

## Notes on Asiatic Chloroperlidae (Plecoptera), with descriptions of New Species

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The fauna of Plecoptera of the Asiatic part of the USSR had been investigated rather poorly until recently. Rather intensive investigations started only during the last 15 years, and it is only now that the species-composition of Plecoptera in Middle Asia, Siberia and the Soviet Far East is ascertained in the main. During these investigations a considerable number of species new to science or to the fauna of the USSR were discovered (papers by I. M. LEVANIDOVA, I. I. ZAPEKINA-DULKEIT, L. A. ZHILTZOVA, T. KAWAI). The discovery of Paraperlinae in the basin of the Amur River is of greatest interest (ZHILTZOVA & LEVANIDOVA, 1970).

In the present article, six species of the family Chloroperlidae are described, two of them new. They belong to the genera *Haploperla* (Japan, Soviet Far East), *Triznaka* (Nearctic, Kamchatka) and *Xanthoperla* (Europe, Karakoram, Middle Asia). The genus *Triznaka* is recorded from Asia for the first time.

Materials of the species *Haploperla ussurica* NAVÁS, *H. lepnevae* n.sp. and *Triznaka diversa* (FRISON) were collected by I. M. LEVANIDOVA in the Amur region and on Kamchatka respectively, materials of *Xanthoperla curta* (MCLACHLAN), *X. kishanganga* (AUBERT) and *X. gissarica* n.sp. were collected by L. A. ZHILTZOVA mainly. Besides, specimens collected by several earlier investigators were examined. Holotypes and most of the paratypes are preserved in the collection of the Zoological Institute in Leningrad, a few paratypes in the collection of the Zoological Museum of Moscow University, in that of the Pacific Institute of Fish Economy and Oceanography in Petropavlovsk on Kamchatka and in the Limnologische Flußstation at Schlitz.

### Genus *Haploperla* NAVÁS

1934 *Haploperla* NAVÁS, Notes Ent. Chinoise, Mus. Heude, 2 (1): 10. — Monotypic, type-species: *Haploperla ussurica* NAVÁS.

Representatives of this genus are easily recognized by the absence of forks of the longitudinal veins and the extraordinary reduction of the anal fan in

*Entomol. Ts. Arg.* 92. H. 3-4, 1971

both wings (fig. 1 a) and by their minute size too. These characters as well as those observed in the inner male genitalia (they differ from most other Chloroperlidae of the Far East in that the terminal sections of the seminal vesicles are fused to form a long unpaired tube and by the presence of four tubular accessory glands) show that *Haploperla* belongs to the more highly evolved genera of the family (ZWICK 1972).

According to the original description of the type-species, *H. ussurica* NAVÁS, this is an entirely pale insect without any definite markings; unfortunately, the types are not available but obviously the species taken for *H. ussurica* by subsequent authors is new (see below), while the real *H. ussurica* had not been taken since the original description; we redescribe it after material collected recently.

*Haploperla ussurica* NAVÁS

(fig. 1 a—e)

1934 *Haploperla ussurica* NAVÁS. Notes Ent. Chinoise, Mus. Heude, 2 (1):11. — Type locality: Sutschan Ussuri.

Length of body 4.5—5.0 mm in the ♂, 5 mm in the ♀; expanse of the ♂ 12—13 mm, of the ♀ 13.5 mm.

General colour very light, pale yellow (specimens kept in alcohol), without dark markings on the head and prothorax; only eyes and ocelli black. Basal section of antenna (up to the 9th or 10th segment) whitish, brownish distally. W-shaped pattern on meso- and metanotum very light, slightly brownish, the median stripe of this figure very pale, indistinct. Wings (fig. 1 a) subhyaline, veins pale, C and Sc slightly brownish. In the frontwing Sc is very short, reaching to the middle of the wing. Rs of both wings not forked, A<sub>1</sub> and A<sub>2</sub> of the frontwing not forked. Anal part of hindwing very small, but distinct, not folded, with three veins (the third one being pale, indistinct).

Longitudinal stripe on the abdomen rather pale, only slightly brownish, extending from the first to the seventh tergite; the spot on the first segment is smaller and lighter than those on the following tergites, that of the 7th tergite small and situated near the front margin of this segment. In the ♀, the longitudinal stripe is somewhat broader and darker than in the ♂. Cerci yellowish, 8—9 segmented.

♂ (fig. 1 c—e). 9th sternite slightly produced backwards and rounded. 9th tergite elevated, rounded and densely covered with hairs. Epiproct short, directed upwards, with tip sharp in lateral view; dorsal view broad, rounded and membranous at the base, triangularly narrowed and sclerotized at the apex. 10th tergite with an oblong sclerotized stripe in a longitudinal depression, this stripe rather light and not quite distinct, somewhat broadened at the base of the epiproct.

Penis similar to the one of *H. lepnevae* n.sp. (see below), the only difference could possibly be that the spine-like sclerite with the anchor-shaped base is a little longer and more slender in *H. ussurica*.

♀ (fig. 1 b). Hind margin of the 8th sternite extended backwards, forming a rather short and triangular subgenital plate with rounded tip. The subgenital plate covers half or little more of the 9th sternite.

