

Addition to the fauna of isopod crustacean genus *Macrostylis*
G.O. Sars, 1864 (Crustacea: Isopoda: Macrostylidae) of the Atlantic
and Arctic oceans, with description of three new Atlantic species

Дополнения к фауне равноногих ракообразных
рода *Macrostylis* G.O. Sars, 1864 (Crustacea: Isopoda: Macrostylidae)
Атлантического и Северного Ледовитого океанов,
с описаниями трех новых видов из Атлантики

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KEY WORDS: Isopoda, isopod crustaceans, *Macrostylis*, new species, bathyal zone, abyssal zone, ultraabyssal zone, Atlantic Ocean.

КЛЮЧЕВЫЕ СЛОВА: Isopoda, *Macrostylis*, равноногие ракообразные, новые виды, батияль, абиссаль, ультраабиссаль, Атлантический океан.

ABSTRACT: Three new species of the genus *Macrostylis* G.O. Sars, 1864 are described from the Atlantic Ocean. *Macrostylis foveata* sp.n. (Western Atlantic, 26°51'–27°18.4'N, 71°03.1'W; 5060–5420 m. Puerto Rico Trench, 19°48.7'N, 68°08'W; 6650 m) differs from all other species by two rows of pits on the pereon dorsal surface. *M. squalida* sp.n. (Central Atlantic, Romanche Trench, 0°08.5'S, 18°35.4'W; 6380–6430 m) differs from the related *M. foveata* sp.n. by the smaller size, rough teguments, lack of pits on the dorsal surface of the tergites, the elongated pleotelson, the shorter sternal spines, the larger lobe of the ischiopodite of pereopod III and some other characters. *M. emarginata* sp.n. (Northern Atlantic, 26°51'N, 71°01.3'W; 5420 m) differs from the related species *M. bifurcata* Menzies, 1962 by the more strongly tapering posterolateral parts of the tergites, the lower lobe of the ischiopodite of pereopod III with a pair of bicuspidate incrassate bristles, as well as by the angularly subacute distal ends of the hyaline processes of pleopods I. In addition, some new data on seven earlier described Northern Atlantic species of the genus *Macrostylis* and one species from the Arctic Ocean are provided. *M. magnifica* Wolff, 1962 is redescribed.

РЕЗЮМЕ: Из Атлантического океана описаны три новых вида рода *Macrostylis* G.O. Sars, 1864. *Macrostylis foveata* sp.n. (Западная Атлантика, 26°51'–27°18,4'с.ш., 71°03,1' з.д.; 5060–5420 м. Желоб Пуэрто-Рико, 19°48,7'с.ш., 68°08'з.д.; 6650 м) отличается от других видов двумя рядами ямок на дорсальной поверхности переона. *M. squalida* sp.n. (Центральная Атлантика, желоб Романш, 0°08,5'ю.ш., 18°

35,4'з.д.; 6380–6430 м) отличается от близкого *M. foveata* sp.n. меньшими размерами, шероховатостью покровов, отсутствием ямок на дорсальной поверхности тергитов, удлиненным плеотельсоном, более короткими стермальными шипами, относительно крупной лопастью исхиоподита переопода III и некоторыми другими признаками. *M. emarginata* sp.n. (Северная Атлантика, 26°51'с.ш., 71°01,3'з.д.; 5420 м) отличается от близкого *M. bifurcata* Menzies, 1962 более оттянутыми постеролатеральными частями тергитов, относительно низкой лопастью исхиоподита переопода III с парой двухвершинных утолщенных щетинок, угловато приостренными дистальными концами гиалиновых отростков плеоподов I. Кроме того, приведены некоторые новые сведения по семи ранее описанным североатлантическим видам рода *Macrostylis* и одному виду из Северного Ледовитого океана. Переописан *M. magnifica* Wolff, 1962.

The present paper puts on record some new data on seven earlier described Northern Atlantic species of *Macrostylis* G.O. Sars, 1864 and one from the Arctic, a redescription of *M. magnifica* Wolff, 1962 (earlier known from a unique female fragment from the pereonite V to the pleotelson), and also descriptions of three new species, two from the ultraabyssal zone (one from the Puerto Rico Trench, the other from the Romanche Trench) and one from the abyssal zone of the Atlantic Ocean. The underlying material was collected by R/V "Vityaz-II" (V-II), R/V "Akademik Mstislav Keldish" (AMK), R/V "Passat" (P), R/V "Akademik Kurchatov" (AK), and the drifting station "North Pole-22" (NP-22) in 1972–1989.

Table. Collecting stations.
Таблица. Станции сбора материала.

Vessel	Voyage	No. of station	Gear	Coordinates		Depth, m
				N	W	
V-II	2	77	ST	34°38.9'	37°25.0'	2500-2800
		149	1/2 GT	27°18.4'	72°03.1'	5060-5110
		150	1/2 GT	26°51.0'	71°01.3'	5420
AMK	4	268	ST	58°52.9'	24°05.9'	2665-2667
		286	BS (qualit.)	58°29.1'	31°37.8'	1545
		316-2	3/4 BS	58°46.6'	27°14.7'	2242
		390-3	ST	58°34.0'	34°51.0'	2930-2951
		392	BS	58°22.1'	31°48.3'	1565
		452	BS	58°22.4'	31°34.7'	1585
		499	ST	58°03.5'	30°21.5'	2429-2440
	18	2091	ST	73°42.8'	73°45.0'	1670-1691
P	34	16	BS	45°54.0'	17°23.0'	4650
		23	BS	46°07.3'	17°29.0'	4300
AK	14	1194	BS	19°48.7'	68°08.1'	6650
	40	4306	ST	09°32.7'	54°43.6'	3425
		4391	ST	23°17.5'	20°00.0'	3879
		4392	ST	24°26.2'	20°00.0'	3714
	11	1013	ST	0°08.5'S	18°35.4'	6380-6430
NP	22	115	SnT	75°02'	171°28'	365-400
		120	ST	74°51.1'	171°27'	325-330
		122	ST	74°52.2'	171°32.3'	325-355
		124	ST	74°54'	172°02.2'	355
		128	ST	74°52.5'	172°14.3'	325-340

Gears: ST — Sigsby Trawl; GT — "Galathea" Trawl; SnT — Sanders Trawl; BS — bottom sampler "Okean"; BS(qualit.) — qualitative sample.

The station data are summarized in a tabular form. Some of the taxa revealed are compared with type material, including syntypes of *Macrostylis spinifera* G.O. Sars, 1864, *M. abyssicola* Hansen, 1916, *M. subinermis* Hansen, 1916, and the holotype of *M. magnifica* Wolff, 1962. Type specimens of the new species are deposited in the Zoological Museum of the Moscow State University.

Macrostylis spinifera G.O. Sars, 1864
Tab.

MATERIAL. 1 ♀ without oostegites, 2.1 mm long, AMK station 286. Syntypes: 7 ♀♀ without oostegites, 1.7-2.1 mm long, 1 ♀ 2.0 mm long with 10 embryos of stage I (by diameter to 0.2 mm), 2 ♀♀ on 1.8 mm long with an empty marsupium, 3 ♂♂ 1.5-1.7 mm long and 1 intersex 1.2 mm long, all from the Oslofjord (F 15358; Christianiafjord).

ADDITION TO DESCRIPTION. Maximal body width (corresponding to middle part of pereon anterior division) 1.6 times greater than maximal width of pleotelson.

Head sub-trapezoidal, length approximately 1.3 times less than maximal width, equal to distance between the posterolateral margins; frontal sclerite 5 times shorter than head.

Maximal width of pereon anterior division 1.15 times greater than its length.

Pleotelson approximately 5 times shorter than total body length; maximal width of pleotelson 1.4 times shorter than its length and 1.2 times broader than width of its distal part.

REMARKS. The general appearance, the structure of the appendages and most of the morphometric indices allow to attribute our specimen to *M. spinifera*. At the same time, when comparing it with the female of *M. spinifera* from the type series (length without oostegites 2.1 mm), one can notice several differences. First of all, our specimen differs by the body more strongly narrowed caudally, the tergite IV a little bit broadened, a shortened pleotelson with the dorsal surface noticeably swollen in the proximal half, whereas the pleotelson of typical representatives is uniformly convex over the whole length of the dorsal surface. It is also distinguished by the shortened posterior spine of the sternal surface of the pereon's anterior division, the antenna II a little bit elongated, with a one-article exopodite rudiment on its apical article, the incrassate bristle on the lobe of the pereopod III ischiopodite less strongly curved, and the elongated protopodites of the uropods. Three of the above characters were indicated by Hansen [1916] for a female specimen (length 2 mm, from the lower bathyal zone southwest off Iceland; 61°02'N, 29°32'W; depth 1761 m), i.e. an elongated antenna II, an almost direct incrassate bristle on the pereopod III ischiopodite, and a relatively broadened pleotelson.

DISTRIBUTION. Northern-Atlantic species penetrating to the Norwegian Sea near the Lofoten Islands: 55°30'-68°N, 37.8°W-14°E.

ECOLOGY. Eurybathic species recorded between 4 and 1761 m in clayey silt with stones, shell debris, foraminifers and sand; bottom temperature 3.9-18°C, salinity 34.69-35.28 p.p.t. The maximum density was reported for the Skagerrak Strait at depth 140 m — 360 ind./m² and 0.36 g/m² [Hult, 1941].

Macrostylis abyssicola Hansen, 1916
Tab.

MATERIAL. Juvenile ♀ (underdeveloped pereonite and pereopods VII) length 3 mm, AMK station 390-3. Syntypes: 2 ♀♀ 2.9 and 3 mm long (last with 5 embryos of stage II, to 0.45 mm long everyone), 3 ♂♂ 2.3 mm long each and 1 juvenile 2.1 mm long, "Ingolf" station 22.

ADDITION TO DESCRIPTION. Teguments of body thickened and fragile, mostly granulated.

Head with convex lateral surfaces, length 1.5 times less than maximal width; proximal margin 1.55 times wider than frontal.

Length of anterior division of pereon equal to maximal width; sternal surface with well expressed median kiel.

Tergite IV not broadened frontally, with practically parallel lateral margins. Sternites IV-VII less carinate than sternal surface of anterior division. Pereonite VII and pleotelson merged dorsally, with shallow furrow on place of connection; outer segmentation expressed laterally and ventrally.

Antenna I four-articled (3rd and 4th articles very short). Antenna II with one-articled exopodite rudiment.

Mandible with 5 teeth on cutting margin; movable plate with 4 apical denticles; tooth row containing not less 7 sawtooth bristles; tooth process comparatively thickened, with 12 distal bristles.

Caudal organs being available, but statocysts poorly visible due to thickened teguments; slot-like apertures transversal.

REMARKS. In contrast to Gurjanova [1964], Svavarsson [1986] doubted that *M. abyssicola* was actually found in the

Arctic Ocean, as this species had not been revealed in the Arctic Ocean, Norwegian and Greenland seas by several specialized deep-sea expeditions. Later, Svavarsson [1988] suggested that Gurjanova misidentified another species, namely *M. subinermis* Hansen, 1916, as *M. abyssicola*. Until now, none of the later expeditions has revealed *M. abyssicola*. Unfortunately, as Gurjanova's material from the Kara Sea has not been relocated in Zoological Institute (St.-Peterburg), where they were deposited, her record remains to be confirmed. The report by Menzies [1962] of *M. abyssicola* from the Southern Atlantic seems to be rather doubtful. In the specimen depicted by Menzies, the head is virtually rectangular, the uropods are equal in length to the pleotelson, and the antenna I is triarticulate. In true *M. abyssicola*, however, the frontal width of the head is considerably less than the proximal one, the uropods are 1.3–1.5 times longer than the pleotelson, and the antenna I is four-articled. Besides, Wolff [1962] noted significant similarities between *M. abyssicola* and *M. bipunctatus* Menzies, 1962 as described from the Southern Atlantic. Hence, prior to a re-examination of the material mentioned by Menzies, this record is to be excluded from consideration.

