

Some Anoplura from Small Mammals in Afghanistan*)

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Abstract. The following 6 species were found in the anopluran material from small mammals captured in the region of East Hindu Kush and in the vicinity of Kabul: *Hoplopleura captiosa*, *H. acanthopus*, *H. ochotonae*, *Neohaematopinus palaeartus*, *Polyplax serrata* and *P. borealis*. The description of the male of *H. ochotonae* is given.

This paper is based on the study of anopluran material collected in Afghanistan by Dr. M. Daniel CSc. (Institute of Parasitology, Czechoslovak Academy of Sciences, Prague) during the First Czechoslovak Mountaineering Expedition to Hindu Kush in 1965. The anopluran fauna of Afghanistan has been never studied in detail till now and the material presented is the first entire original collection of Anoplura from that country.

MATERIAL

During the investigations of small mammals and their parasites in the high mountain range Hindu Kush (Vakhan region) and the vicinity of Kabul a total of 190 lice were found, belonging to 6 species and 3 genera. The following hosts were found to be parasitized: *Marmota caudata* (Jacquemont, 1844), *Ochotona roylei* (Ogilby, 1839), *Alicola argentata* (Severtzov, 1879), *Cricetulus migratorius* (Pallas, 1770), *Apodemus sylvaticus* (L., 1758), *Microtus afghanus* Thomas, 1912, *Mus musculus* L., 1758 and *Crocidura russula* (Hermann, 1780). (Details on the hosts investigated are included in the paper by Hanzák et Daniel, in press.)

A brief characterization of localities

I. The vicinity of Kabul. Collections were made on the banks of small irrigation canals between grain fields and in the stubble fields which had not been irrigated after harvesting.

II. High mountain range of East Hindu Kush

A**) — The close vicinity of the village Ishmurkh (altitude of 2,750 m). Banks of irrigation canals overgrown with vegetation.

*) The results of the First Czechoslovak Expedition to Hindu Kush 1965. Communication No. 4.

**) This designation also applies to Tab. I and to all references in further text.

B — The willow grove at the level of the junction of the Ishmurkh and Chap Darrah valleys (2,850 m), situated at the confluence of streams flowing from both valleys. The willow growths contacting the arid area were surrounded by a belt of wild rosebushes (*Rosa* species).

C — The vicinity of Ishmurkh Darrah, near the front of glacier:

1. stony debris under the cliffs in the western part of the valley (3,800—4,000 m)

2. Huge moraine in the eastern part of the valley (4,000 m).

D — The Chap Darrah Valley (3,700 m). At this altitude the valley expands considerably and its bottom constitutes a moderately rising plain covered with wormwood steppe (*Artemisia leucotricha*).

E — The Ishmurkh Darrah Valley (4,550 m). At the place where the glacier originating under the Anushah col flows into the glacier of the western branch of the valley, there is an island of rock terraces devoid of ice, but with marks of previous glaciation. At this biotope the most elevated occurrence of small mammals was registered (13 specimens of *Alticola argentata*, which, however, were not infested with lice).

SYSTEMATICS

1. *Hoplopleura captiosa* Johnson, 1960

Material collected: 2 ♂♂, 1 nymph, Kabul, 4. 7. 65, from *Apodemus sylvaticus* (3 specimens); 2 ♀♀,

Kabul, 7. 7. 65, from *Mus musculus* (1 specimen).

This species was formerly confused with some other species, especially with *H. hesperomydis* Ferris. It was also published under this name in the USSR (especially from the Central-Asiatic area) by some Soviet authors (see e.g. SOSNINA 1951, 1954, 1957). In all cases the lice were found on *Mus musculus* L.

JOHNSON (1960), however, demonstrated that all records of *H. hesperomydis* Ferris from *Mus musculus* L. in both the palaearctic and oriental regions are to be considered as belonging to a new species which she described under the name *H. captiosa*. According to this authoress *H. captiosa* Johns. is for the present the only louse species parasitizing primarily *Mus musculus* L. Together with its host *H. captiosa* has a very wide distribution and is known from many records in palaearctic, oriental and also nearctic regions.