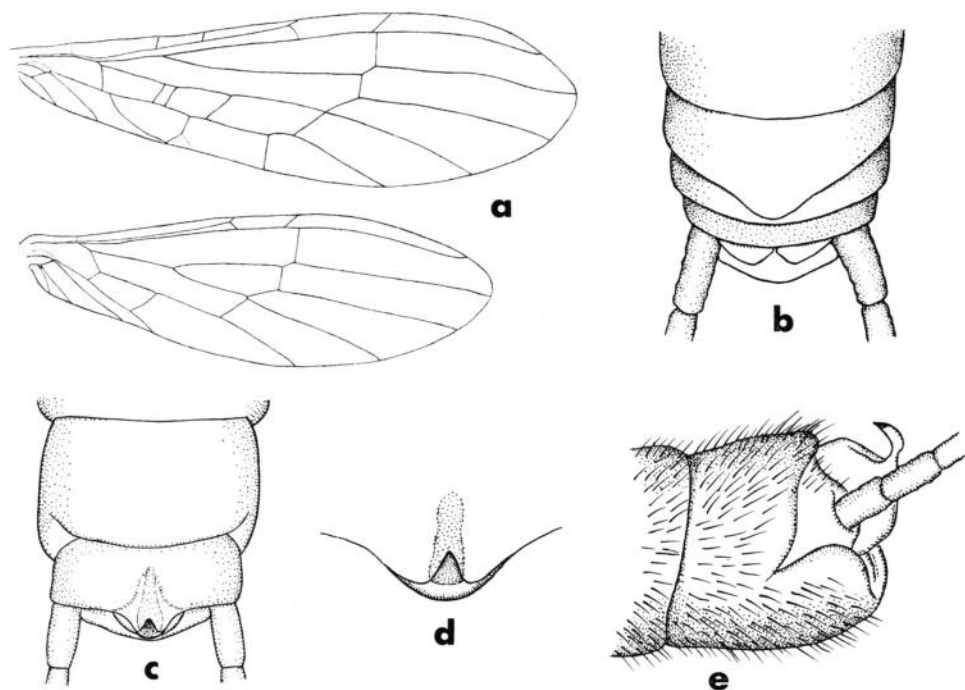


Fig. 1. *Haploperla ussurica* (NAVÁS). Wings (a), ♀ abdominal tip, ventral view (b), ♂ abdominal tip dorsally (c) laterally (e), epiproct dorsally (d).

**Affinities:** the species differs from the other two known species of *Haploperla* by the lighter colour of the body, absence of dark markings on the dorsal surface of head and thorax, the lack of lateral brown stripes on the abdominal base and by the W-shaped marking on meso- and metanotum which has the middle stripe pale and indistinct. For further differences see under *H. lepnevae* n.sp.!

**Material:** Amur-basin, River Khor, 23.6.1961, 3 ♂♂, 1 ♀ (leg. I. M. LEVANIDOVA); same locality and collector, 17.6.1961, 7 ♂♂, 5 ♀♀.

*Haploperla lepnevae* ZHILTZOVA et ZWICK, n.sp.

*Haploperla ussurica* — auct., nec NAVÁS! see ILLIES 1966: 445.

Shape and general structure as in *H. ussurica*, size similar too (4.5—5 mm long, expanse 12—13.5 mm), but strikingly different in aspect by a number of dark dorsal patches. On the head, a dark brown patch covers the area between the ocelli and extends a little more to the sides in front of the posterior ocelli (fig. 2 e). The prothorax is yellowish, except for a longitudinal brown patch of slightly variable shape in the middle, which reaches from the front to the rear margin and is widest posteriorly; it covers less than half of the width of that segment.

Longitudinal brownish spots are present on meso- and metanotum too.

beginning with a wide base in front of the W-marking and terminating anteriorly in a rounded tip. The W-pattern is distinct, its median line sharply delimited, lanceolate. A median band of dark patches extends over the abdominal tergites 1 to 7; there are additional small dark patches aligned along the sides of abdominal segments 1—3. Finally, the tips of the long antennae are dark too, growing gradually paler towards the base.

♂ (fig. 2 a—d). The 9th segment normal, tergite brownish at the base and along a diffuse median line, sternite extended into a subgenital plate. Tergite 10 small, pale, with a minute epiproct. The basal arm of this does not reach to the front margin properly, the terminal hook is curved and very pointed in lateral view, with the rear face pale and soft.

Penis (fig. 2 c, d) lacks hard and distinct sclerites, it consists of a small chitinous cap with wrinkled surface, which is distally split into two lobes, the tips of which are rather wide in lateral view. The approximatively heart-shaped appearance of the organ in dorsal view is characteristic, but there is no definite lateral sclerite. Below the two distal lobes and normally hidden between them, consequently very difficult to see, is a thorn-like little sclerite which originates from a bifid base; the whole resembles an anchor or reversed T.

The penial apex described above forms the tip of a long penial shaft, in which it is concealed in resting position. At its base, the shaft is covered by minute, delicate spicules, the rest is bare with only a few scattered tiny teeth occasionally.

♀. Similar to *H. ussurica*, sternite 8 triangularly produced to form a small subgenital plate with blunt tip.

Affinities: This species bears some resemblance to *H. japonica* KOHNO; in the latter species, pigment is said to be black and it differs in the shape of the pronotal patch too, which is widest in front. According to the drawing given by UENO & OKAMOTO (1950), the epiproct looks different too, having a rounded tip; KAWAI (1967) calls it membranous. KAWAI's description of the colouration seems to be incomplete when it is compared to the drawing given by UENO & OKAMOTO; no material has been available for study.

The main characters distinguishing the new species from *H. ussurica* have been mentioned above; additional differences comprise the presence of a brownish pattern on tergite 9 in the ♂ of *H. lepnevae* and the more sharply pointed epiproct which seems to be wider in dorsal view too. These differences, however, are minute and not easily observed.

Material: Holotype ♂, Amur basin, River Khor, 15.6.1961, leg. I. M. LEVANDOVA; paratypes: 2 ♂, 5 ♀ taken together with the holotype; from the same locality and collector: 1 ♂, 2 ♀ 17.6.1961, 1 ♂ 1 ♀ 23.6.1951. Most of the following specimens in the collection of the Zoological Institute in Leningrad are pinned: Amur near Beitonovo, 28.5.1915, 1 ♂, 1 ♀; Amur 60 km below Khabarovsk, 13.5.1911, 1 ♀ (SOLDATOV); Amur 230 km below Khabarovsk, 26.5. 1911, 1 ♂ (SOLDATOV); lower reaches of Amur, 11.6.1910, 1 ♀ (SOLDATOV); Amur, N8896, 2 ♀ (RADDE); Amur, N 8905 2 ♂ (RADDE); Maritime Provinces, Jakovlevka (DJAKONOV, FILIPJEV): 20.5.1926, 1 ♂; 24.5.1926, 1 ♂; 19.6.1926, 2 ♀; 28.6.1926, 1 ♀; 29.6.1929, 2 ♂; Jakovlevka, River Daubikhe (DJAKONOV, FILIPJEV), 15.6.1926, 1 ♂, 2 ♀; Sakhalin, River Ljutoba, 17.6.1956, 2 ♀ (VIOLOVICH). Krasnojarsk district, Reservation "Stolby", River Mana, 14.6.1957, 2 ♂, 2 ♀ (G. D. DULKEIT); Krasnojarsk, 7.6.1912, 1 ♂ (BASHMAKOVA); Birjusa, 50 km S.-W. of Krasnojarsk, 9.6. 1903, 1 ♀ (SALSTREAM); Envir [ons] Minussinsk, 7.6.1924, 1 ♀ (N. FILIPJEV). Gebiet d[es] Jakutsk (CZEKANOVSKI): 9.7., 1 ♀ (no year indicated), 1 ♀ (without date); Münd[ung] d[es] Alakit, Gebiet Jakutsk, 23.7., 1 ♀.