DISTRIBUTION. Northern-Atlantic species (58°–60° 17'N, 34°51'–54°05'W).

ECOLOGY. Abyssal species found at depth 2930–3521 m in silt-covered foraminiferal sand with shingle and gravel at temperature 1.3–1.4°C.

Macrostylis subinermis Hansen, 1916

Tab.

MATERIAL. 3 ♀♀: 2 without oostegites 2.7 and 3.1 mm long and 1 ♀ with an empty marsupium 2.9 mm long, AMK station 392; 1 ♀ with an empty marsupium 3 mm long and 1 ♀ without oostegites 3.3 mm long, AMK station 452; 2 ♀♀ without oostegites 2.6 and 3.1 mm long, AMK station 2091; incomplete specimen ♂ (from head till pereonite IV, length 0.9 mm) and fragment ♂ (0.9 mm long, NP-22 station 115; 1 ♀ without oostegites 2.3 mm long and incomplete specimen ♀ (from head till pereonite IV, length 1.3 mm), NP-22 station 120. Syntypes: 1 ♀ 3 mm long with embryos of stage II to 0.4 mm long everyone, incomplete specimen ♀ (without pleotelson, length 3.1 mm) with an empty marsupium and 7 ♀♀ without oostegites 2.5–3.2 mm long, "Ingolf" station 102.

ADDITION TO DESCRIPTION. Female 3.1 mm long. Maximal width of body 1.5–1.7 times greater than maximal width of pleotelson.

Head length 1.6 times less than its maximal width.

Length of pereon anterior division almost 1.2 times less than its maximal width.

Tergite IV noticeably broadened frontally.

Length of pleotelson 1.4–1.5 times greater than its maximal width, constituting about a quarter of total body length; maximal width of pleotelson 1.3 times greater than width of its distal part; caudal organs vaguely visible, slot-like apertures diagonal.

Antenna I with one-articled exopodite rudiment.

Cutting margin of mandible uniform concave, not serrated; movable plate with 3 apical denticles; tooth row with not less than 6 sawtooth bristles; tooth process with 8 long bristles at end of tapered distal part.

DISTRIBUTION. Northern-Atlantic species widely spread in Arctic Region. Northern Atlantic — 58°10'–22.4°N, 31°34.7'–48°25'W; Arctic Region — 63°10'–67°53'N, 10°45'W–04°49'E (Norwegian Sea), 68°08'–80°04.27'N, 06°59'–16°02'W (Greenland Sea), 74°51.1'–75°02'N, 171°26.5'–171°28.1'W (Chukchi Sea), 81°30.5'N, 26°07.9'E (Arctic Ocean).

ECOLOGY. Abyssal-bathyal species known from depth 1565–3474 m (Northern Atlantic), 830–2105 m (Norwegian

sea), 232–1691 m (Greenland sea), 325–400 m (Chukchi Sea) and 850–1020 m (Arctic Ocean). In liquid silt with stones (325–400 m), silt-covered sand with gravel (800 m), aleutic-pelagic foraminiferal silt (1670–1691 m) at temperature from –1°C up to 1.4°C. The maximum quantity (133 ind./m², 0.133 g/m²) are marked for depth 850–1691 m in the Arctic Ocean.

Macrostylis truncatex Menzies, 1962

Tab. Fig. 1, a–e.

MATERIAL. Incomplete specimen ♀ (from pereonite I till pleotelson) without oostegites; 3.0 mm long, V-II station 77; ♂ 3.4 mm long and juvenile ♀ 2.4 mm long, V-II station 149; juvenile ♀ 2.4 mm long, V-II station 150.

ADDITION TO DESCRIPTION. Male 3.4 mm long. Body length 4.5 times greater than its maximal width being, in turn, 1.4 times greater than maximal width of pleotelson; setation poorly expressed, as sparse short hairs on pleotelson; macrosculpture not expressed.

Head trapezoidal, with very poorly convex, almost direct lateral surfaces; length approximately 1.15 times less than maximal width; frontal margin straight.

Anterior division of pereon rounded-quadrate, with direct lateral surfaces, length 1.15 times less than maximal width; sternal surface with small frontal spine.

Tergite IV large, noticeably broadened frontally; maximal width 2.4 times greater than length. Sternites IV–VII with small spines.

Length of pleotelson 1.5 times exceeding its maximal width, constituting a little less than a quarter of total body length; distal width 1.2 times less than maximal width; caudal organs not visible, slot-like apertures diagonal.

Antenna I with one aesthetasc on apical article.

Cutting margin of mandible flexuous, without teeth; at movable plate, not less than 4 denticles assembled longitudinally in preapical row; in tooth row 5–6 sawtooth bristles; tooth process being narrow conical, with 4 distal bristles.

Ischiopodite of pereopod III with slightly curved thickened bristle on top of lobe being noticeably displaced distally; 6 and 5 long bristles situated in, respectively, combs of meropodite and carpopodite.

Uropod 1.6 times shorter than pleotelson; protopodite 3.6 times longer than endopodite.

Female 3.0 mm long. Maximal width of anterior division of pereon approximately 1.2 times greater than its length.

Maximal width of tergite IV 2.9 times greater than length.

Length of pleotelson 1.3 times greater than its maximal width; distal width 1.5 times less than maximal width; a lot of short thin hairs disposed on the whole surface of pleotelson.

Operculum tongue-like, with 10 bristles of average length on roundly truncated distal margin.

Protopodites of uropods 2.8 times shorter than pleotelson (in ♂, this correlation about 2.1).

DISTRIBUTION. A northwest part of the Atlantic Ocean (26°51'–34°38.9'N, 37°25'–75°55'W).

ECOLOGY. Abyssal species found at depth 2500–5420 m on pteropodal-foraminiferal and silts at temperature 1.5–2.2°C.

Macrostylis setifer Menzies, 1962

Tab. Fig. 1, f–k.

MATERIAL. ♀ with empty marsupium 4.8 mm long, AK station 4306; incomplete specimen ♀ (from pereonite IV till pleotelson) 3.7 mm long and 2 incomplete specimens of juvenile ♀♀ (from head till pereonite IV 1.5 mm long and from head till pereonite VII 2.5 mm long), AK station 4392.

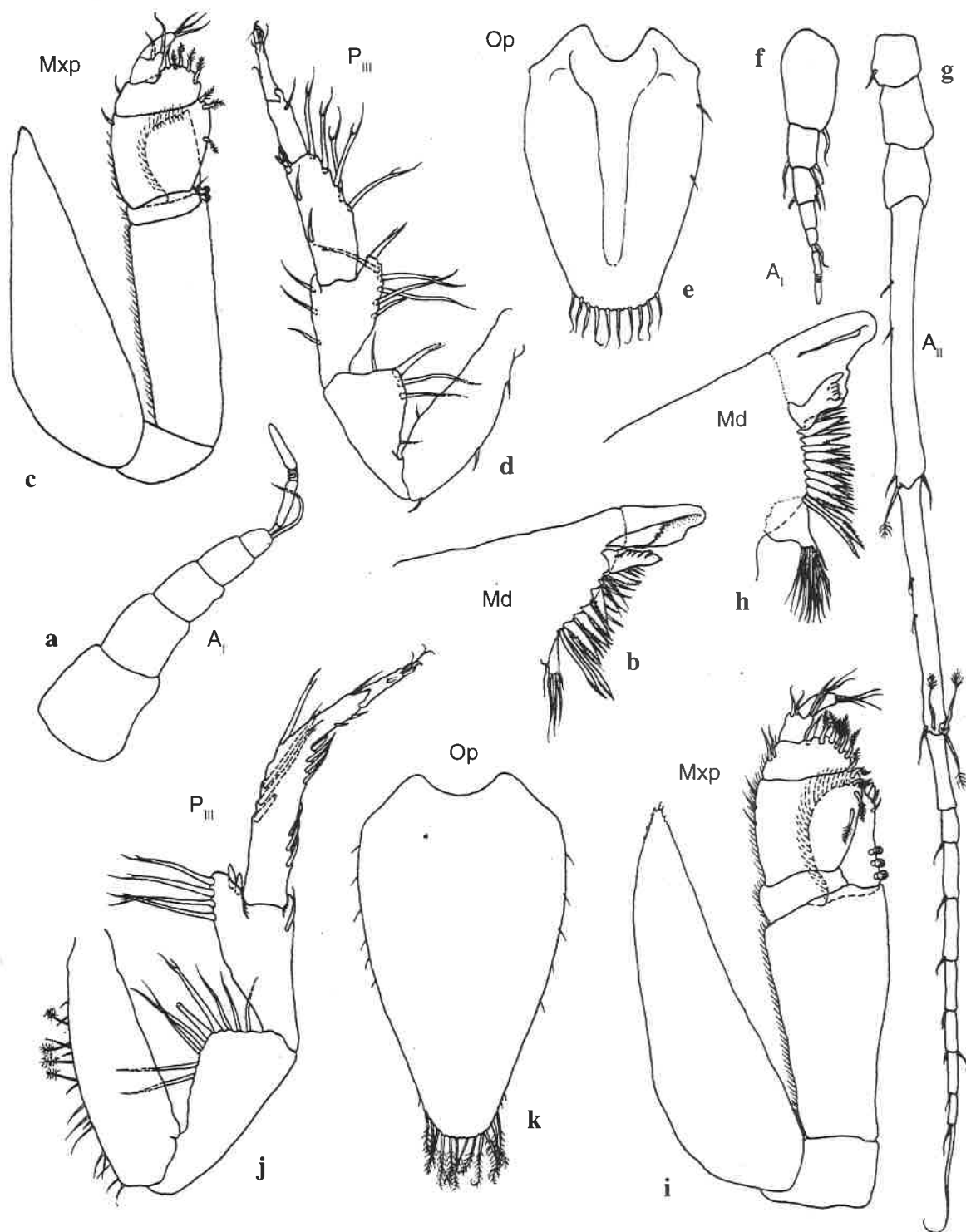


Fig. 1. *Macrostylis truncatex* Menzies, 1962: appendages of female (a-e). *M. scitifer* Menzies, 1962: appendages of female (f-k).
Рис. 1. *Macrostylis truncatex* Menzies, 1962: придатки ♀ (a-e). *M. scitifer* Menzies, 1962: придатки ♀ (f-k).

ADDITION TO DESCRIPTION. Female 4.8 mm long. Maximal width of body 3.9 times less than its length and 1.6 times exceeding maximal width of pleotelson. Teguments glossy, without expressed macrosulpture. Very short hairs on dorsolateral surfaces of tergites and pleotelson.

Head large, poorly trapezoidal, its length 1.1 times less than maximal width; frontal margin slightly convex.

Anterior division of pereon rounded-quadrangle, its length 1.3 times less than maximal width; sternal surface with one frontal spine.

Tergite IV broadened frontally. Sternites IV–VII with spines.

Pleotelson reverse-pyriform, its length constituting about quarter of body length; maximal width 1.6 times less than length and 1.5 times greater than distal width; caudal organs not visible, slot-like apertures almost longitudinal.

Antenna I with one aesthetasc on apical article. Antenna II approximately 5.1 times longer than antenna I and reaching posterior margin of tergite III; flagellum with 7 articles; rudiment of exopodite not detected.

Cutting margin of mandible not serrated; movable plate with 6 distal denticles; tooth row with not less than 9 sawtooth bristles; tooth process swollen at its base; distal part of tooth process shortly tapered, with approximately 10 bristles at end. Epipodite of maxilliped without excavation on exterodistal margin.

Ischiopodite of pereopod III oblong-triangular, with two thickened bristles on top of low rounded-angular lobe; up to 4 long bristles in combs of meropodite and carpopodite.

Operculum oblong-tongue-like; maximal width 1.6 times less than length and 4.9 times greater than distal width; 12 pinnate bristles of average length situated on narrowly rounded distal margin.

Protopodites of uropods (endopodites missing) approximately 6 times shorter than pleotelson.