2. *Hoplopleura acanthopus* (Burmeister, 1839)

Material collected: 6 ♀♀, 5 ♂♂, 6 nymphs, Kabul 24. 6.—7. 7. 65, from *Microtus afghanus* (4 specimens)

This very common species parasitizing various species of voles (*Microtinae*) is widely distributed in both the Old and New Worlds.

3. *Hoplopleura ochotonae* Ferris, 1922

Fig. 1

Material collected: 3 ♀♀, 2 ♂♂, 2 nymphs, Eastern Hindu Kush, Chap Darrah, loc. "D" — 17. 8. 65, from *Ochotona roylei*; 5 ♀♀ 1 nymph, Eastern Hindu Kush, Ishmurkh Darrah, loc. "C", 28. 8. 65, from *Ochotona roylei*.

This species was described by FERRIS (Stanf. Univ. Publ. Biol. Sc., 2, 1922) from female specimens collected from *Ochotona cansus* (= *Ochotona thibetana*) in China, *Ochotona roylei* in Baltistan and *Ochotona danurica* in Mongolia. There have been no other records since.

H. ochotonae Ferris has an isolated position within the genus and is easy to identify because of the absence of the paired strong setae on the third sternite in the combination with the very characteristic shape of sternal plate (see Fig. 1B—D).

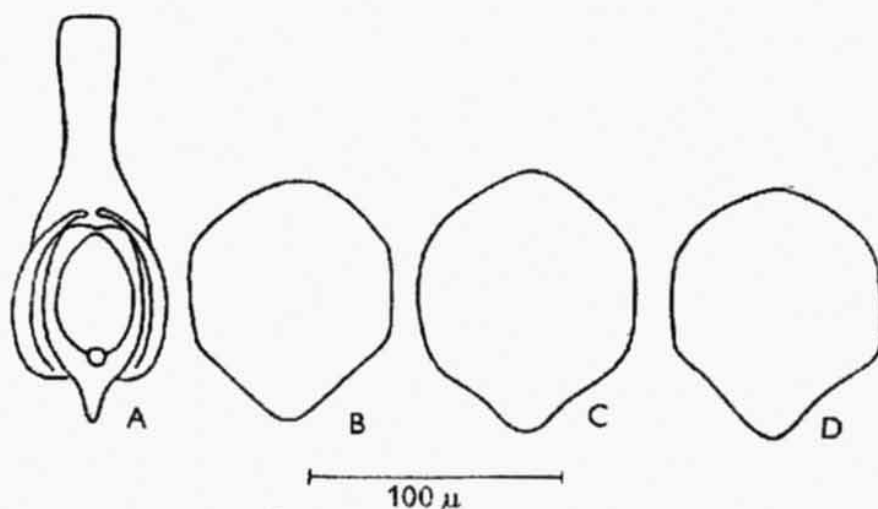


Fig. 1. *Hoplopleura ochotonae* Ferris, 1922 (Afghanistan, Chap Darrah, 3,700 m, all specimens from *Ochotona roylei*). A — male genitalia (aedeagus). B—D — sternal plates.

As the male of this species has not been described till now, the main differences against female are presented here:

Head and thorax as in female, but the former a little stouter. Paratergal plates in general as in female, paratergal plates VII and VIII without teeth. Tergites and sternites of the abdomen with two rows of setae, tergite and sternite 7 with one row of setae. Aedeagus with the basal plate very slender but strongly expanded at the apex, parameres very stout, pseudopennis relatively short, V-shaped, sharply pointed (details see Fig. 1A).

H. ochotonae is known only from various members of the genus *Ochotona* in Central Asia.

4. *Neohaematopinus palaeoarctus* Olsoufieff, 1938

Figs. 2, 3, 4

Material collected: 35 ♀♀, 28 ♂♂, 7 nymphs, Eastern Hindu Kush, Chap Darrah, loc. "C", 15.—18. 8. 65, from *Marmota caudata* (6 ex.); 2 ♂♂, 1 nymph, Eastern Hindu Kush, Chap Darrah "C" 19. 8. 65, from *Ochotona roylei* (2 ex.); 1 ♂, 1 nymph, Eastern Hindu Kush, Ishmurkh Darrah loc. "B", 22. 8. 65, from *Apodemus sylvaticus*; 1 ♂, Eastern Hindu Kush, Ishmurkh Darrah, loc. "A", 18. 7. 65, from *Apodemus sylvaticus*.