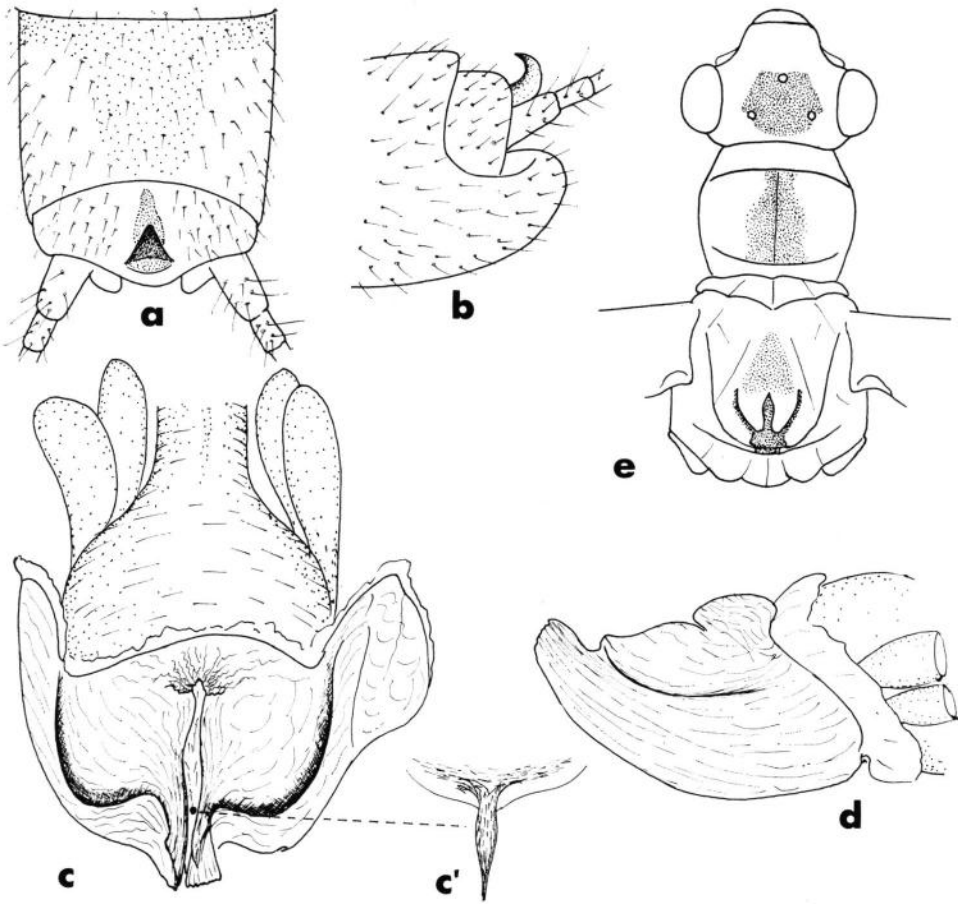


Fig. 2. *Haploperla lepnevae* n. sp. ♂ abdominal tip dorsally (a) and laterally (b), penis (resting position, ventral view, with part of the inner organs still attached: c; in c' the normally hidden anchor-shaped sclerite; lateral view: d).

*Triznaka diversa* (FRISON)

(fig. 3 a—f)

1935 *Alloperla diversa* FRISON, Trans. amer. ent. Soc., 61: 333; fig. 2, 5, 16, 20, 31, 40. —

Type locality: Hood River, Parkdale, Oregon.

1966 *Triznaka diversa* — ILLIES, Katalog: 457.

The discovery of this species in Asia is of extraordinary zoogeographical interest — the species is known from Western North America, where it occurs from California north to Alaska. Though it has recently been stressed (ZWICK 1971 b) that the Eastern Palearctic (which, as far as stoneflies are considered, has almost nothing in common with the Western Palearctic) shows a strikingly close faunistical relationship to the (Western) Nearctic, this is in

fact the first species of stoneflies known to occur on both continents (a few strictly circumpolar species excepted)! All other faunal similarities are at generic level.

To facilitate recognition of this species, we give a short description of the main characters. The insect is small, 6—8 mm long. It is pale, with prominent dark markings. The head is pale with the eyes and ocelli black and there are faint brownish spots on the clypeus and two behind the ocelli on the occiput. Pronotum with brown lateral rims and only fine dark lines along anterior and posterior border and along the middle; pronotal callosities occasionally with a faint brown tinge. Dark W-shaped patterns on both pterothoracic segments, pleural folds and ventral sutures also dark. On the abdomen, the usual median stripe over tergites 1—8 (it is widest in the middle, tapering to both ends) and the lateral ones along the first three segments are present. Wings (fig. 3 f) transparent, venation as typical for the genus. Antennae dark brown except for the light basal third; legs yellowish with slightly infuscated biarticulated tarsi. Cerci yellow, consisting of 8—10 segments, hardly longer than half of the abdomen.

♂ (fig. 3 a—d). The inner genitalia follow the pattern characteristic of the genus *Triznaka* (fig. 3 a). The subquadrate tip of the epiproct (fig. 3 d) is characteristic, though it is pale and is easily overlooked (FRISON's original figure does not show it well, but our specimens have been compared to specimens from Montana, which also have it). The penis with its two feather-like appendages (fig. 3 a, 3 b) is highly diagnostic; on the penial shaft, rows and patches of spicules occur.

♀ (fig. 3 e). Segment 8 extended in a long, parabolic subgenital plate reaching to the tip of segment 10; sometimes, it is even more rounded than shown in fig. 3 e. Its surface is less hairy than the rest of the sternite; two sharp longitudinal folds setting the sternite off against the lateral portions of the segment are present.

Material studied: Kamchatka, River Ozernaja (Kurilskaja), 31.7.1968 3 ♂, 5 ♀ (I. M. LEVANIDOVA); Kamchatka, River Bushueva, running into lake Azabachye, (I. M. LEVANIDOVA): 4.8.1969 1 ♀; 5.8.1969 5 ♂, 7 ♀, 1 larva.

### *Xanthoperla kishanganga* (AUBERT)

(fig. 4 a, b)

1959 *Chloroperla kishanganga* AUBERT, Mem. Soc. Vaud. Sci. Nat., 12: 89; fig. 92—94. — Type locality: Gilgit, Cachemir and Jammou, Pakistan.

