaluensis*, even on the same host individuals; occasionally a third species of *Palacopsylla* joins them (one shrew, from Yante Khalka, had 11 specimens of *Palacopsylla* representing the three forms dealt with in this paper, and a *Hystrichopsylla synaptica* as well); the female allotype of *P. tauberi makaluensis*, misdetermined, belongs to *P. aporema*. Although the differences between these two forms are not great, on present evidence *P. aporema* does not seem to represent an extreme form of *P. tauberi makaluensis*; hence it is
described here as a full species. Further studies of more extensive material may clarify the true taxonomic position of the various representatives of *Palaeopsylla* occurring in Nepal.

*Palaeopsylla danieli* sp. n.  
(Figs. 21—25)

♂ Holotype, Yomite Khalka (e), 3600 m, Barun Khola valley, Nepal, 4. IV. 1973, *Soriculus nigrescens centralis*, leg. M. Daniel; ♀ allotype, Yomite Khalka (f), 7. IV. 1973, same host and collector. Paratypes: 2 ♂ 1 ♀, same data as holotype; 1 ♀, Phenatan (b), 30. IV. 1973, same host and collector.

Diagnosis. Quite a distinct flea, among the species with 18 pronotal spines at once recognisable in the male by the markedly triangular apex of the telomere and the relatively short and blunt distal arm of sternum IX, in the female by the presence of two setae below the level of the spiracle on terga III—V1 and the large number of setae on sternum VII.

![Fig. 21. *Palaeopsylla danieli* sp. n. Head and pronotum of holotype.](image)

Description. Head (Figs. 21, 22): Frontal wall not very thick although somewhat less narrow in its lower fourth; frontal tubercle well developed. Lowermost spine of genal ctenidium rounded apically but with a tendency to forming a point; second spine somewhat spatulate in the female (Fig. 22) but more slender and pointed in the male (Fig. 21); third spine not excessively long and the dorsal obtuse one triangular as is usual in the genus. Chaetotaxy of head as shown in Figs. 21 and 22. Proboscis reaching to about 2/3rd the length of the fore coxa. Thorax (Fig. 21): Pronotum of normal width, its ctenidium consisting of 18 slightly curved, slender and pointed spines. Remainder of thorax, and legs, as in most other shrew-infesting members of the genus. Abdomen: Numbers of tergal spinelets on terga I—VI, ♂: 3, 2—3, 1—2, 1—2, 1, and 1—0 respectively; ♀: 3, 3—4, 2—3, 1—3, 1—2 and 0. On terga III—V1 in the female two setae of the main row are situated below the level of the spiracular fossa, in the male one seta (as is normal for both sexes in the genus; the only other species in the genus with 2 setae below spiracle on several terga in ♂ are *P. moqura* Sakaguti and Jameson (Korea, Japan) and *P. setzeri* Traub and Evans (W. Pakistan). Antesensorial setae normal (Fig. 25). Basal sternum in the male with one ventral seta each side, in the female with a vertical row of 3—5 setae. Sterna III—V1 in the female also more setose than in related species; sternum VII strikingly hairy, with about 20—25 setae each side.

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Male (Figs. 23, 24): Sternum VIII as in Fig. 23; the cuticular ridges on the ventro-posterior part of the inner side are densely lined with minute spicules. Distal arm of sternum IX straight and relatively short, with an obtuse apex; none of its setae long or very stout. Basimere without striarium; telomere relatively large, straight, gradually widening a little towards the remarkably triangulated apex (Fig. 23). Phallosome as in Fig. 24.

Female (Fig. 25): Sternum VII with an oblique and fairly narrow sinus, the lobe above it not very large; the striking chaetotaxy as shown in Fig. 25. Sternum VIII without a free elongate apical half, with only a few minute ventral setae. Tergum VIII and genitalia as in Fig. 25.

Figs. 22—24. *Palaeopelopia danieli* sp. n. (22) Preantennal part of head, ♀ allotype; (23) sterna VIII, IX and paramere, holotype; (24) phallosome, holotype.
Length: $\sigma$ 2 mm, $\varphi$ 2.25 mm.

Remark. We have much pleasure in naming this new species in honour of Dr. Milan Daniel in appreciation of his unstinted efforts to obtain material from localities which are quite out of reach for most parasitologists; as we have remarked before, this was "certainly no sinecure".