This species was described by OLSOUFJEV from specimens collected from *Marmota caudata* in Southern Kirghizia, Western Kashgaria and from Kizil-Su in the Alai valley. It seems to be a frequent parasite of *Marmota caudata* in the Central-Asiatic area. The occurrence of this species on *Apodemus sylvaticus* and *Ochotona roylei* in our material represents merely a secondary infestation. The shape of the sternal plate in this species is subject to a distinct variability as it is shown in Figs. 2A—C. Apical part of the male copulatory organ which resembles the male copulatory organ of *N. marmotae* Ferris, and some other morphological details of the population

studied are given in Figs. 2D and 3A, B. For the hitherto unknown shape of the egg of this species see Fig. 4.

5. *Polyplax serrata* (Burmeister, 1839)

Material collected: 1 ♂, Eastern Hindu Kush, loc. "A", 18. 7. 65, from *Apodemus sylvaticus*.

This species, parasitizing primarily murids of the genus *Apodemus* is very often found also on *Mus musculus* L. or on white laboratory mice. It is very widely distributed in the palaearctic region and it was recorded from white laboratory mice also from North America and Africa.

6. *Polyplax borealis* Ferris, 1933

Fig. 5

Material collected: 4 ♀♀, 4 ♂♂, 1 nymph, Eastern Hindu Kush, Chap Darrah, loc. "C", 5. 8. 65, from *Alicola argentata*.