DISTRIBUTION. Western Atlantic (9°28.8'–24°26.2'N, 20°–66°24'W).

ECOLOGY. Abyssal species found at depth 3425–5494 m in pteropodal-foraminiferal silt at temperature 2.0–2.5°C.

Macrostylis caribbicus Menzies, 1962

Tab. Fig. 2, a–f.

MATERIAL. ♀ without oostegites 5.8 mm long, AK station 4391.

ADDITION TO DESCRIPTION. Maximal width of body 4 times less than its length and 1.4 times exceeding maximal width of pleotelson.

Head large, half-orbicular, its length ca. 1.3 times less than maximal width; frontal margin very poorly convex.

Anterior division of pereon rounded-quadrate, with direct lateral surfaces, width 1.2 times greater than length; sternal surface with 2 spines of average sizes, located frontally and proximally. Sternites IV–VII with spines.

Pleotelson constituting in length hardly less than fourth part of the whole body; maximal width of pleotelson 1.3 times less than its length and 1.6 times greater than width of its distal part; caudal organs distinctly visible, slot-like apertures diagonal.

Antenna I containing 5 elongated articles, with one aesthetasc on apical article; antennae II missing.

Cutting margin of mandible without expressed teeth; movable plate with no less than 4 denticles; tooth row containing not less than 10 sawtooth bristles; tooth process short, broad-conical, with ca. 13 distal bristles.

Ischiopodite of pereopod III oblong-triangular, without thickened bristles; lobe displaced distally, with two thickened bristles of average length on apically pointless top; 12 and 7 bristles situated in combs of meropodite and carpopodite, respectively.

Ischiopodite of pereopod IV wide angular; lower margins of meropodite and carpopodite with 4 and 3 bristles of average length, respectively.

Operculum narrow, tongue-like, with directly truncated distal margin.

Protopodites of uropods approximately 1.5 times shorter than pleotelson; endopodites missing.

DISTRIBUTION. Central Atlantic (11°30'–17.5°N, 20°–75°50'W).

ECOLOGY. Abyssal species found at depth 2875–3879 m in pteropodal-foraminiferal silt at temperature 2.5–4.1°C.

Macrostylis vemae Menzies, 1962

Tab. Fig. 2, g–m.

MATERIAL. ♂ 4.3 mm long, V-II station 149; ♂ 4.5 mm long and juvenile ♀ 2.4 mm long, V-II station 150; ♀ without oostegites 4.0 mm long, AMK station 390-3.

ADDITION TO DESCRIPTION. Male 4.5 mm long, maximal width of body 5 times less than its length and 3.9 times less than maximal width of pleotelson; macrosculpture not expressed; setulation represented by 2–3 bristles on posterolateral parts of tergites V–VII and sparse short hairs on dorsal surface of pleotelson.

Length of head 1.3 times less than its maximal width.

Length of pereon anterior division 1.05 times less than its maximal width; sternal surface with unique (frontal) spine of average size. Sternite IV with small angular projection on place of spine. Each of sternites V–VII with a rather large spine.

Length of pleotelson 1.7 times exceeding its maximal width, constituting a quarter of total body length; caudal organs vaguely visible, slot-like apertures almost longitudinal.

Antenna II 3.8 times longer than antenna I and reaching middle of tergite III; flagellum 7-articled, rudiment of exopodite poorly expressed.

Mandible with 2–3 roundly pointless teeth on cutting margin; movable plate with 4 short digitate denticles; tooth row with 10 sawtooth bristles; tooth process almost cylindrical, with 12 distal bristles. Epipodite of maxilliped without excavation on exterolateral margin, its length 3.2 times greater than maximal width.

Lobe of ischiopodite of pereopod III convex proximally and concave distally, with 2 thickened bristles on top; 10 and 9 long bristles situated in combs of meropodite and carpopodite of pereopod III, respectively.

Pleopod II with angularly tapered exterodistal part and excavate distal margin; length 2.6 times greater than maximal width.

Female 4.0 mm long. Maximal width of body 3.6 times less than its length and 1.5 times greater than maximal width of pleotelson.

Sternite IV with small spinule. Spines of sternites V–VII of significant smaller size.

Maximal width of pleotelson 1.3 times less than its length and 1.4 times greater than width of its distal part.

Antenna I consisting of 5 articles, with one aesthetasc on preapical and apical articles each.

Operculum tongue-like, with some tapered distal part and roundly truncated distal margin; maximal width 1.6 times less than length and 2.4 times greater than width of distal margin.

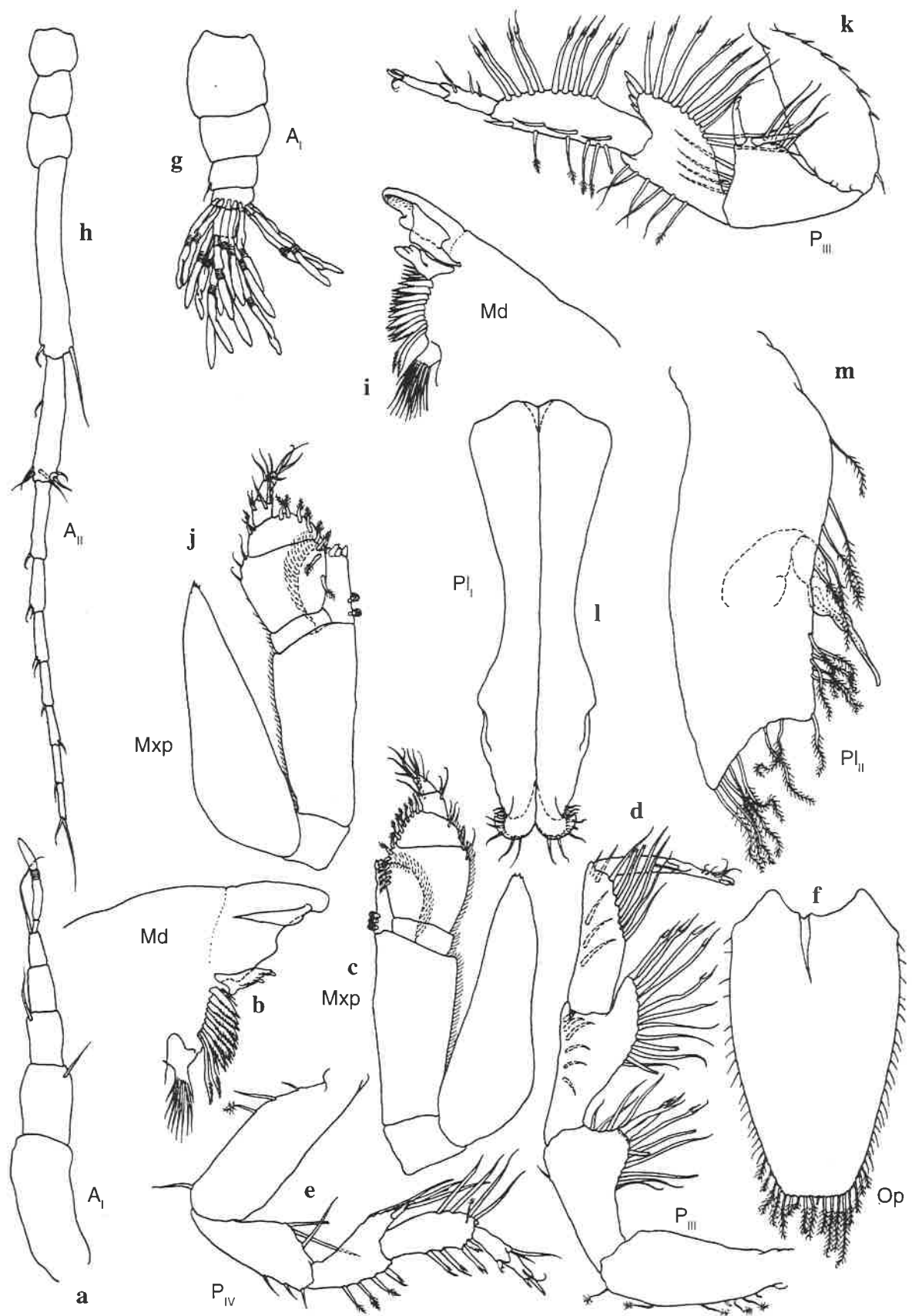
DISTRIBUTION. Western Atlantic (21°18.7'–58°34'N, 34°51'–72°03.1'W).

ECOLOGY. Abyssal species found at depth 2930–5684 m in foraminiferal sand with shingle and gravel (2930–2951 m) and silt (5060–5684 m) at temperature 1.0–2.1°C.

Macrostylis magnifica Wolff, 1962

Tab. Fig. 3.

MATERIAL. Incomplete specimen ♀ (from head till pereonite IV, length 2.1 mm) with 2 embryos in a marsupium (stage I, to 0.35 mm long euryone), P station 16; ♀ without oostegites



5.0 mm long, P station 23; 5 ♀♀ without oostegites 4.6–5.0 mm long, ♀ with empty marsupium 5.0 mm long, incomplete specimen ♀ (from pereonite IV till pleotelson, 2.6 mm long) and incomplete specimen ♂ (from pereonite I till pleotelson, length 3.1 mm), AMK station 268; 2 ♀♀ without oostegites 3.3 and 3.5 mm long, AMK station 316-2; 2 ♀♀ without oostegites 4.0 and 4.8 mm long and ♀ 3.9 mm long with 15 embryos in marsupium (stage I, to 0.25 mm long euryone), AMK station 499.

REDESCRIPTION. Female without oostegites 5.0 mm long (AMK, station 268). Maximal body width, corresponding to distance between distal ends of posterolateral processes of tergite III, 3.2 times less than its maximal length and 1.7 times greater than maximal width of pleotelson. Teguments smooth and glossy, with distinctly visible (especially on intersegmental sites) granulation; macrosculpture expressed by cariniform suberected medial thirds of posterolateral processes at tergites III–VII; setulation as separate thin hairs on dorsolateral parts of tergites and pleotelson.

Head broad-trapezoidal, its length 1.7 times less than maximal width equal to distance between distal ends of posterolateral parts noticeably tapered in angular processes; maximal width 1.7 times greater than width of frontal margin; medial part with insignificant concave lateral surfaces; frontal margin poorly convex.

Anterior division of pereon slightly trapezoidal, length 1.5 times less than maximal width; tergite I approximately 1.3 times shorter than tergite II and twice shorter than tergite III; sternal surface differentiated segmentally by distinct transverse grooves, with large uncinat spine directed frontally.

Maximal width of tergite IV almost three times greater than its length; sternite with uncinat spine of average sizes directed backwards.

Tergites V–VII subequal in length among themselves, their posterolateral parts plucked backwards in large, subacute distally processes; sternite V with small hook-like spine directed backwards; sternite VI with large direct spine directed downwards; sternite VII with small uncinat spine directed backwards.

Pleotelson ovoid, with angular posterolateral projections, its length 1.2 times greater than maximal width, constituting ca. one fifth of total body length; proximal third 1.4 times wider than distal one; distal lobe short and widely rounded, with long pinnate bristles on margin; caudal organs visible, slot-like apertures transversal.

Antenna I consisting of 5 articles, their respective lengths from basal to distal relate as 1.0 : 0.35 : 0.2 : 0.1 : 0.07; length of basal article subequal to total length of remaining ones; predistal and distal articles with short aesthetasc each. Antenna II approximately 4.3 times longer than antenna I and reaching posterior margin of tergite III, with six-articled flagellum and one-articled rudiment of exopodite.

Mandible with excavate cutting margin; movable plate with 4 digitate teeth apically; tooth row with 6 ovate-lanceolate sawtooth bristles; tooth process rounded-conical, with approximately 12 distal bristles; small bristle situated at palp place. Epipodite of maxillipede rounded-triangular, its distal end shortly tapered as small denticle; length 3.5 times greater than maximal width.