1967 *Xanthoperla kishanganga* — ZWICK, Mitt. schweiz. ent. Ges., 40 (1/2): 9; fig. 7.

This species is new to the fauna of the USSR. It has only been known from Pakistan and Afghanistan before. Males can be separated from the following species by their stout epiproct which is wider than high and has its anterior margin straightly cut and by the penial sclerites (see ZWICK 1967). The presence of dark markings on the frontoclypeus is characteristic of both sexes and readily distinguishes them from both *X. curta* (MCLACHLAN) and *X. gis-sarica* n.sp.

Material (all collected by L. A. ZHILTOVA): Tadzhikistan, West Prepamirs: Khozretisho Range, river Obirangou (tributary of the river Pyandzh), envir. Nulvand, 27.5.1970, 1 ♂, 1 ♀, 5 larvae; 28.5.1970, 1 ♂, 4 ♀. Darvaz Range, stream below the

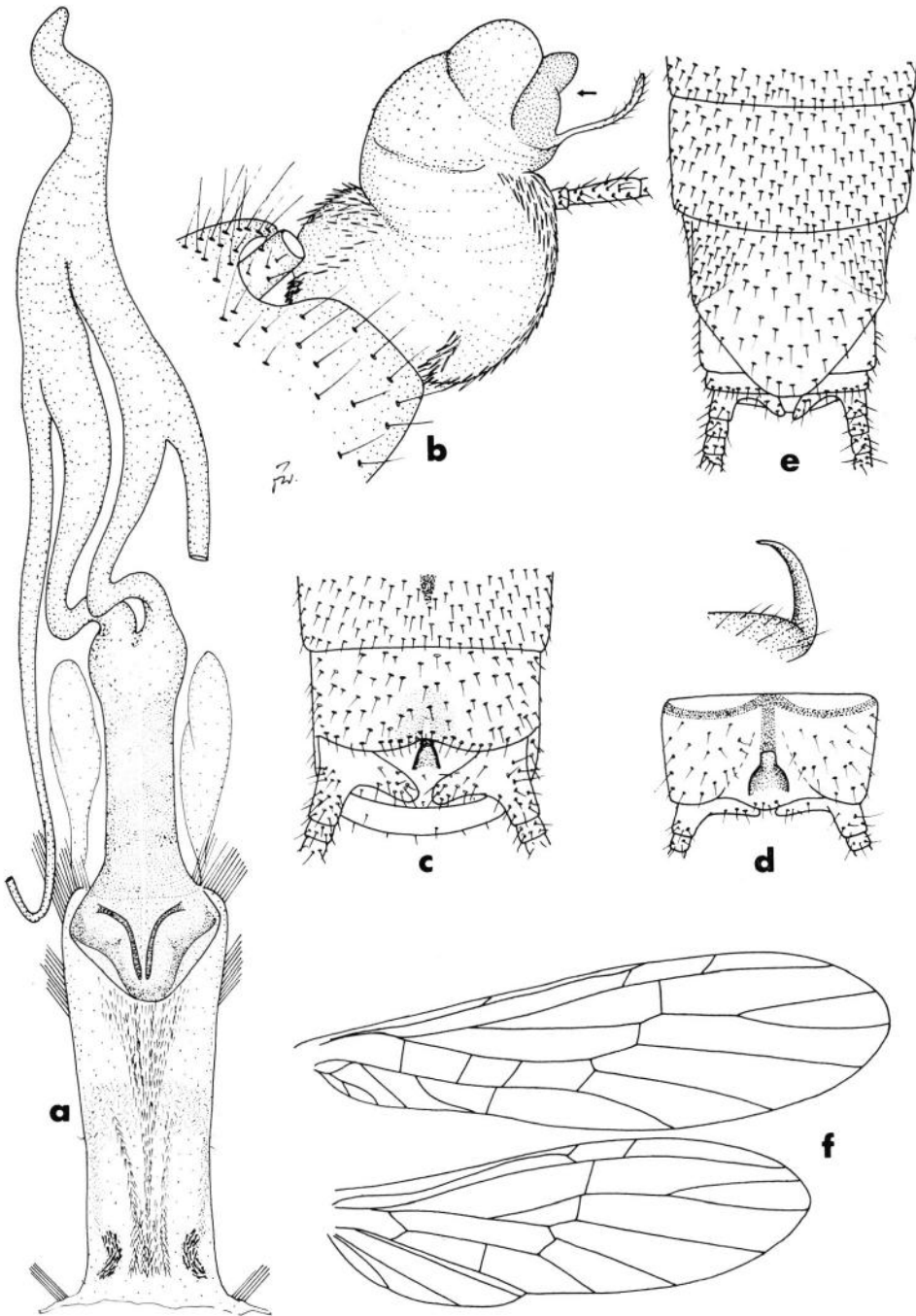


Fig. 3. *Triznaka diversa* (FRISON). Penis and part of the inner genitalia (a), extruded penis (b), ♂ abdominal tip, dorsal view (c), tergite 10 of male, dorsally, epiproct, laterally (d), ♀ abdominal tip, ventral view (e) and wings (f).

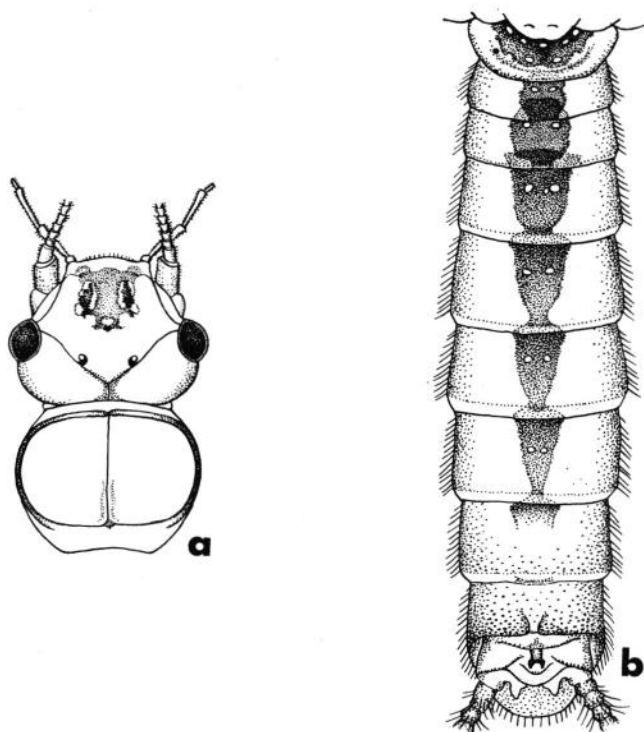


Fig. 4. *Xanthoperla kishanganga* (AUBERT). Head and prothorax (a), abdomen (b), dorsal views.