Leptopsyllidae

Amphipsyllinae

Frontopsylla (Frontopsylla) spadix nepalensis Brehm, 1975

Smit and Wright (1975) synonymized Frontopsylla spadix gurkha Smit, 1975 (from the western half of Nepal) with $F. [spadix] diyiengensis$ Li and Hsieh, 1974 (from Yunnan). The male of $F. spadix nepalensis$ differs slightly from that of the
latter by having a longer basimere and processus basimeris (Fig. 26). The female (Fig. 27) appears to be quite identical.

Whereas the length of the processus basimeris appears to be rather variable, the internal sclerotization of the ventro-posterior part of sternum VIII of the male still affords a good difference between *F. spadix* spadix (J. and R.), *F. s. causa* J. and *F. s. diqiengensis*. A study of much more material is required to ascertain the extent of individual variation of the various forms of *Frontopsylla spadix*.

**Geusibia triangularis** (Lewis, 1972)

Phematan (b), 30. III, Ochotona roylei: 2♀; (c), 1. IV, same host: 3♂ 2♀; 31. III, *Pitymys sikimensis*: 1♂ 1♀; 2. IV, same host: 1♀. Yanle Khalka (g), 9. IV, Ochotona roylei: 3♂ 5♀. Base camp at 4800 m (k), 24. IV, same host: 1♂ 1♀.

This recently described species, an *Ochotona* flea, was still only known from the type material (4♂ 1♀) collected from *Ochotona* sp. at Khumjung in the Solukhumbu district of Nepal and from 1♂ 3♀ from a locality below Makalu, at 4850 m, as recorded by Brelih (1975).

**Amphipsylla tuta gregorii** Brelih, 1975 (new status)  
(Figs. 28—33)

All collected from *Pitymys sikimensis*: Phematan (a), 27. III: 1♂ 3♀; (b), 30. III: 4♂ 5♀; (c), 31. III: 4♂ 10♀; 1. IV: 3♂ 5♀; 2. IV: 1♂ 3♀; (d), 31. III: 1♂ 1♀. Yanle Khalka (e), 4. IV: 3♂ 5♀; (f). 5. IV: 1♀; 8. IV: 3♂ 3♀; 9. IV: 3♂ 2♀; 16. IV: 1♂ 4♀. Tadosa (h), 14. IV: 1♂; (i). 16. IV: 4♀.

Obviously a very common flea of *Pitymys sikimensis* in north-eastern Nepal (originally described as a full species). The short original description of *A. tuta* Wagner, 1928, based on 1♂ 6♀ collected by A. Kuzmakov from *Microtus* sp. near a lake by the upper reaches of the Yellow River (Hwang-ho) in eastern Tibet in June 1900, is accompanied by only a small sketchy figure of the male paramere. A new figure of this structure of the same specimen was published by Ioff and Tiflov (1939: fig. 91) who also illustrated the outline of sternum VII and the ductus bursae (their figs. 24, 63). The specimens from Nepal agree reasonably well with the description and these figures except for the posterior margin of the telomere which is shown to be slightly concave in Wagner’s figure, straight in Ioff and Tiflov’s illustration of the same specimen and is more strongly concave, but in varying degrees (see Figs. 30—32), in the specimens from Nepal. Not knowing the range of individual variation of the Tibetan populations, the significance of the rather slight difference in shape of

![Fig. 27. *Frontopsylla spadix nepalensis* Brelih. Sternum VII and genitalia of female (Phematan).](image)

![Figs. 28, 29. *Amphipsylla tuta gregorii* Brelih. (28) Acetabulum (Yanle Khalka); (29) Sternum VIII of male (Phematan).](image)
the telomere cannot at present be fully evaluated. In order to aid future studies on
the status of these fleas we give here illustrations of sternum VIII ♂ (Fig. 28), sternum
IX and paramere (Fig. 29), two telomeres (to show variation) (Figs. 30, 31), aedeagus
(Fig. 32) and sternum VII and genitalia, ♀, and variations in outline of sternum VII
(Fig. 33).