Ischiopodite of pereopod III with long lobe narrow tapered and slightly inclined forwards bearing slightly curved thickened bristle on top; combs of meropodite and carpopodite with 7 long bristles each.

Ischiopodite of pereopod IV with rather large narrow-trapezoidal lobe; meropodite with comb of 4 long bristles and with 4 bristles of average length on lower margin, 2 of which being thin; comb of carpopodite with 5 long bristles; lower margin of carpopodite without bristles.

Operculum tongue-like, maximal width almost 1.4 times less than length and twice greater than distal width; distal margin poorly rounded bearing not less than 10 long pinnate bristles.

Uropods 1.1 times shorter than pleotelson; protopodite 7.1 times longer than endopodite (female without oostegites 5.0 mm long; P, station 23).

Male (incomplete specimen, from pereonite I till pleotelson, 3.1 mm long; AMK, station 268). In appearance differing by smaller size of body (calculated length of the entire specimen about 3.5 mm), slightly increased posterolateral processes of tergites III–VII and relatively broadened pleotelson, which maximal width 1.2 times greater than distal. Besides, male distinguishing by less uncinat sternal spines. Pleopods I with prominent posterolaterally and hook-likely curved forwards large hyaline processes. Protopodite of pereopod II knife-shaped, with angularly tapered interodistal part and 13 long pinnate bristles on roundly beveled extrolaterally distal margin; length 3.25 times greater than maximal width; process of endopodite not reaching distal margin of protopodite; exopodite hidden under protopodite.

TAXONOMIC REMARKS. Birstein [1963, 1970] noted similarities between *M. magnifica* and the Pacific *M. vitjazi* Birstein, 1963 and *M. ovata* Birstein, 1970. The rather large body size of *M. magnifica*, the elongated basal article of the antenna I, the large process of the pereopod III ischiopodite, the configuration and proportions of the female operculum are also evidence of its close affinities with *M. grandis* Birstein, 1970. Yet the greatest resemblance is to be found between *M. magnifica* and *M. vitjazi* in the outline of the head and entire body, the configuration and relative size of the tergites, the posterolateral processes of tergites III–VII elongated and subacute distally.

The basic distinctive characters of *M. magnifica* are as follows: short preapical and apical articles of antenna I, extrolateral angularity of maxillipede epipodite, lack of spines on sternites II and III, shorter and wider pleotelson, operculum of female narrower in its distal one-third. Besides, *M. magnifica* differs from all closely related species by the long narrow lobe on the ischiopodite of pereopod III.

DISTRIBUTION. Northern Atlantic (45°54'–59°12'N, 17°23'–51°05'W).

ECOLOGY. Abyssal zone at depth 2242–4650 m in silt-covered foraminiferal sand (frequently with inclusions of shingle, gravel, larger stones) at temperature 1.3°C (3521 m).

Macrostylis polaris Malyutina et Kussakin, 1995

Tab. Fig. 4.

MATERIAL. 5 ♀♀ without oostegites 1.5–1.9 mm long and 10 juveniles 1.2–1.7 mm long — NP-22, station 115; 2 ♀♀ without oostegites 1.9 and 2.3 mm long, 1 ♂ 1.9 mm long and 4 juveniles 1.3–1.5 mm long — NP-22, station 120; 4 ♀♀ 2.0–2.5 mm long, 3 without oostegites and 1 with empty marsupium, 1 ♂ 1.8 mm long and 2 juveniles 1.5 and 1.6 mm long — NP-22, station 122; fragment ♀ and 2 juveniles 1.4 and 1.5 mm long — NP-22, station



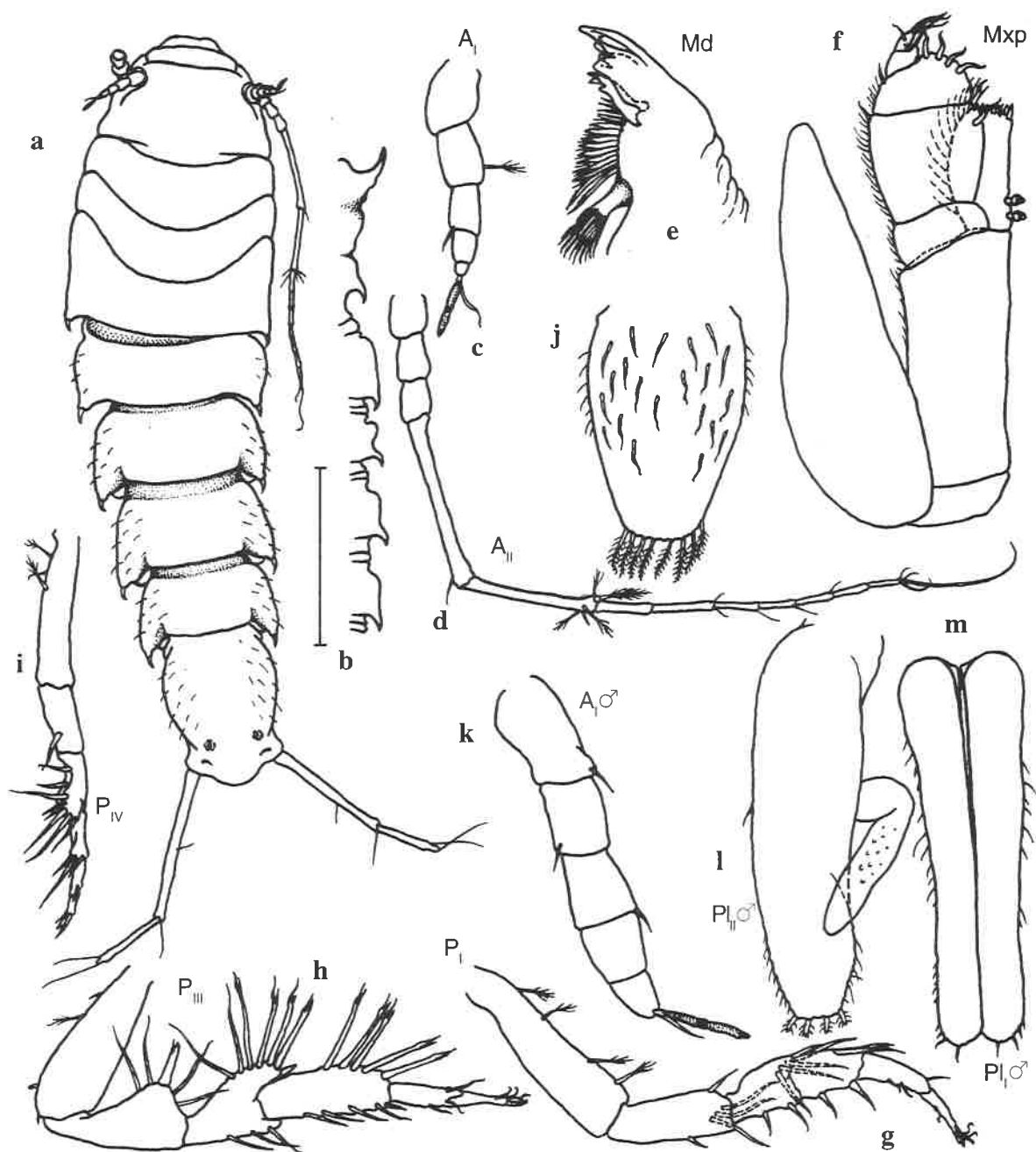


Fig. 4. *Macrostylis polaris* Malyutina et Kussakin, 1995: total view from above (a), sternites from lateral side (b) and appendages (c-j) of female; appendages of male (k-m). Scale (a,b) 0.5 mm.

Рис. 4. *Macrostylis polaris* Malyutina et Kussakin, 1995: общий вид сверху (a), стерниты сбоку (b) и придатки (c-j) ♀; придатки ♂ (k-m). Масштаб 0,5 мм (a,b).

Fig. 3. *Macrostylis magnifica* Wolff, 1962: total view from above (a), sternites from lateral side (b) and appendages (c-j) of female; appendages of male (k,l). Scale (a,b) 1.0 mm.

Рис. 3. *Macrostylis magnifica* Wolff, 1962: общий вид сверху (a), стерниты сбоку (b) и придатки (c-j) ♀; придатки ♂ (k,l). Масштаб (a,b) 1,0 мм.

124; 6 ♀♀ without oostegites 1.3–2.3 mm long, 1 ♂ 1.6 mm long, fragment ♂, juvenile 1.5 mm long — NP-22, station 128.

ADDITION TO DESCRIPTION. Female without oostegites 2.1 mm long (station 122). Maximal width of body 3.5 times less than its length and 1.8 times greater than maximal width of pleotelson; covers thin, smooth and glossy; granulosity and macrosculpture not expressed; setation expressed by short thin hairs, mainly on lateral parts of tergites IV–VII and on pleotelson.

Anterior division of pereon subrectangular, maximal width 1.2 times greater than length; sternal surface differentiated segmentally by rather deep transversal grooves.

Caudal organs visible distinctly, slot-like apertures transversal.

Antenna II 4 times longer than antenna I, with seven-articled flagellum and rudiment of exopodite.

Uropods 1.25 times longer than pleotelson, protopodite 2.4 times longer than endopodite.

Male 1.9 mm long (station 120). Body length 4.1 times greater than its maximal width. Pleopod I without prominent hyaline process.

DISTRIBUTION. Arctic Ocean (Chukchi Sea: 74°54'–75°02'N, 171°28.1'–172°14.3'W).

ECOLOGY. Upper bathyal zone, depth 325–400 m; in liquid silt with stones, at bottom temperature 0.4–0.63°C.

Macrostylis foveata Mezhov, **sp.n.**

Tab. Fig. 5.

MATERIAL. Holotype — ♀ without oostegites 2.6 mm long, № Mc-1347, AK station 1194. Paratypes: ♂ 3.7 mm long, № Mc-1348, V-II station 149; 2 ♀♀, one without oostegites 2.9 mm long and one with empty marsupium 2.5 mm long, № 1349, V-II station 150.

DESCRIPTION. Female 2.6 mm long. Maximal width of body 3.9 times less than length and 1.45 times greater than maximal width of pleotelson;

Surface of body smooth, glossy, with translucent weak granulation; macrosculpture represented by two longitudinal rows of pits on medial third of dorsal surface of pereon (2 pits in each row on tergites I–III and 1 on remaining ones), setulation not expressed.

Head broad-trapezoidal, maximal width 1.7 times greater than length and almost 1.6 times greater than width of frontal margin; lateral surfaces poorly concave medially; frontal margin a little bit concave in medial third.

Anterior division of pereon slightly barrel-like, length approximately 1.1 times less than maximal width; tergite I 1.4 times longer than tergite II and 1.1 times longer than tergite III; sternal surface differentiated segmentally by shallow transversal grooves, with frontal spine.

Tergite IV slightly broadened frontally, length almost 4 times less than maximal width; posterior margin of sternite angularly tapered.

Tergite V 1.2 times shorter than tergite VI and practically equal in length to tergite VII; posterolateral parts of tergites V–VII noticeably tapered backwards, with distal bristles; sternites V–VII with small spines.

Pleotelson goblet-like, its length constituting less than a quarter of body length; dorsal surface distinctly greater convex proximally; maximal width 1.5 times less than length and 1.3 times greater than width of distal part; mediolateral lobe short, widely rounded; caudal organs visible distinctly, slot-like apertures almost transversal.

Antenna I consisting of 5 articles, their respective lengths from basal to distal relate as 1.0 : 0.7 : 0.55 : 0.4 : 0.15; distal

article with one aesthetasc of average length. Antennae II missing.

Mandible with serrated cutting margin and movable plate (not less than 3 teeth each); tooth row with ca. 10 sawtooth bristles; tooth process conical, with approximately 10 distal bristles. Epipodite of maxillipede oblong-leaflike, with insignificant extrolateral excavation; Length almost 3.4 times greater than maximal width.