pass Khabu-Rabot, tributary of the river Obikhumbgou, 29.5.1970, 14 ♂, 9 ♀, 4 larvae. River Viskharv (tributary of the river Pyandzh) 50 km east of Kalai-Khumb, 30.5.1970, 3 ♂, 1 ♀, 2 larvae; stream, tributary of the river Viskharv, 31.5.1970, 1 ♂, 2 larvae. Stream near the village Kurgovat, 1.6.1970, 12 ♂, 2 ♀, 14 larvae. Mountain Badakhshan: Vanch Range, stream (tributary of the river Vanch) near village Chikhokh, 2.6.1970, 19 ♂, 3 ♀. Yasgulem Range, river Yasgulem, 4.6.1970, 1 ♂; stream (tributary of the river Yasgulem near village Matravn), 5.6.1970 45 ♂, 16 ♀, 7 larvae. River Bartang, stream near village Bartang, 7.6.1970 11 ♂, 3 ♀, 1 larva. Envir. Khorog, river Shakhdara, 10.6.1970, 1 ♂; 16.6.1970, 1 ♂; 19.7.1969, 1 ♀; stream Andzhindara (tributary of the river Shakhdara) near village Andzhin, 25.7.1969, 54 ♂, 47 ♀, 7 larvae; stream Vesdara (tributary to the river Shakhdara), 2800 m, 23.7.1969, 1 ♂, 1 ♀; 24.7.1969, 1 ♂, 8 ♀. Stream, tributary of the river Gunt, near village Suchan, 21.7.1961, 1 larva; another tributary to the river Gunt near village Kolkhosabad, 21.7.1969, 5 ♂, 6 ♀, 3 larvae; spring brook at the same locality, 21.7.1969, 1 ♂, 4 larvae.

*Xanthoperla curta* (MCLACHLAN), comb.nov.

(fig. 5 a—f, 6 a—h)

1875 *Isopteryx curta* MCLACHLAN, FEDTSCHENKO's Travels in Turkestan: 53.

1875 *Isopteryx montana* — MCLACHLAN (nec PICTET!), FEDTSCHENKO's Travels in Turkestan: 52.

This species was originally described by MCLACHLAN from brachypterous females collected by A. FEDTSCHENKO in the Alai Mountain Range and in the Alai valley; its identity has been dubious since. These females resemble those



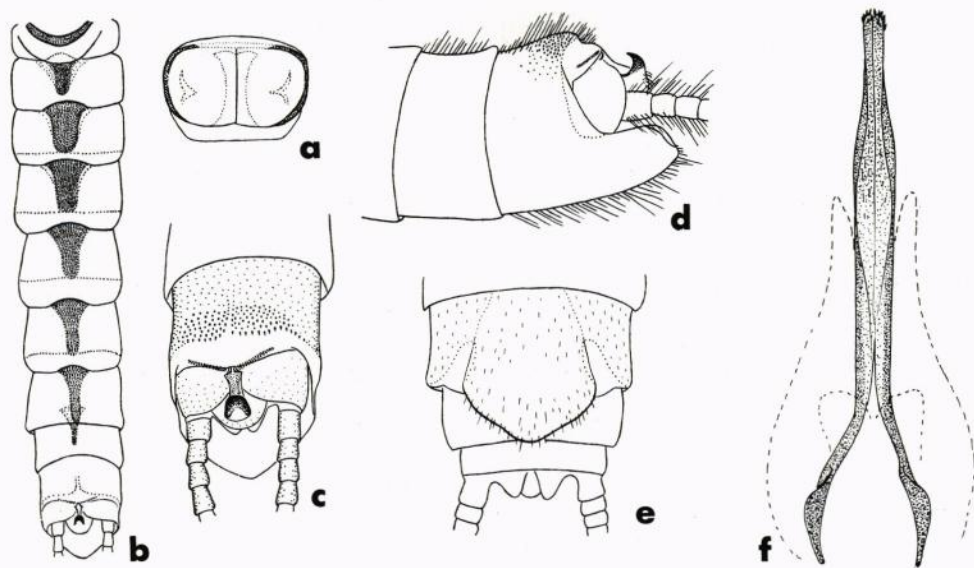


Fig. 5. *Xanthoperla curta* (MCLACHLAN). pronotum (a), ♂ abdomen, dorsal view (b), ♂ abdominal tip, dorsal view (c), lateral view (d), ♀ abdominal tip, ventrally (e), penis in half-diagrammatic ventral view (f).

contained in the long series of specimens collected in 1966—1970 by the senior author in different places in Tien-Shan and in the Turkestan, Alai and Gissar Mountain Ranges. The vast majority of these specimens are full-winged, but in the Alai and Turkestan Mountains slightly brachypterous specimens are very rarely met among macropterous ones. Apparently, they all belong to the same species which we redescribe here; the hitherto unknown male is also described.

30 males and 30 females were measured; the body-length varies from 8—11 mm in males, from 10—14 mm in females. Forewings are 9—10 mm long in males, 10.5—12.5 mm in females and expanses are 19—22 mm or 22—27 mm respectively (for dry specimens of his "*Isopteryx montana*" MCLACHLAN indicated a length of 7—9 mm and an expanse of 20—24 mm, sex was not indicated; for brachypterous females of *I. curta* he gives a body-length of 7 mm and an expanse of 14 mm).

General colour yellow, in living insects tinged with green. Head without dark markings, only the ocelli are edged with dark pigment; basal part of antennae yellow, remainder brownish, growing gradually darker towards the ends. Pronotum light (fig. 5 a), its lateral margins usually dark, sometimes light. Wings mostly fully developed, extending far beyond the tip of the abdomen, very rarely shortened and extending only to the abdominal tip. Longitudinal stripe on the abdomen brown, extending from the first to the eighth tergite (fig. 5 b) and consisting of 7 oblong spots (the 8th spot is indistinct). Usually, the individual spots are of characteristic shape, broad anteriorly and narrowing and rounded posteriorly. However, this character

is rather variable and in specimens from Alai Mountains the spots (particularly the anterior ones) are larger, less narrowing backwards and not rounded posteriorly, as they are in specimens from Tien-Shan. The stripe as a whole is narrowing backwards.