*Amphipsylla orthogonia* Liu, Tsai and Wu, 1975

Base camp at 4900 m, (k), 21. IV, *Alticola stoliczkanus*: 1 ♀; same data but 22. IV: 4 ♀. Slope against
base camp, (n), 10. V, same host: 1 ♀.

![Diagram](image-url)

Figs. 30—32. *Amphipsylla tuta gregorii* Breilih. (30) Sternum IX and paramere (Phematan); (31, 32)
basimere and telomere (Phematan and Yanle Khalka).
Recently described from Tsinghai, west China, also from Alticola, this species is obviously mainly found at high altitudes (4000 m and over).

The female „Amphipsylla primaris ssp.“, from Charka, ex Alticola stoliczkanus, as recorded by Smit (1975) also belongs to this species (the female of which does resemble that of A. primaris).

Fig. 33. Amphipsylla tutu gregorii Brebih. Sternum VII and genitalia (a) and outline of sternum VII of three females (Phematan) (b –d).

Ceratophyllidae

Amphalius clarus (Jordan and Rothschild, 1922)

Phematan (b), 30. III, Pitmys sikimensis: 2♂; (c), 1 IV, Ochotona roylei: 2♂; (d), 31. III, Pitmys sikimensis: 1♂.

This parasite of Ochotona is known from Nepal, Tibet, Kazakhstan, east Kirgiziya and Tadzhikistan from O. macrotis and O. rutula.

Callopsylla (Callopsylla) sparsilis sparsilis (Jordan and Rothschild, 1922)

Base camp at 4900 m (k), 21. IV, Alticola stoliczkanus: 3♂ 3♀; same data but 22. IV: 1♂ 3♀.

Ceratophyllus sparsilis was described from the female holotype collected by A. F. R. Wollaston at Tingri (28.33 N 86.40 E), Tibet, from Ochotona daurica curzoniae in July, 1921. Ioff and Sealon (1954: 72, footnote) correctly suggested that C. sparsilis
might belong to *Callopsylla* while Smit and Wright (1975: 41) synonymized *Ceratophyllus* (*Citellophilus*) *tenuihamus* Liu, Wu and Wu, 1966 — described from Tibet and recorded, as *Callopsylla tenuihamus* *tenuihamus*, from northern Nepal by Smit (1975) — with *C. sparsilis* (J. and R., 1922).

*Callopsylla* (*Callopsylla*) *dolabella* sp. n.  
*(Figs. 34—37)*


**Diagnosis.** At once distinguishable from related species by the much reduced eye; the male is characterized by the shape and chaetotaxy of the hatchet-like telomere which bears quite long and pointed spiniforms, the female by the possession of several very stout and sickle-shaped setae along the ventral margin of the anal sternum.

**Description.** **Head** (Fig. 34): Of the frontal row of setae only a small dorsal one is present. Ocular row of 3 setae. The five-unit labial palp reaches to the apex of the fore coxa. Eye noticeably small, though very distinct. Setae of antennal pedicel extending to near half the length of the clava in the male, to near the apex of the clava in the female. Postantennal region of head with one large seta above the middle of the antennal fossa and with the usual posterior row.

**Thorax:** Pronotum with one row 6—8 setae each side; pronotal ctenidium consisting of 18—20 rather short spines, the dorsal ones of which being shorter than the length of the pronotum, especially in the female. Mesonotum with a main row of 5—6 setae per side and 4 (occasionally 5) pseudosetae each side under its collar, mesosternosome with 5—8 setae and several small ones anteriorly. Metanotum with a main row of 5—6 setae, and 2—3 marginal spinules; lateral metanotal area with 2—3 setae, metepisternum with one and metepimeron with 4—7 setae.

**Legs:** Hind tibia with 8 notches (including the apical one) in the dorso-posterior margin, containing (from base to apex) 2, 2, 2, 2, 2, 1, 2 and 3 setae respectively; it may be noted that in most *Ceratophyllids* the third notch contains only one seta. Longest seta of second hind tarsomere not quite reaching apex of third tarsomere. Distitarsomere of all legs with 5 pairs of lateral plantar setae.