Ischiopodite of pereopod III oblong-triangular, length 1.7 times greater than maximal width; lobe short, widely rounded and noticeably moved distally, with two bicuspid thickened bristles; combs of meropodite and carpopodite with 6 bristles each.

Lobe of ischiopodite of pereopod IV practically not expressed; lower margins of meropodite and carpopodite with 3 and 2 bristles of average length, respectively.

Operculum tongue-like, maximal width 1.4 times less than length and 1.9 times greater than width of distal margin; distal margin poorly rounded, with 12 long pinnate bristles.

Uropods missing.

Male (length 3.7 mm; V-II, station 149). Body length 4.1 times greater than maximal width. Sternal surface of anterior department with two spines; spines of sternites V–VII relatively elongated. Antenna I with 5 thickened articles, their respective lengths from basal to distal relate as 1.0 : 0.65 : 0.55 : 0.4 : 0.4; distal end of apical article with one short aesthetasc. Pleopods I without prominent hyaline processes. Protopodite of pleopod II narrowly lanceolate, length 3.5 times greater than maximal width; distal margin narrowly rounded, with 7 pinnate bristles; process of endopodite short, slightly prominent beyond proximal margin of distal quarter of protopodite. Uropods missing.

TAXONOMIC REMARKS. The general outlines and proportions of the body, the same number of sternal spines, the structure of the female antenna I as well as some other characters are evidence of obvious affinities between *M. foveata* sp.n. and *M. subinermis* Hansen, 1916. The basic distinctive characters of the new species are as follows: the widely rounded mediolateral lobe of the pleotelson, the relatively shortened basal article of the antenna I, the comparatively short operculum of the female, the less angular lobe of the ischiopodite of the pereopod III with a pair of incrassate bristles. The new species differs from another closely related congener, *M. truncatex* Menzies, 1962, by the more strongly elongated basal article of the antenna I, lack of an angulate extrolateral margin of the maxillipede epipodite, the non-serrated cutting margin of the mandible, the presence of two thickened bristles on top of a rounded lobe of the pereopod III ischiopodite. Besides, *M. foveata* sp.n. differs from both species by two rows of pits on the dorsal surface of the pereon.

ETYMOLOGY. From latin *foveatus* (foveate); points out original morphological structure constituted by two rows of pits on dorsal surface of pereon.

DISTRIBUTION. Western Atlantic (26°51'–27°18.4'N, 71°3'–72°03.1'W).

ECOLOGY. Abyssal zone (depth 5060–5420 m, aleutric silt) and ultraabyssal zone (Puerto-Rico Trench, 19°48.7'N–68°08.1'W, depth 6650 m, clayey silt).

Macrostylis squalida Mezhov, **sp.n.**

Tab. Fig. 6.

MATERIAL. Holotype — adult ♂ 2.7 mm long, № 1350, AK station 1013.

DESCRIPTION. Male 2.7 mm long. Maximal width of body 4.2 times less than its length and 1.55 times greater than

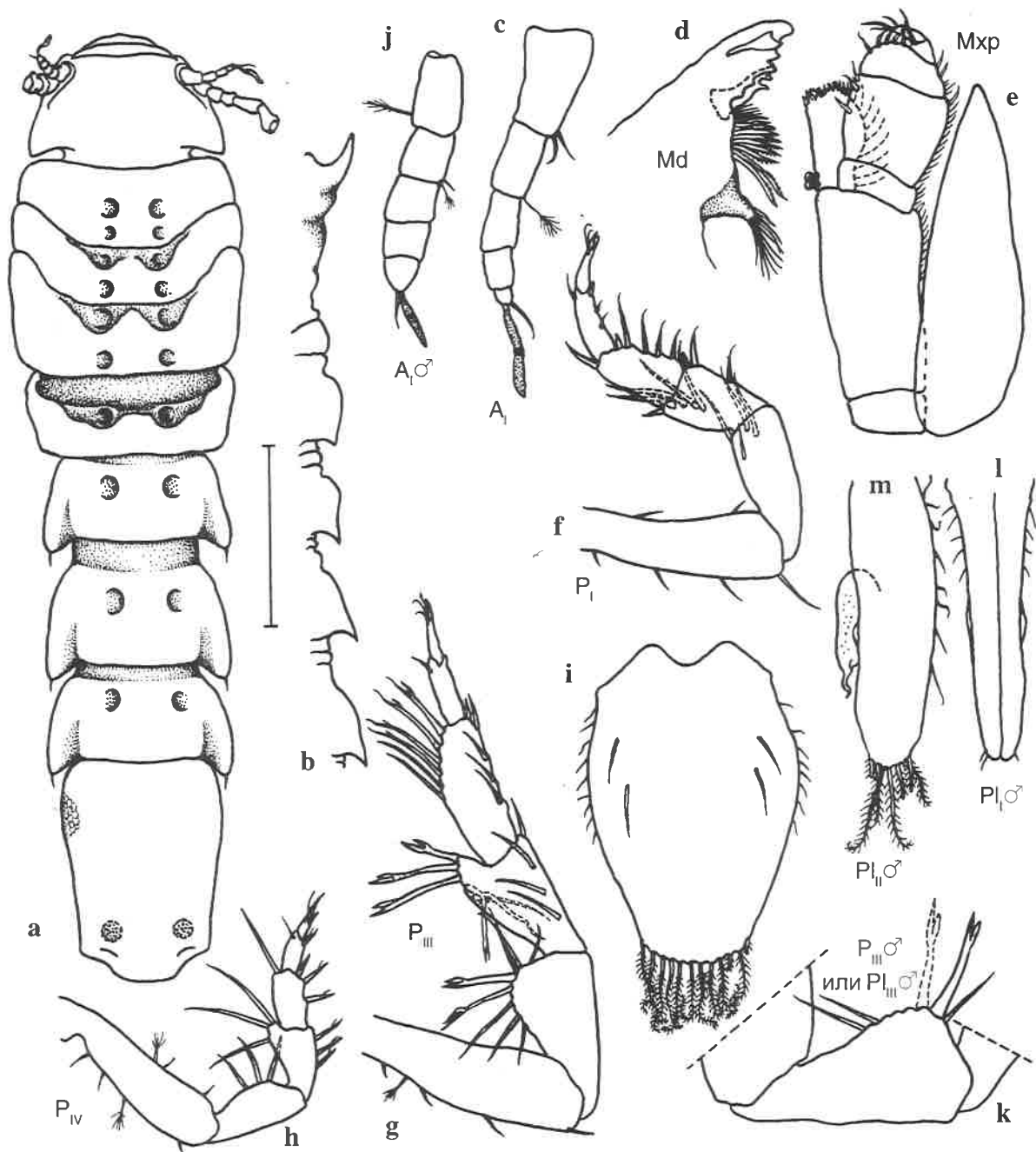


Fig. 5. *Macrostylis foveata* Mezhev, sp.n. holotype female (a-i) and paratype male (j-m): total view from above (a), sternites from lateral side (b) and appendages (c-i) of female; appendages of male (j-m). Scale (a,b) 0.5 mm.

Рис. 5. *Macrostylis foveata* Mezhev, sp.n., голотип ♀ (a-i) и паратип ♂ (j-m): общий вид сверху (a), стерниты сбоку (b) и придатки (c-i) ♀; придатки ♂ (j-m). Масштаб (a,b) 0,5 мм.

maximal width of pleotelson; granulosity of teguments expressed by roughness and distinct reticular design of their surface; macrosculpture of dorsal surface expressed by two triangular grooves at frontal margin of tergite III; setation consisting of not numerous short hairs on dorsolateral surfaces of tergites and pleotelson.

Head trapezoidal, maximal width 1.8 times greater than length and 1.5 times greater than width of frontal margin; lateral surfaces convex; frontal margin poorly concave in medial third.

Anterior division of pereon poorly barrel-like, length subequal to maximal width; tergite I equal in length to tergite II and 1.2 times shorter than tergite III; sternal surface differentiated segmentally by shallow transversal grooves, with frontal spine.

Tergite IV noticeably broadened frontally, its length 3.3 times less than maximal width; lateral surfaces slightly concave; sternite strongly and uniformly swollen, without spine.

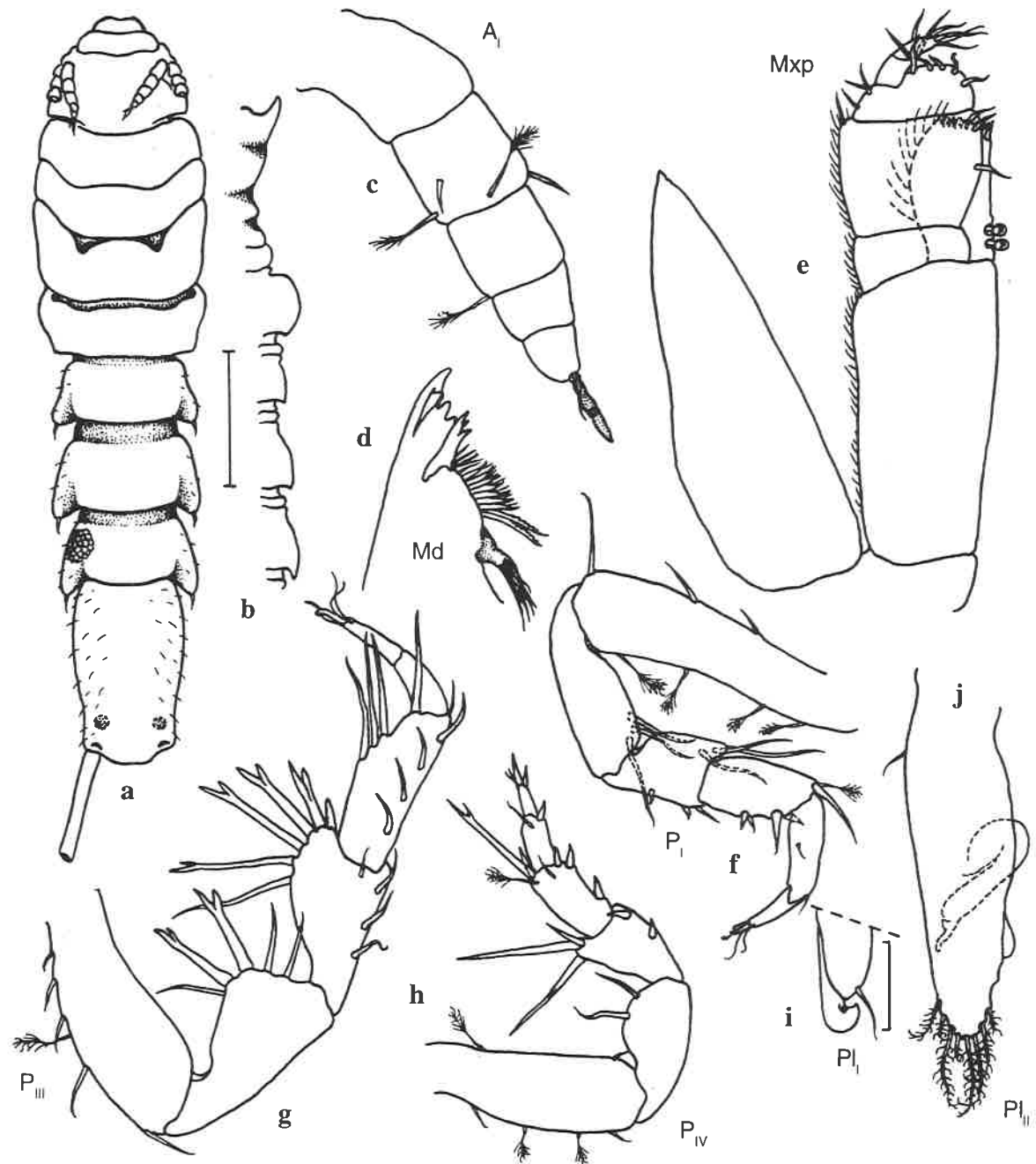


Fig. 6. *Macrostylis squalida* Mezhov, sp.n., holotype male: total view from above (a), sternites from lateral side (b) and appendages (c-j). Scale (a,b) 0.5 mm.