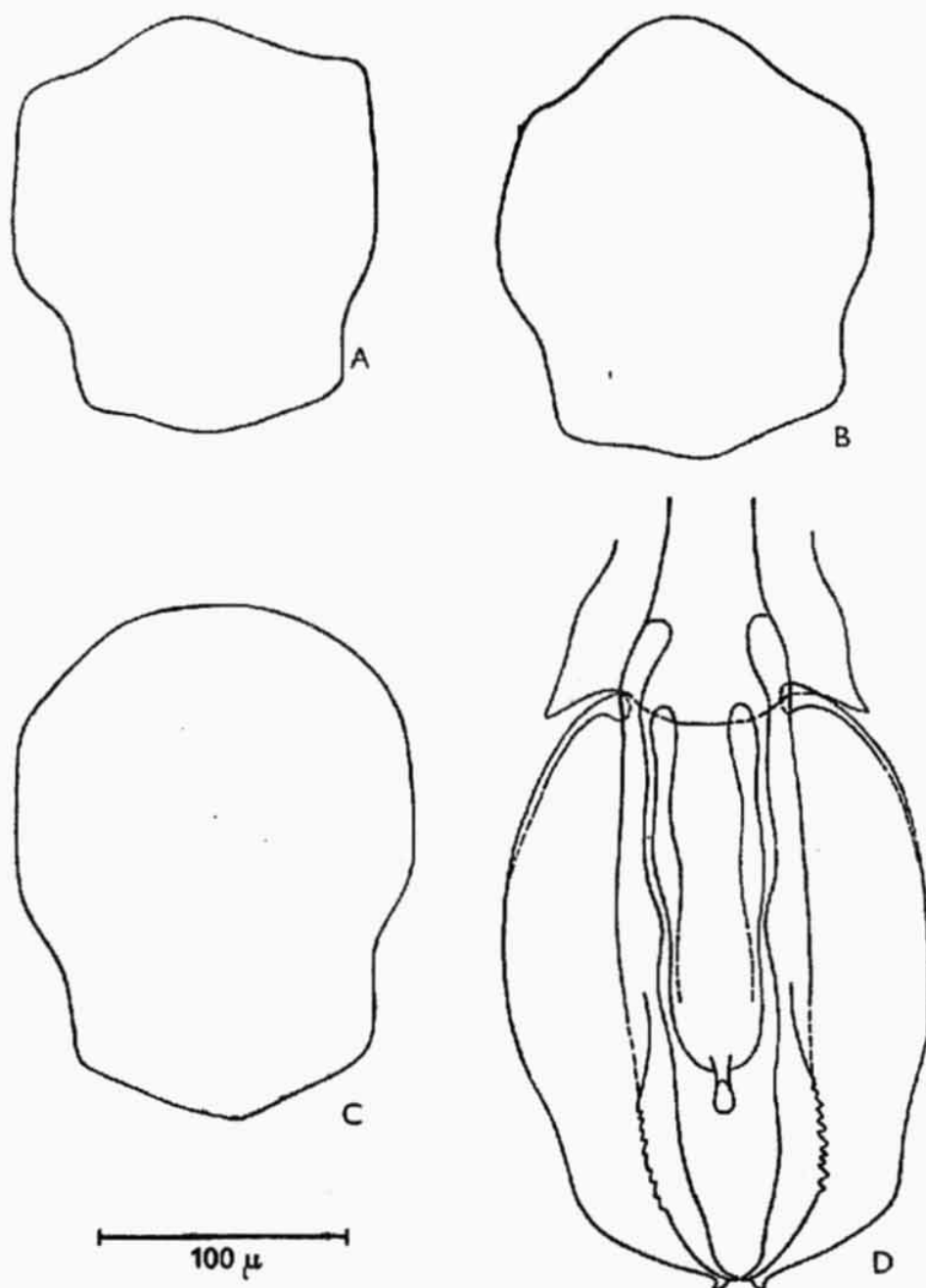


Fig. 2. *Neohaematopinus palaeartus* Olsoufieff, 1938 (Afghanistan, Chap Darrah, 3,700 m, all specimens from *Marmota caudata*). A—C — sternal plates. D — apical part of the male genitalia.

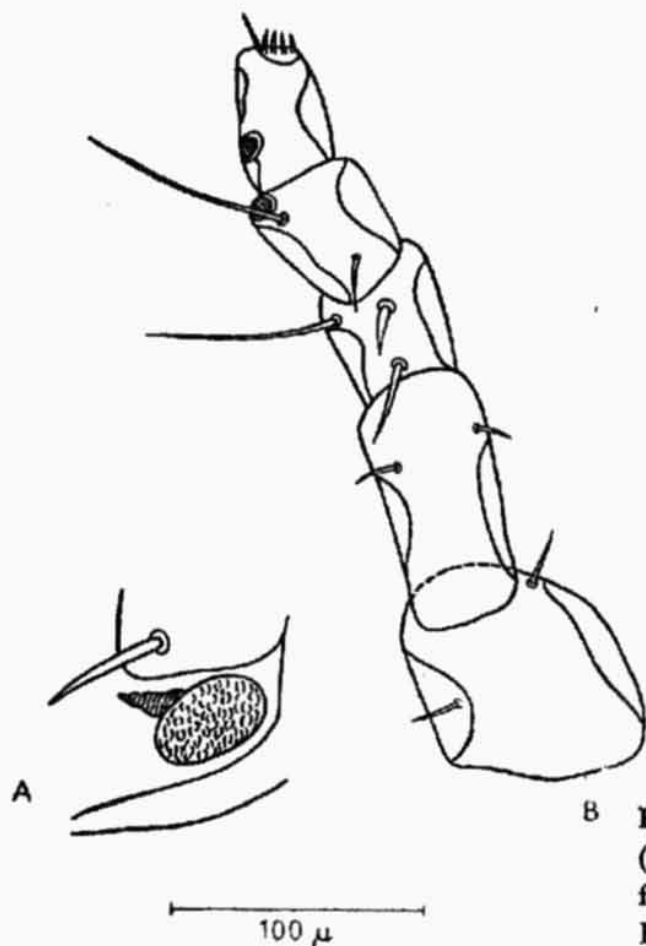


Fig. 3. *Neohaematopinus palaeartus* Olsoufieff, 1938 (Afghanistan, Chap Darrah, 3,700 m, all specimens from *Marmota caudata*). A — thoracic spiracle, B — antenna of male.