♂ (figs. 5 c, d). Epiproct dark, in dorsal view with bluntly rounded tip, almost not narrowed from the base to the tip, in lateral view curved forward, with sharply pointed tip. 9th sternite produced backwards, the rear margin angularly projecting, 9th tergite with two groups of dense strong bristles near the posterior edge. Penis (fig. 5 f; compare figs. 7 c—e — *X. gissarica* n.sp. — too!) slender, consisting of two sclerites with spinulose tips, lying parallel distally and diverging basally within the muscular penial apex, with outwardly directed basal expansions for muscle attachment. Basal arms less than half as long than the parallel section of the sclerites. Sclerites widest before the tip, tapering slowly; the narrow section long, much longer than the width of both sclerites taken together. In lateral view, sclerites are gently arched. Above and below these sclerites a number of membraneous folds and lobes occur; the dorsal ones are short and bluntly triangular, the ventral ones long and pointed, reaching dorsally on the outer side and bearing a smaller triangular ventral lobe medially.

♀ (fig. 5 e). Subgenital plate very much produced backwards, covering most of the 9th sternite, with rounded or slightly angular posterior margin, with rather dense hairs along the margin, otherwise only scattered hairs.

Larva (fig. 6). Mature male nymphs are 9—10,5 mm long, female nymphs measure 10,5—12,5 mm. Dorsally, the general colour is yellow-brownish, ventrally it is yellow. Abdomen unicoloured, light brown, head and thorax yellow with brown markings. On the head a large dark spot between the ocelli extends in front up to the M-shaped line and there are two less distinct spots on the occiput. Pronotum with a dark stripe along the fore margin and a broader, dark stripe along the hind margin. Meso- and metanotum with two dark stripes along the wingpads and less distinct small markings near the median line at the anterior and posterior margins. Abdomen light brown, sometimes indistinctly lighter along the middle. Legs yellowish.

Mouthparts of the shape typical for the family (fig. 6 e—h). Lateral margins of the pronotum slightly rounded, as are anterior and posterior margins too (particularly the latter); there is a fringe of long hairs along all margins. These hairs are especially long and dense near the angles, but very sparse in the middle of the lateral margins. Cerci shorter than the antennae, each article with a ring of hairs (two of which are long) around its hind margin.

The sex of mature larvae is easily recognized. Males have the row of hairs along the posterior margin of sternite 8 interrupted, the 9th sternite is longer than in the ♀ and the 10th tergite is posteriorly blunt and rised, the epiproct may already be visible by transparence (fig. 6 b, c). Females also have an interruption of the hair-fringe of sternite 8, but there is an obvious thickening of the sternite's rim; furthermore, the 10th tergite of the ♀ is sharply angular behind. (fig. 6 d).

The present larva differs from the few known larvae of European Chloroperlidae, from the larva of *Pontoperla* from Asia Minor (ZWICK 1971) and can also be distinguished from the larva described as *Chloroperla* sp. from the Karakoram by KAWAI (1963).

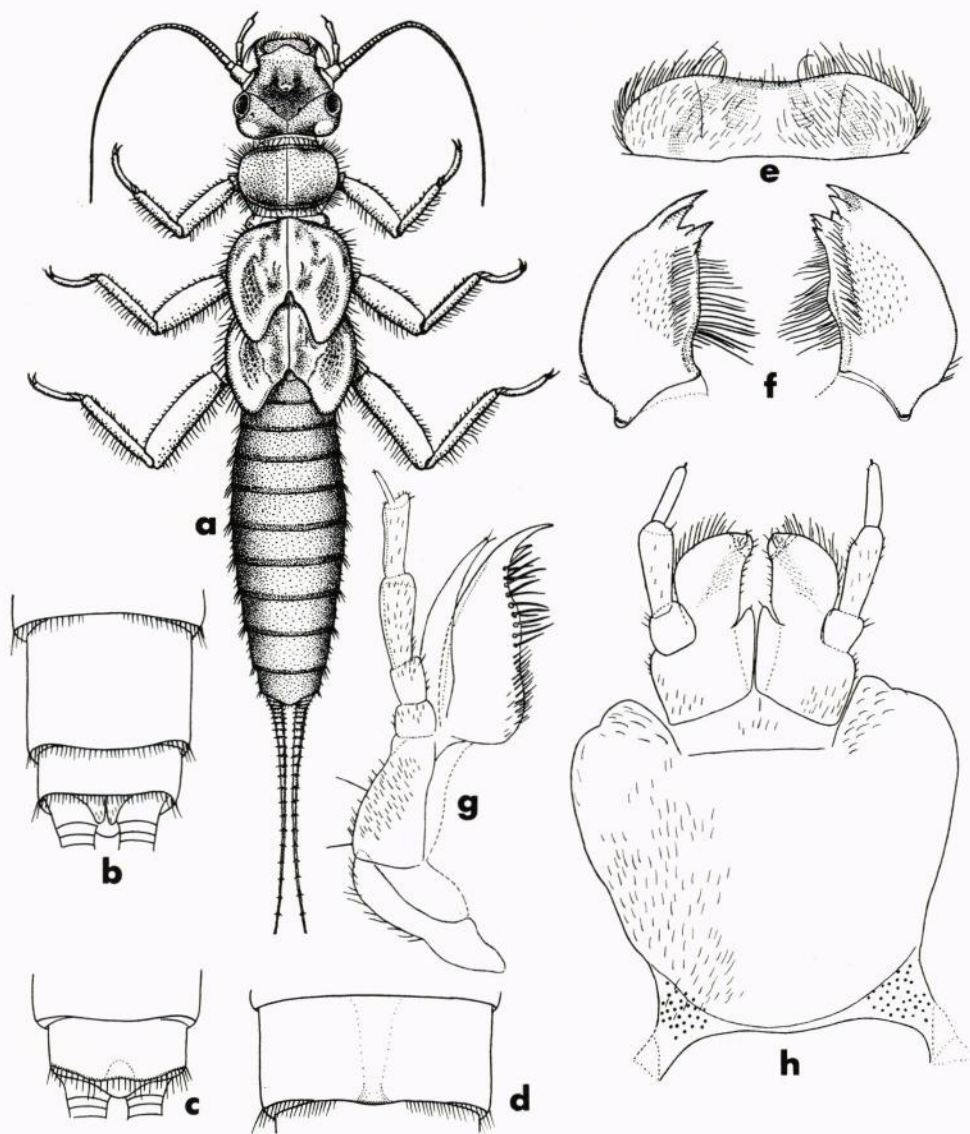


Fig. 6. *Xanthoperla curta* (McLACHLAN), nymph, general aspect (a), ♂ abdominal tip from below (b) and above (c), 8th sternite of ♀ (d), labrum (e), mandibles (f), maxilla (g) and labial segment (h).