Рис. 6. *Macrostylis squalida* Mezhov, sp.n., голотип ♂: общий вид сверху (a), стерниты сбоку (b) и придатки (c-j). Масштаб (a,b) 0,5 мм.

Tergite V 1.15 times shorter than tergite VI and approximately equal in length to tergite VII; posterolateral parts of tergites V-VII noticeably plucked caudally, with distal bristles; sternites V and VI with angular projections directed caudally; sternite VII with short spine directed caudally.

Pleotelson oblong-goblet-like, with uniform convex dorsal surface; its length more than a quarter of body length; maximal width almost 1.6 times less than length and almost

1.2 times greater than width of distal part; caudal organs visible distinctly, slot-like apertures transversal.

Antenna I consisting of 5 articles, their respective lengths from basal to distal relate as 1 : 0.7 : 0.6 : 0.35 : 0.4; distal article with one short aesthetasc. Antennae II missing.

Mandible with serrated cutting margin and movable plate (at least 3 teeth on each); tooth row with at least 9 sawtooth bristles; tooth process conical, with at least 5 bristles on end



Fig. 7. *Macrostylis emarginata* Mezhov, sp.n., holotype incomplete specimen of male: total view from above (a), sternites from lateral side (b) and appendages (c–g). Scale (a,b) 0.5 mm.

Рис. 7. *Macrostylis emarginata* Mezhov, sp.n., голотип — дефектный экземпляр ♂: общий вид сверху (a), стерниты сбоку (b) и придатки (c–g). Масштаб (a,b) 0,5 мм.

of widely tapered distal part. Epipodite of maxilliped leaf-like, with shallow wide excavation in distal half of extrolateral margin; length three times greater than maximal width.

Ischiopodite of pereopod III triangular, length 1.45 times greater than maximal width; lobe of ischiopodite with two bicuspid thickened bristles on narrowly pointless top; combs of meropodite and carpopodite with 6 and 4 bristles, respectively.

Ischiopodite of pereopod IV with distinct widely rounded lobe; lower margins of meropodite and carpopodite with two short bristles each.

Pleopod I with hook-likely curved hyaline process tapered distally, not prominent extrolaterally. Protopodite of pleopod II stretch-elliptic, length 3.4 times greater than maximal width; distal margin roundedly subacute, with 8 pinnate bristles; process of endopodite with very shortly tapered distal part.

Protopodite of uropod 1.7 times shorter than pleotelson; endopodites missing.

TAXONOMIC REMARKS. The outline of the body and the structure of some appendages suggest rather close affinities between this species and *M. foveata* sp.n. The new species differs by the smaller size, rough teguments, the lack of pits on tergites, the elongated pleotelson, the short sternal spines, the larger lobe of the ischiopodite of the pereopod III, the distinct comb of the ischiopodite and the short bristles on the lower margins of the meropodite and carpopodite of the pereopod IV, the prominent hyaline process on the pleopod I, the more elliptic configuration of the pleopod II, etc.

ETYMOLOGY. From latin *squalidus* (rough); points out distinct granularity of covers.

DISTRIBUTION. Central Atlantic, Romanche Trench (0°08.5'N, 18°35.4'W);

ECOLOGY. Ultraabyssal zone, 6380–6430 m; in silt with sand and stones at temperature 0.65°C.

Macrostylis emarginata Mezhov, sp.n.

Tab. Fig. 7.

MATERIAL. Holotype — incomplete specimen adult ♂ (from pereonite I till pleotelson, length 2.1 mm), № Mc-1351, V-II station 150.

DESCRIPTION. Maximal width of pereonite III approximately 1.5 times greater than maximal width of pleotelson. Teguments distinctly granulated, macrosculpture and setation not expressed.

Anterior division of pereon partially deformed. Tergite III broadened frontally, with convex lateral surfaces and shallow median excavation on posterior margin; posterolateral parts plucked in short processes with distal bristles. Sternal surface differentiated segmentally by distinct transversal grooves, with frontal spine.

Tergite IV slightly broadened frontally, length 2.6 times less than maximal width; sternite with rather large spine directed backwards and downwards; base of spine flattened cariniformly; posterolateral parts plucked in short processes with small distal bristles.

Tergite V 1.1 times shorter than tergite VI and subequal in length to tergite VII; sternites with large spines, directed downwards (sternites V and VI) and backwards (sternites VII); bases of spines cariniformly flattened; posterolateral parts of tergites V–VII rather strongly plucked, with short distal bristles.

Pleotelson back-goblet-like, maximal width in proximal part almost 1.7 times less than length and only slightly exceeding maximal width of distal part; dorsal surface poorly convex; distal part separated by shallow transversal groove

and roundedly pointless; medial third of distal margin with shallow, but distinct rounded excavation; caudal organs visible distinctly, slot-like apertures transversal.

Ischiopodite of pereopod III oblong-triangular, with two bicuspid thickened bristles on top of low trapezoidal lobe; combs of meropodite and carpopodite with 5 and 6 elongated bristles, respectively.

Ischiopodite of pereopod IV with low broad-trapezoidal lobe; lower margin of meropodite and carpopodite with 3 and 2 bristles of average length, respectively.

Hyaline processes of pleopods I prominent laterally by angularly subacute distal ends. Length of protopodite of pleopod II approximately 2.4 times greater than maximal width; distal margin angularly excavate also bearing 10 long pinnate bristles; process of endopodite and exopodite hidden under protopodite.

Uropods missing.

TAXONOMIC REMARKS. Only one Atlantic species is characterized by a mediodistal excavation on the pleotelson, namely, *M. bifurcatus* Menzies, 1962, from the Southern Atlantic. *M. emarginata* sp.n. differs from it by the more strongly tapering posterolateral parts of the tergites, the relatively elongated pleotelson, the lower lobe of the ischiopodite III with a pair of bicuspidate incrassate bristles, the angularly subacute distal ends of the hyaline processes of the pleopods I.

ETYMOLOGY. From latin *emarginatus* (excavate); points out the mediodistal excavation of pleotelson.

DISTRIBUTION. Northern Atlantic (26°51'N, 71°01.3'W).

ECOLOGY. Abyssal zone (5420 m), in silt.

Conclusions

The record of a *M. spinifera* specimen aberrant in several morphological characters from the lower bathyal zone (58°29.1'N, 31°37.8'W, depth 1545 m) is of immediate interest. Considering the same structural deviations in a specimen from a close habitat (61°02'N, 29°32'W, depth 1761 m), Hansen [1916] supposed its fitting within the range of individual and/or local variability. Unfortunately, the absence of sufficient material of *M. spinifera*, with only two deep-water specimens known to date, makes it still impossible to perform a complete analysis of this species' individual variability. Regarding some local distinctions in population structure, it seems reasonable to surmise the existence of at least two *M. spinifera* populations, bathyal and shallow-water ones. With accumulation of further deep-water material that will become available for study, this separation is to become clarified, perhaps resulting in a subdivision of *M. spinifera* into two stratigraphically isolated subspecies.

As regards *M. magnifica* redescribed here, already Birstein [1963] pointed out the probability of its attribution to a group of morphologically similar species, including the Northern Atlantic *M. longiremis* (Meinert, 1890) and the Pacific *M. vitjazi* Birstein, 1963. Analysis of new *M. magnifica* material shows that *M. grandis* and *M. ovata* are also similar to the former species. All of them seem to form a sufficiently well outlined group of morphologically close species.

Regarding *M. longiremis*, there seems to be currently insufficient evidence to agree with Birstein's opinion. Indeed, reference of this species to the same group containing *M. magnifica* and *M. vitjazi* was based mainly on two characters, i.e. presence of a spine on sternite VII and a long antenna II. However, the first character occurs rather frequently in different species, for example, such well-studied yet rather distant taxa as *M. spinifera* and *M. subinermis*. Similarly, the second antennae are frequently broken off in available specimens of various species simply due to inaccurate sampling techniques. Consequently, their length is not a reliable character. In addition, the antennae II appear to reach the middle of tergite IV in *M. vitjazi* only, whereas in the remaining three "broad-bodied" species they usually do not exceed the tergite III. On the contrary, in *M. longiremis* they are distinctly projecting beyond the posterior margin of the tergite IV. The following traits are absent from *M. longiremis* being characteristic of the remaining four species: large size, very wide body and long posterolateral processes of tergites. Last but not least, *M. longiremis* is virtually known from the shelf zone only while the others are found in the abyssal (*M. magnifica*) and ultraabyssal zones. All this seems to provide sufficiently strong evidence that only *M. magnifica*, *M. vitjazi*, *M. grandis* and *M. ovata*, but not *M. longiremis*, are to be assigned to a separate group of similar if not closely related species. The case of an extreme resemblance found here between *M. magnifica* and *M. vitjazi* reinforces the idea of profound relations existing between the macrostylid faunas of the Atlantic and the West Pacific regions [Mezhov, 1981, 1999].

Still another problem requiring a more detailed discussion is, two new *Macrostylis* species from the ultraabyssal zone. *M. foveata* sp.n. is possibly identical to the yet not properly described *Macrostylis* sp.n. from the Puerto Rico Trench and adjoining abyssal zone collected during the 14th voyage of R/V "A. Kurchatov" [Wolff, 1975]. What seems especially interesting is, that Wolff noted the clear affinities between the specimens available to him and *M. truncatex*, which are also characteristic of *M. foveata* sp.n. Up to now, *Macrostylis*

sp.n. remains undescribed and only *M. foveata* sp.n. and the close *M. squalida* sp.n. represent the macrostylids of the Atlantic ultraabyssal zone. The description of the new species from Atlantic trenches allows to consider one more regional ultraabyssal fauna. A general list of the ultraabyssal macrostylid faunas of already three oceanic regions includes no less than 16 species, i.e. 13 from the Pacific, one from the Indian, and two from the Atlantic oceans.

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A new species of the genus *Lithoglyptes* Aurivillius, 1892 (Crustacea: Cirripedia: Acrothoracica) from the Fiji Sea, with some data on its ultrastructure

Новый вид рода *Lithoglyptes* Aurivillius, 1892 (Crustacea: Cirripedia: Acrothoracica) из моря Фиджи, с некоторыми данными по его ультраструктуре

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KEY WORDS: Cirripedia, Acrothoracica, morphology, systematic, SEM.

КЛЮЧЕВЫЕ СЛОВА: Cirripedia, Acrothoracica, морфология, систематика, СЭМ.

ABSTRACT: Four lithoglyptid females and a dwarf male, which may be referred to a new species of the genus *Lithoglyptes*, were found in the coral collections of the Zoological Institute (St.-Petersburg). Their morphology was examined under a light microscope and SEM. Their appearance is similar to that described by Tomlinson [1969] for *Balanodytes taiwanus* Utinomi, 1950. But the presence of two-segmented caudal appendages indicates the affinity of these specimens to the genus *Lithoglyptes*. The systematic position of the genus *Balanodytes* is discussed.

РЕЗЮМЕ: Четыре самки и карликовый самец, которые могут быть отнесены к роду *Lithoglyptes*, были обнаружены в коллекциях кораллов Зоологического Института (С.-Петербург). Их морфология была изучена с помощью светового и сканирующего электронного микроскопов. Их строение сходно со строением, описанным Томлинсоном [Tomlinson, 1969] для *Balanodytes taiwanus* Utinomi, 1950, но присутствие двучлениковых каудальных придатков указывает на их принадлежность к роду *Lithoglyptes*. Также обсуждается систематическое положение рода *Balanodytes*.

Introduction

The genus *Balanodytes* was erected by Utinomi [1950] for a single species *Balanodytes taiwanus* Utinomi, 1950. It is a lithoglyptid barnacle possesses four pairs of terminal cirri and no caudal appendages. He has obtained complete and incomplete females from *Balanus* (*Megabalanus*) *tintinnabulum* *tintinnabulum* (Linnaeus, 1758) from Formosa, which were lost in dissection.