**Abdomen:** Numbers of setae per side in the main row of terga I—VII, ♀: 5—6, 7—8, 7—9, 7—8, 7—8 and 6—8 respectively, in the ♀: 5—6, 8, 7—8, 7—8, 7—8, 7—8 and 6. Numbers of marginal spinules of each side of terga I—IV, ♀: 2—3, 2—3, 2 and 1—2; ♀: 2, 2, 2 and 1. Numbers of setae in the main row per side on sterna II—VII, ♀: 1, 3—4, 3—4, 4—5, 4 and 4; in ♀: 1 (and 0—2 small lateral ones), 3, 4—6, 4—5, 5—7 and 7—8 respectively.

**Male** (Figs. 35, 36): Tergum VII (Fig. 35) with a narrow marginal area spiculosa, a group of 5—8 small setae antero-dorsal of the spiracular fossa, about a dozen larger setae on the upper half of the tergum and a vertical row of 3—6 long setae on the ventral half. Sternal VIII narrow, with 2 or 3 preapical setae each side; vesseilum fairly large, apically spiculose and with a ventro-apical spiculose process. Processus basimeris long and narrow; manubrium straight and of medium width. Telomere with a curved, narrow basal part and a wider rectangular main part which bears one stout dorso-posterior seta, two widely spaced long and pointed spiniforms (which are normally short and obtuse in this genus), and a fairly stout ventro-posterior seta (Fig. 35). Proximal arm of sternum IX quite narrow and almost straight; ventral margin of anterior part of distal arm not strongly bulging, with a fringe of slender setae; posterior part of distal arm ellipsoid, chaetotaxy as shown in the figure.
eagus (Fig. 36) with a lobus fuleri lateralis which has an expanded apex (typical for the genus), a fairly short fistula and a fairly large hamulus which is ventro-posteriorly produced into a sclerotized sharp triangular process. Virgae penis making not quite half a convolution.

**Female** (Fig. 37): Posterior margin of sternum VII with a blunt lateral lobe, below which a sinus of equal size; a fair number of small setae in front of the main row.

**Figs. 34—36.** Callopsyllo dolabella sp. n. (34) Procantennal part of head, ♀ paratype (Phematian); (35) sternum VII, segment VIII, sternum IX and paramere of ♂ holotype; (36) aedeagus of paratype (Phematian).
Remaining terminal segments as shown in Fig. 37. Quite striking are the 3 or 4 strong and apically anteriad-curved setae along the ventral margin of the anal sternum. Bursa copulatrix with a sclerotization (this organ is not well preserved in the material examined). Bulga of spermatheca of the for the genus usual pattern.

Length: ♂ 2—2.5 mm, ♀ 2.5—3 mm.

Fig. 37. Callopesylla dolabella sp. n. Terminalia of female allotype.

Ceratophyllus (Ceratophyllus) enefdeae tjanschani Kunitskaya, 1968

Tadoma (h), 15. IV, Ithacin cruentus cruentus: 1 ♀; (j), 19. IV, bird's nest in shrub: 1 ♂ 6 ♀.

This bird-flea was thus far only known from the Za-Ili Alatau mts (nr Alma-Ata) and the Narynkol region in the Terskei Alatau from nests of Pica pica, Nucifraga caryocatactes, Oenanthe isabellina, Lyrurus tetrix and other birds. The nominate subspecies occurs in central and northern Europe and a third subspecies in the Yukon Territory of Canada.
Pulicidae

Pulicinae

Pulex (Pulex) irritans Linnaeus, 1758


Brelih (1975) recorded the fact that 1♂ 1♀ of the human flea had accompanied a climber to a base camp on the Makalu at an altitude of 4850 m.

BLOXH (SIFIONAPTERA), SOBRANNAYE D-RI DANNYELM V NEPALAE

F. G. A. V. SMIT I B. ROSEZKIY

Razume. Bo vremeni Trigvej cheshovskoi ekspeditsii v Himalayi vesnoi 1973 g. dr Daniel sobral 244 osobey blox, otnosyushchikh k 19 raznym taksonam (srednyh okazalo 4 do sikh nor ne opisannyh vidi) s mlenkoitaichuyu ci cih iz doliny Barun Hola u podnozy gory Makalu na yugo-vostok ot Eweresta. V rabote privedeny dannye i primeneniya, ka-saющиеся собранного материала blox i dann y opisaniy novyh vidov.

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