Affinities: *X. curta* is the closest relative of *X. gissarica* n.sp. Both resemble *X. kishanganga* in general aspect and in the structure of the penial sclerites; on the other hand, they remind of the only European species of the genus, *X. apicalis* (NEWMAN), which has the tips of the penial sclerites spinulose like *X. curta* and *X. gissarica* n.sp.

Area: Middle Asia.

Material studied (if not indicated otherwise, the material has been collected by L. A. ZHILTOVA!):

Syntypes of *X. curta*: Alai-Mountains, Pass Isfairam (now Tengizbai), 19.7.1871 1 ♀ (A. FEDTSCHENKO); Alai valley, 24.7.1871 2 ♀ (A. FEDTSCHENKO) (Collection of the Zool. Museum of Moscow University).

Specimens identified as *Chloroperla montana* by McLACHLAN (Coll. Zoological Museum of Moscow University): Valley Zeravshan, canyon Dzhidzhik-Rut (northern slope of Gissar Mountains) 19.6.1870 1 ♀; Zeravshan Mountains, envir. fortress Sarvada, 23.6.1870 3 specimens; Turkestan Mountains, upper reaches of the river Isfara, Canyon Khodzha-Chiburgan, 21.6.1871, 1 ♂, 1 ♀; canyon Dzhhytyk, 23.6.1871 1 ♂ (all leg. A. FEDTSCHENKO).

Talas Alatau Mountains, reservation Aksu-Dzhabagly: river Big Baldabrek: 15.6.1965 many ♂♂, ♀♀ and larvae (L. ZIMINA); 26.5.—13.6.1966 many ♂♂, ♀♀ and larvae; 24.6.1966 1 ♀, 29.6.1966 1 ♂, 3 ♀, 7.7.1966 1 ♀ (R. FISETSCHKO); 23.—28.4.1967 1 ♂, many larvae. River Little Baldabrek: 4.—6.6.1966 2 ♂, 11 larvae. Brook Bakhrau: 29.5.—14.6.1966 very many ♂♂ and ♀♀. River Aksu: 8.6.1966 3 ♂, 4 ♀; 30.4.1967 1 larva. River Dzhabagly, 16.4.1967 1 larva. Valley Dzehtymsai, 10.6.1966 1 ♂. Brook Kshy-Kaindy, 22.—24.5.1966 2 ♂, 1 ♀. Southern slope of Talas Alatau Mountains (near their border to the Susamyr-tau Mountains), upper reaches of the river Chichkan (tributary of river Naryn), 28.6.1966 1 ♂. Zailiji Alatau Mountains, envir. Alma-Ata, Gorelnik, 28.7.1968 1 ♀. Kuramin Mountains, pass Kamchik, 18.6.1966 1 ♂, 1 ♀. Chatakal Mountains, reservation Sary-Tschelek, river Khodzha-ata, 23.6.1966 2 ♀; brook falling into the lake Sary Tschelek, 24.6.1966 6 ♂, 6 ♀, 1 larva. Kirgiz Mountains, river Tujuk (45 km south-east of Frunze), 3.7.1966 2 ♂; brook on the southern slope of pass Dolon, 8.7.1966 1 ♂. Alai Mountains, district Naukat, valley Kirgiz-ata, 2000—2700 m, 20.—22.6.1970 8 ♂, 12 larvae. Turkestan Mountains, (near their border with the Alai Mountains), upper reaches of the river Sokh, brook near village Rovut, 2200—2430 m, 24.—26.6.1967 22 ♂, 12 ♀; upper reaches of the same brook, 25.6.1970. 19 ♂, 20 ♀ and 3 larvae; Turkestan Mountains, western part, valley Kusavli-Say, 28.6.1970 1 ♂ and 4 larvae from a spring brook.

Gissar Mountains, northern slope: river Yagnob near village Yagnob, 4.7.1970 6 ♂, 3 ♀. Gissar Mountains, southern slope: valley Takob, 19.6.1969 1 ♂, 1 ♀; valley Takob, spring brook near the banks of the river Takobka, 21.—25.6.1969 5 ♂, 6 ♀; river Takobka, 23.6.1969 8 ♂, 6 ♀; valley Varmonik (in the upper part of the valley Takob), 21.6.1969 4 ♂, 13 ♀, 1 larva; Takob, rapid brook, 6.7.1965 6 ♂, 10 ♀ (A. BULGAKOVA). Upper reaches of the river Varzob near village Ziddy, 7.—11.7.1969 3 ♂, 9 ♀; brook (left tributary of the river Varzob) near village Ziddy, 10.7.1969 3 ♂, 8 ♀, 8 larvae. Reservation Ramit, 2700 m, 22.7.1967 8 ♂, 15 ♀ (A. BULGAKOVA); reservation Ramit, small mountain brook, 2500 m, 6.7.1967 2 ♂; river Sardai-Miona, 24.6.1967 1 ♂; river Sardai-Miona near village Viston, 29.6.1969 1 ♀, 1 larva; brook Pshandoch (tributary of the river Sardai-Miona) 30.6.1969 2 ♂, 2 ♀, 2 larvae.

*X. curta* is a very common and abundant species in Tien-Shan. The period during which adults have been collected extends from May to July. They appear in great numbers on the grass along the banks of rivers and brooks, newly hatched specimens are met under stones. The adults were infected by small red mites, densely covering their bodies. Larvae are found from April to the middle of June in the water under stones, mainly in localities protected from strong current, sometimes in accumulations of moss and sand near the banks. Water temperatures of the rivers in the reservation Aksu-Dzhabagly during the larval period were 4.0—9.5°C and 4.0—14°C when the adults appeared. The larvae inhabit running mountain waters of different kind, mainly big rivers and brooks with strong current, rarely small brooks. The range of altitude inhabited is 1300—2500 m, possibly even higher; the species was abundant at elevations between 1800 and 2200 m in the Aksu-Dzhabagly reservation.