Lately, Tomlinson [1969] described a single dried female without an attachment area and infected by a

fungus. It was found in the coral *Distichopora nitida* Verrill, 1864 from the Marshall Islands. But his specimen has another general appearance than *Utinomi* specimens.

In both cases the material has been lost or damaged by a fungus. Therefore, there is a necessity in the complete description, based on a new material. Such material (similar to Tomlinson's description) was obtained during the survey of the coral collections of the Zoological Institute, Russian Academy of Sciences (St.-Petersburg). It comes from the Fiji Sea, four intact females and a dwarf male were found in a hydrocoral colony. The investigation of this material under light and scanning electron microscopes revealed the presence of well-developed attachment disk and two-segmented caudal appendages.

Taxonomy

SUBCLASS CIRRIPEDIA BURMEISTER, 1834

SUPERORDER ACROTHORACICA GRUVEL, 1905

ORDER PYGOPHORA BERNDT, 1907

Family Lithoglyptidae Aurivillius, 1892

Genus *Lithoglyptes* Aurivillius, 1892

Lithoglyptes balanodytes Kolbasov, **sp.n.**
Figs. 1–3.

Balanodytes taiwanicus: Tomlinson, 1969: 84–87, fig. 20.

DIAGNOSIS: *Lithoglyptes* with two long opercular spines bent posteriorly ("carinally") at the tips in adult and anteriorly ("rostrally") in young specimens, without the lateral bars, the orificial knob area without denticles and spines. The attach-

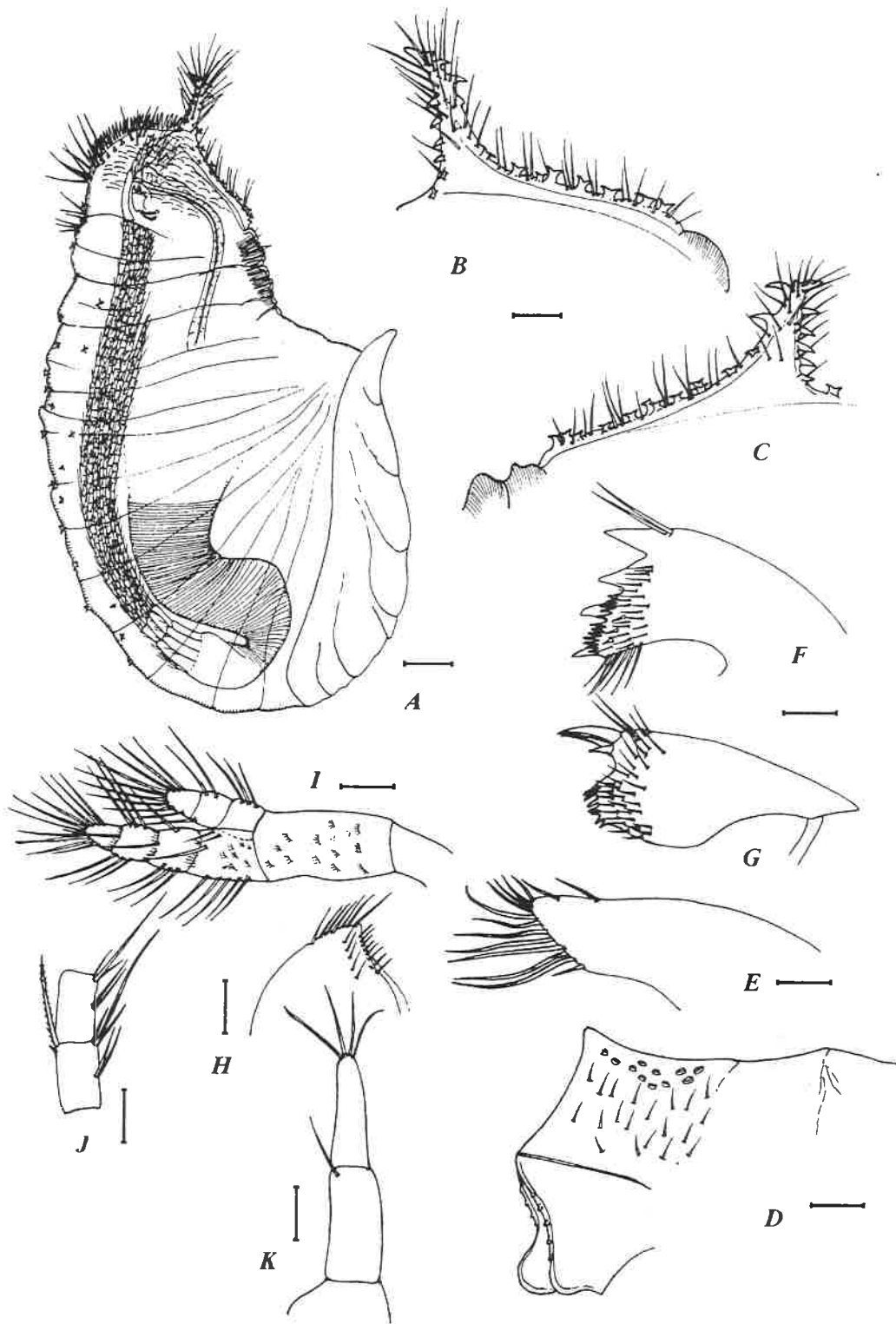
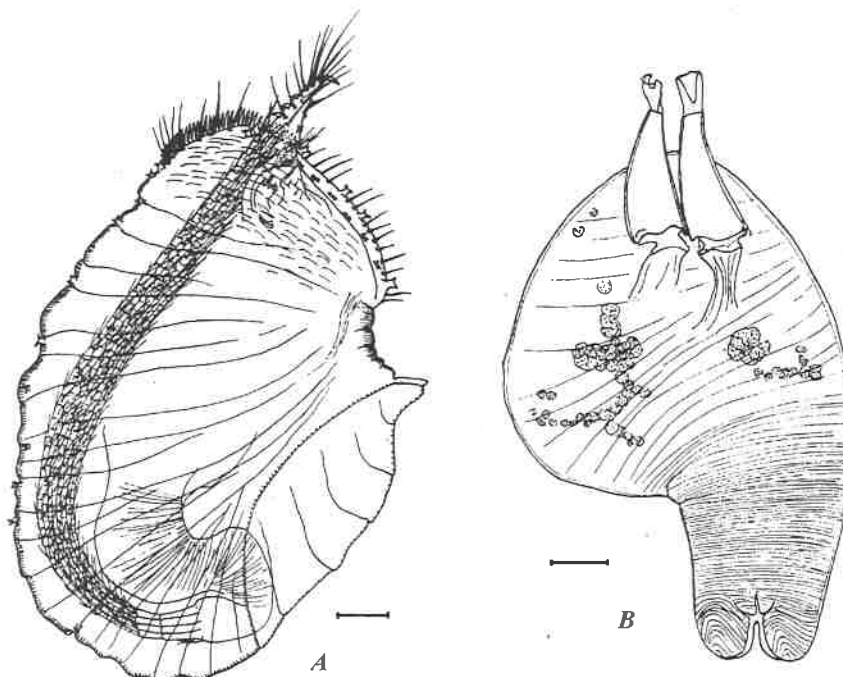


Fig. 1. *Lithoglyptes balanodytes* sp.n., holotype, ♀: A — general view; B, C — left and right opercular bars; D — labrum; E — mandibular paly; F — mandible; G — maxillule; H — maxilla; I — mouth cirrus; J — middle segments of anterior ramus of IV pair of terminal cirrus; K — caudal appendages. Scale bars: A — 215 μ m; B, C — 100 μ m; D, I, J — 43 μ m; E, F, G, H, K — 30 μ m.

Рис. 1. *Lithoglyptes balanodytes* sp.n., голотип, ♀: A — общий вид; B, C — левое и правое оперкулярные утолщения; D — лабрум; E — мандибулярный щупик; F — мандибула; G — максиллула; H — максилла; I — ротовая усоножка; J — срединные членики передней ветви IV пары терминальной усоножки; K — каудальные придатки. Масштаб: A — 215 μ m; B, C — 100 μ m; D, I, J — 43 μ m; E, F, G, H, K — 30 μ m.

Fig. 2. *Lithoglyptes balanodytes*:
A — young female, general view; B
— dwarf male, general view. Scale
bars: A — 151 μ m; B — 43 μ m.

Рис. 2. *Lithoglyptes balanodytes*:
A — молодая самка, общий вид; B
— карликовый самец, общий вид.
Масштаб: A — 151 μ m; B — 43 μ m.



ment area developed, with distinct attachment disk. Caudal appendages two-segmented. The dwarf male pear-shaped, without antennular stalk.

MATERIAL. Three females, one with a dwarf male and young female in the colony of the Hydrocorallia. Locality: The Fiji Sea, 29°29.5'S, 167°52.0'E, 40 m deep. Three females and dwarf male were boiled in KOH for light microscopy investigations. Adult and young females and a male were also examined under SEM. They were cleaned in TWEEN solution, post-fixed in 2% OsO₄ (osmium tetroxide) for 2 hr, dehydrated in acetone, and critical point dried in CO₂, sputter coated with platinum-palladium, and examined with a scanning electron microscope (HITACHI S405A) at 15 kV. Holotype and paratype are deposited in the Zoological Museum of the Moscow State University, (holotype ♀ Mg-1201, paratype ♀ Mg-1202).

DESCRIPTION. Female: Holotype (Fig. 1 A) 2.9 mm long, with an aperture of 0.77 mm measured straight across. Opercular area of adult barnacle slightly elongated, narrower than other part of mantle sac, whereas mantle sac of young female rounded, without elongated opercular area (Fig. 2 A). Opercular bars (Fig. 1 B, C) ca. 1/2 of length of whole apertural lips in adult specimens and 2/3 in young specimen, equipped with bifid teeth and setae. A pair of long, posteriorly (in adult specimens) or anteriorly (in young specimen) bent opercular spines, armed with simple curved teeth and long setae, at middle of apertural lips. Typical comb collar at anteroventral end of mantle sac (Fig. 1 A). With SEM, it appears as a palisade row of closely spaced cuticular projections (Fig. 3 D). These projections are united at their bases, but have free apical ends about 50 μ m long, with numerous villi on the lateral margins. This comb collar ultrastructure resembles that described by Smyth [1986] and Kolbasov [1999b]. Two clusters of scattered long setae of apertural area grouped at ventral (posterior) end of comb collar.

Faces of opercular area with conspicuous massive scales [Kolbasov, 1999b] discernible as transverse rows of fine dots at a light microscope. Each scale of massive multifids is 10–15 μ m in length and 3–6 μ m in height, and consists of 20–30

short sharp denticles fused together, leaving only the apical ends free. They are denser at the lateral surfaces, just under opercular bars and spines (Fig. 3 B), than at ventral side of opercular area (Fig. 3 A). These scales may act like an abrasive or file in burrowing process [Kolbasov, 1999b]. The lateral bars absent. The rest of mantle sac is mostly equipped with rare simple, bifid, but occasionally trifid teeth (Fig. 1 A).

No distinct and armed orificial knob, its area covered with wrinkled cuticle, without conspicuous spines or teeth (Fig. 1 A, B, C). Surface of orificial knob area bears small setae and rare feeble multifid scales (according to Kolbasov, 1999) consisting of 5–10 variable separate denticles about 5 μ m long (Fig. 3 C). This type of scales together with setae may serve for burrow cleaning [Kolbasov, 1999b]. Horny attachment disk (Fig. 1 A) drop-like, developed and represented by thin cuticle.