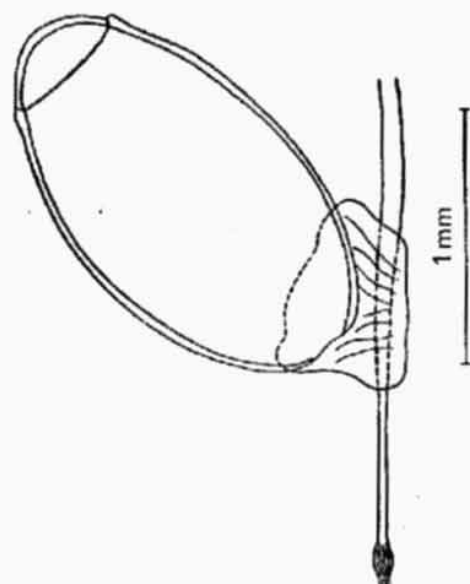


Fig. 4. *Neohaematopinus palaeartus* Olsoufieff, 1938 (Afghanistan, Chap Darrah, 3,700 m, from *Marmota caudata*), egg.

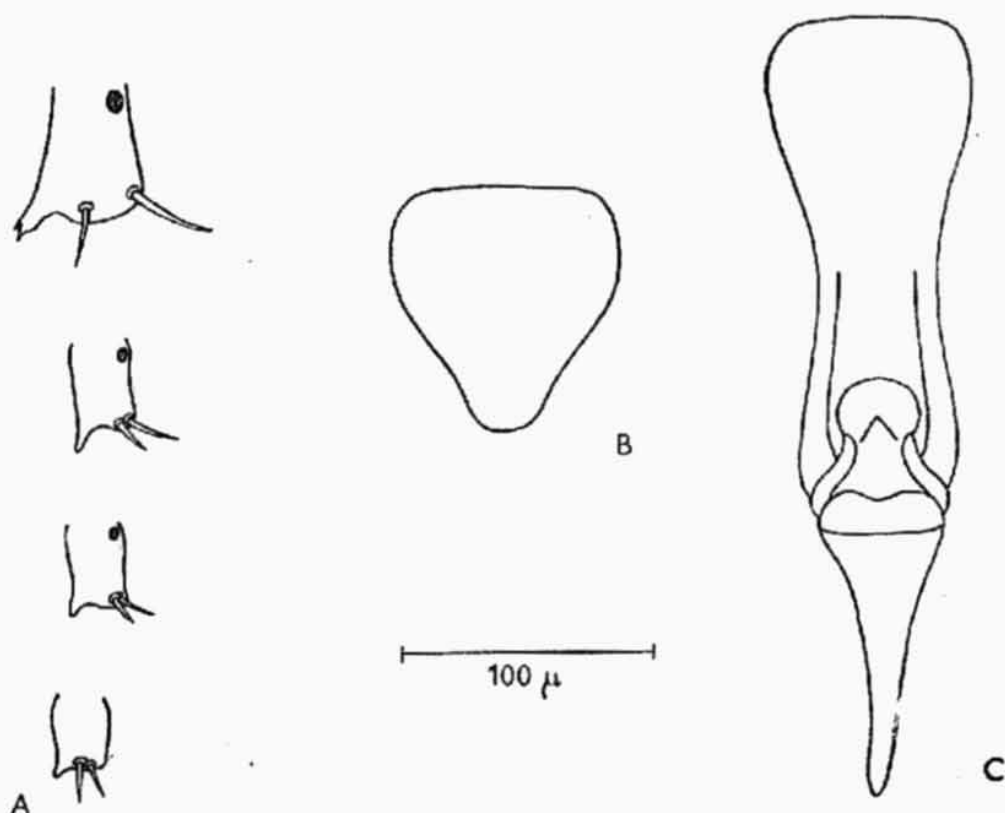


Fig. 5. *Polyplax borealis* Ferris, 1933 (Afghanistan, Ishmurkh Darrah 4,000 m, from *Alticola argentata*). A — paratergal plates III—VI of 3rd (?) nymphal instar, B — sternal plate, C — male genitalia (aedeagus).

This species was synonymized with *P. alaskensis* Ewing by EWING (1935) and this synonymy was accepted by FERRIS (1951). But BRINCK (1951) regarded it as a separate species and this opinion was later confirmed by SCANLON and JOHNSON (1957).