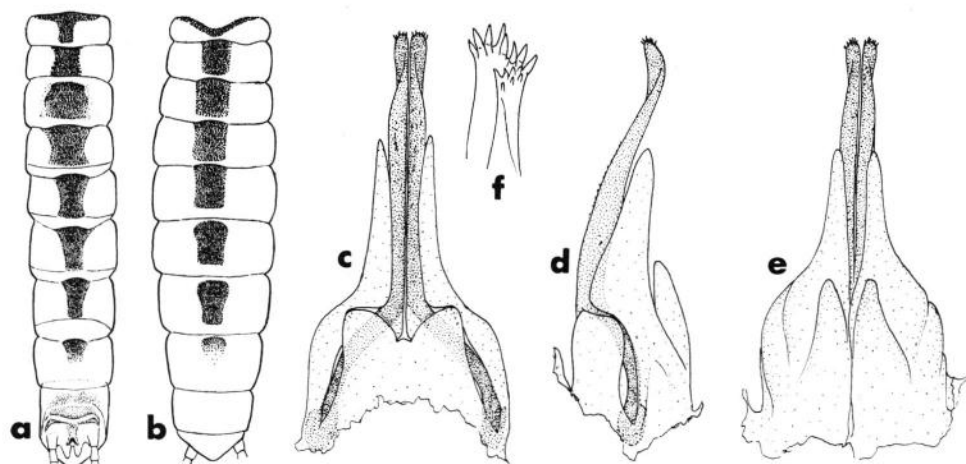


Fig. 7. *Xanthoperla gissarica* n. sp. - dorsal views of ♂ (a) and ♀ (b) abdomina, penis in dorsal, lateral and ventral view (c—e); in f, tip of the left penial sclerite, enlarged.

*Xanthoperla gissarica* ZHILTZOVA et ZWICK, n.sp.

(fig. 7 a—e)

1875 *Isopteryx tripunctata* — MCLACHLAN (nec SCOPOLI!), FEDTSCHENKO'S Travels in Turkestan: 53.

This species is very similar to *X. curta* in shape, but differs from the latter species in size and some other characters.

Length of body 5—9 mm for the ♂, 8.5—10 mm for the ♀; length of forewing 7.5—8.5 mm (♂) or 8.5—10 mm (♀), expanse 16—17 mm or 18.5—21 mm respectively. General colour yellow, somewhat brighter than in *X. curta*. The dark stripe along the lateral margins of the pronotum broad and very dark, always present, while in *X. curta* it is a little narrower and lighter, sometimes even entirely absent. Longitudinal stripe of the abdomen very dark and clearly wider than in *X. curta*. The stripe is narrowing posteriorly in the ♂ (fig. 7 a) but almost not in the ♀ (fig. 7 b). Each spot in the stripe, particularly in its anterior portion, is quadrangular and less narrowing backwards than in *X. curta*.

Epiproct of the ♂ smaller than the one of *X. curta*, in dorsal view clearly narrowing to the tip. However, the shape of the epiproct is rather variable and this narrowing is not always distinct. 9th tergite near the posterior margin, behind the convex hairy parts, more sclerified and shining than in *X. curta*. Penial sclerites (fig. 7 c—e) very similar to those of *X. curta*, but considerably shorter and stouter. The basal arms of the sclerites are more than half as long as the parallel distal sections, the narrowed tip is short, only as long as both sclerites together wide at the tip.

Subgenital plate of the ♀ resembling that of *X. curta*, though it is a little shorter and its rear margin is more smoothly rounded than in the related species.

Area: Middle Asia.

Material examined: Holotype, 1 ♂, Tadzhikistan, reservation Ramit (southern slope of the Gissar Mountains), 2700 m, 22.7.1967, mountain brook (leg. A. BULGAKOVA).

Paratypes (collected by L. A. ZHILTZOVA, if no other statement is made): Turkistan Mountains, valley Kusavlisay, 28.6.1970 1 ♂. Valley Zeravshan, envir. Obburdon, 1830 m, 5.6.1870 4 ♂ (O. FEDTSCHENKO). Gissar Mountains northern slope, envir. village Anzob, 9.7.1961 1 ♂; river Yagnob near village Yagnob, 4.7.1970 1 ♂, 1 ♀. Gissar Mountains, southern slope: upper reaches of the river Varzob (envir. village Ziddy), 11.7.1969 1 ♀, 3 larvae; valley Varzob, envir. Gushary, 25.6.1956 1 ♂ (KIRJANOVA); valley Takob, 1600—1800 m: 19.6.1969 1 ♂, 1 ♀, 1 larva; 20.6.1969 3 ♂; 23.6.1969 1 ♂, 2 ♀, 1 larva; 24.6.1969 1 ♀, 2 larvae. Spring brook near the bank of river Takobka; 21.6.1969, 11 ♂, 15 ♀; 23.6.1969 23 ♂, 27 ♀; 25.6.1969 11 ♂, 7 ♀, 2 larvae. Reservation Ramit, 2700 m, 22.7.1967, 2 ♂ 8 ♀ (O. BULGAKOVA); Ramit, river Sardai-Miona, 14.6.1967, 1 ♂ (A. BULGAKOVA); Ramit, river Zarek, 2500 m, 6.7.1967 2 ♂, 6 ♀ (A. BULGAKOVA); Ramit, brook (tributary of the river Sardai-Miona) near village Nouak, 1.7.1969 1 ♀. Karategin Mountains, above Muskinabad, 20.6.1961 4 ♀ (SOBOLEVA). West Pamirs: brook (tributary of the river Gunt, 21 km east of Khorog) 21.7.1969 3 ♂; brook (tributary of the river Shakdara) near village Redzhyst, 30.7.1969 35 ♂, 31 ♀, 3 larvae.

The area of this species differs from that of *X. curta* — the latter species is very common and largely distributed over Tien-Shan, whereas *X. gissarica* is absent from Tien-Shan and distributed considerably more to the south, namely in the Turkestan, Zeravshan, Gissar and Karategin Mountains and in the West Pamirs.

Like *X. curta* this species inhabits running mountain waters of different kinds (rivers and brooks), with strong current but, unlike the former, prefers small spring brooks near the banks of big mountain rivers and is more abundant there than in the rivers themselves. In a spring brook on the bank of the river Takobka, larvae and nymphal exuviae of *X. gissarica* were met under stones almost up to the source.

The adults are met on the grass and bushes along the water courses inhabited from June to July; in sunny weather, they fly along the brooks. When larvae and adults were found, water-temperatures in rivers varied from 4—10°C, in spring brooks from 3,5—6,0°C. The range of altitude inhabited is 1600—2700 m.

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