In addition to the different shape of the sternal plate (Fig. 5B), *P. borealis* differs from *P. alaskensis* in the shape of male copulatory organ, mainly the pseudopenis (Fig. 5C) and in the shape of abdominal sternites. For the hitherto unknown shape of the paratergal plates of third (?) nymphal instar see Fig. 5A.

The occurrence of *P. borealis* Ferris in the high mountain elevation in Afghanistan is of great interest from zoogeographical point of view, but it is in agreement with the previous records from Kazakhstan. The species was collected there from *Clethrionomys rufocanus* Sund. in the vicinity of Alma-Ata lake, elevation about 2,600 m (BEZUKLADNIKOVA 1962). *P. borealis* is circumpolar in its distribution (transcontinental in northern areas of North America, North Scandinavia and mountains in the Central-Asiatic area). Possibly the distribution of this species in the palaearctic region has the boreoalpine character. This opinion should be confirmed by further investigations.

NOTES TO THE ECOLOGY OF SPECIES FOUND IN THE HIGH MOUNTAIN ELEVATIONS

Although the anopluran material, which served as a basis of the present paper, had been also collected in lower regions of Afghanistan, main attention was given to the catches of small mammals and collections of their parasites in high mountain elevations of the East Hindu Kush (Vakhan region). Collecting was mainly carried out in two valleys (Ishmurkh Darrah and Chap Darrah) at the altitudes between 2,750 and 4,550 m. The Ishmurkh Valley connects the area of the main mountain ridge of East Hindu Kush with the valley of the river Ab-i-Pyandj, which it enters near the settlement Ishmurkh. (The valley of Ab-i-Pyandj separates the mountain system of East Hindu Kush from Pamir in the north.) Catches of small mammals were done in order to obtain a survey about the elevation distribution of hosts and their parasites from the village Ishmurkh (2,750 m) and higher. As for the terrain conditions, the Ishmurkh valley may be roughly divided into three layers:

1. The bottom part (about 2,750—3,200 m) is characterized by a wide, flat and moderately rising bottom. The conditions there are similar to those in the main valley of the Ab-i-Pyandj river. The slopes are formed by conglomerate walls, the major part of this section being devoid of vegetation. The valley in this part is of steppe character.
2. The valley part from 3,200 m towards the front of glacier (3,800 m) has montane features, its slopes are formed by crystalline rocks. Under the rock scarps are scree-strewn fields. The vegetation, together with the occurrence of small mammals, is limited to small isolated places.
3. The part of terrain extending from the front of glacier to higher elevations (3,800 m) has a distinct high mountain character.

The vertical distribution of lice in the area studied is included in the survey given in Table 1.

The results show that the occurrence of lice in this high mountain region is primarily associated with the presence of marmots *Marmota caudata* (which are main hosts of *Neohaematopinus palaeartus*) and pikas *Ochotona roylei* (hosts of *Hoplopleura ochotoniae*). On the other hand, the most frequent small rodent *Alticola argentata*, which may be considered as typical inhabitant of those elevations, was found to be parasitized only in one case by the louse *Polyplax borealis*.

Table 1. Vertical distribution of lice parasitizing small mammals in East Hindu Kush

Vertical stratification of valley	Occurrence of louse species	Hosts			
		Species	Number of captured specimens	Number of positive specimens	% posit.
I. layer (2.750—3.200 m) locality A, B*)	<i>Polyplax serrata</i>	<i>A. sylvaticus</i>	16	1	6
	<i>Neohaematopinus palaeartus</i>	<i>A. sylvaticus</i>		2	13
	—	<i>C. migratorius</i>	9	0	0
		<i>A. argentata</i>	24		
<i>O. roylei</i>		1			
		<i>C. russula</i>	20		
II. layer (3.200—3.800 m) locality D	<i>Neohaematopinus palaeartus</i>	<i>M. caudata</i> <i>O. roylei</i>	7	7	100
			1	9	
	<i>Hoplopleura ochotonae</i>		11	1	9
	—	<i>A. argentata</i>	15	0	0
III. layer (3.800 m and higher) locality C	<i>Hoplopleura ochotonae</i>	<i>O. roylei</i>	2	1	50
	<i>Polyplax borealis</i>	<i>A. argentata</i>	13	1	8

*) Corresponding with designation in the text.

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