Appendages are typical for genus: pedicles of mouth cirri (Fig. 1 I) bear four-segmented anterior and three-segmented posterior rami, respectively. Labrum (Figs. 1 D; 3 G, H) saddle shaped, with stub setae and bushy multifid scales along upper margin (Figs. 1 D, 3 H), lateral faces covered with short simple setae and arc-shaped multifid scales (Fig. 3 H), distal margins bear conate denticles (Fig. 3 G). Such structure of labrum is typical for genus *Lithoglyptes*. Mandibles (Fig. 1 F) with 4 teeth, lower half of blade with a row of 12–13 sharp spines, half of lower margin with setae. Superior angle of maxillule (Fig. 1 G) with a pair of large and one small spines, following by a notch without spines, inferior half of distal margin with a row of small spines; lateral faces distally setose. Maxilla (Fig. 1 H) triangular, lateral margins and anterior face with long setae.

Four terminal cirri have a typical structure for genus: anterior side of each article with 3 distal (one long and two short) setae and 2 middle ones at midlength. Long biserrate seta on posterior margin of each second or third article. Caudal appendages two-segmented (Figs. 1 K; 3 E), distal segment with tuft of 4 setae, basal one with 2 setae.

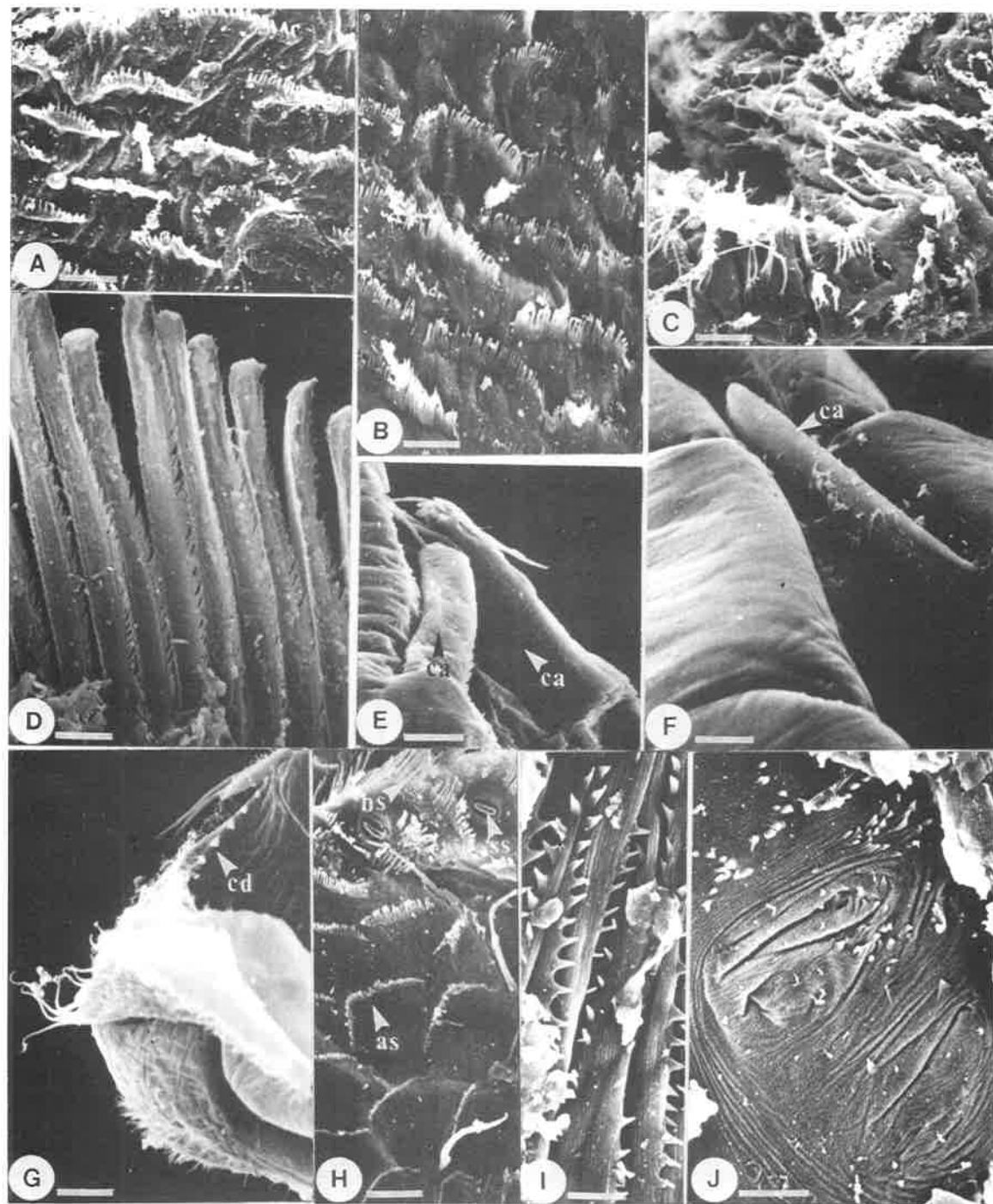


Fig. 3. *Lithoglyptes balanodytes* A-E — ♀, G-J — ♂; *Cryptophialus variabilis* F: A — massive multifid scales at ventral part of opercular area; B — massive multifid scales under opercular spine; C — area, corresponding to orificial knob; D — comb collar; E — caudal appendages; F — rudimentary caudal appendage; G — distal part of labrum and mandibular palps; H — lateral surface of labrum; I — cuticle of middle part of dwarf male; J — pustule-like cuticular structures near distal end. Abbreviations: as — arc-shaped multifid scales; bs — bushy multifid scales; ca — caudal appendages; cd — conate denticles; ss — stub setae. Scale bars: A, B, D, J — 6 μm; C, F, H — 8 μm; E — 12 μm; G — 24 μm; I — 4 μm.

Рис. 3. *Lithoglyptes balanodytes* A-E — ♀, G-J — ♂; *Cryptophialus variabilis* F: A — массивные чешуйки на вентральной части оперкулярной области; B — массивные чешуйки под оперкулярным шином; C — область, соответствующая устьевому бугорку; D — гребневидный воротничок; E — каудальные придатки; F — рудиментарный каудальный придаток; G — дистальная часть лабрума и мандибулярных щупиков; H — боковая поверхность лабрума; I — кутикула срединной части карликового самца; J — сосочковидные кутикулярные структуры около дистального конца. Обозначения: as — арковидные чешуйки; bs — кустистые чешуйки; ca — каудальные придатки; cd — массивные (сопате) шипики; ss — пеньковидные щетинки. Масштаб: A, B, D, J — 6 мк; C, F, H — 8 мк; E — 12 мк; G — 24 мк; I — 4 мк.

Male with pear-shaped body, without lateral lobes, 403 μm long, 274 μm high (Fig. 2 B), with two antennules at anterior end. Posterior end elongated, wrinkled, with distinct apertural slit. Cuticle with fine annular striation, without setae or mantle teeth, bears sharp denticles assigned into transverse rows at anterior and middle parts of the body (Fig. 3 I). Several paired pustule-like cuticular structures were observed near the distal end (Fig. 3 J). Neither a long stalk between body and antennules nor an appendage similar to penis were found.

Burrow apertures are keyhole shaped, 0.6–1.0 mm long, the carinal end is rounded, the rostral end is sharp.

ETYMOLOGY. A new species is dedicated to *Balanodytes taiwanus*, erroneously described as belonging to a new acrothoracican genus.

COMPARISON. The females of a new species resemble that of *L. scamborachis* Tomlinson 1969, *L. wilsoni* Tomlinson, 1969 and *L. stirni* Turquier, 1987 in having long curved opercular spines and absence of an armed orificial knob. But these spines curved anteriorly in adult specimens of *L. wilsoni* and *L. stirni*, whereas they bent posteriorly in a new species. Besides of this, *L. wilsoni* possesses a very long attachment disk reaching the opercular spines. From *L. scamborachis* it differs in absence of a stout toothed cone on the left side of the opercular bars. The male of a new species has a typical structure for the genus.

Discussion

When describing a new genus and a new species *Balanodytes taiwanus* Utinomi [1950] wrote: "Owing to the scantiness of material as well as to poor preservation, I could not observe the internal structure in details." Meanwhile he indicated the absence of such internal structures as caudal appendages and retractor orificii muscle. This information looks a doubtful one, and after re-examination of Utinomi description (an original material was unfortunately lost) I concluded that his *B. taiwanus* is rather a form of other species *Lithoglyptes habei* (Tomlinson, 1963), firstly described as *Kochlorine habei*. This points to the fact that sometimes it may be difficult to determine the generic affinity of a species. Both *L. habei* and Utinomi's material possess similar opercular bars (longer then $\frac{1}{2}$ of the aperture and armed with bifid teeth), long anteriorly bent opercular spines with 1–2 curved simple teeth and a well developed and armed orificial knob. I also suppose that Utinomi could not find caudal appendages due to poor preservation of the material. Considering the absence of retractor orificii in Utinomi's specimens, it must be noted that there is still no complete information on the presence or absence of this muscle within the genus *Lithoglyptes*. Besides of this, this genus probably is not monophyletic [Grygier & Newman, 1985; Kolbasov, 1999a].

Tomlinson specimen is very similar to the specimens described herein: they have similar morphology of opercular bars and opercular spines, both of them lack of orificial knob. Tomlinson [1969] referred his specimen to the *Balanodytes* because he did not find any caudal appendages, but the barnacle was damaged by a fungus and caudal appendages probably were lost due to infestation.

All these facts indicate that *B. taiwanus* Utinomi, 1950 should be reckoned as a form of *L. habei* and Tomlinson's specimen identified as *B. taiwanus* probably belongs to a new species described herein.

Recently I have found structures similar to rudimentary caudal appendages in a cryptophialid species, tentatively identified as *Cryptophialus variabilis* Stubbing, 1961 (Fig. 3 F). Thus we also should exclude an absence of caudal appendages from the family Cryptophialidae diagnosis. Probably only two acrothoracican genera *Berndtia* Utinomi, 1950 and *Trypetesa* Norman, 1903 lack caudal appendages.

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On type specimens of Myriapoda (Chilopoda, Diplopoda) in the collection of the National Museum of Natural History in Sofia

О типовых экземплярах Мυγriapoda (Chilopoda, Diplopoda) в коллекции Национального музея естественной истории, София

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KEY WORDS: Chilopoda, Diplopoda, type material, museum, Sofia, Bulgaria.

КЛЮЧЕВЫЕ СЛОВА: Chilopoda, Diplopoda, типовой материал, музей, София, Болгария.

ABSTRACT: The collection of the National Museum of Natural History in Sofia contains type material of 38 species or subspecies of Chilopoda, and 65 of Diplopoda. These materials were collected by Iv. Buresch, P. Beron, G. Ribarov, V. Golemansky, P. Stoev and their collaborators, and identified by K. Verhoeff, K. Strasser, W. Shear, R. Hoffman, H. Enghoff, E.H. Eason, J.-P. Mauriès, A. Heymer, Z. Matic, G. Stavropoulos, E. Mikhajlova, J.P. Kim, S. Golovatch, P. Stoev, and V. Golemansky. These types derive from Bulgaria, Greece, Albania, Turkey, Papua New Guinea, Nepal, China, North Korea, Indonesia, Burma, Thailand, Uganda, Crimea, and Turkmenistan.

РЕЗЮМЕ: Коллекция Национального естественно-исторического музея в Софии содержит типовой материал 38 видов и подвидов Chilopoda и 64 видов Diplopoda. Этот материал собирали Ив. Буреш, П. Берон, Г. Рибаров, В. Големански, П. Стоев и их сотрудники, а определяли К. Ферхефф, К. Штрассер, У. Шир, Р. Хоффман, Х. Энгхофф, Э. Изон, Ж.-П. Морьес, А. Хаймер, З. Матик, Г. Ставропулос, Е. Михалева, Дж. Ким, С. Головач, П. Стоев и В. Големански. Этот типовой материал был собран в Болгарии, Греции, Албании, Турции, Папуа Новой Гвинеи, Непале, Китае, Северной Корее, Индонезии, Бирме, Таиланде, Уганде, Крыму и Туркменистане.

Introduction

The National Museum of Natural History in Sofia (NMNH), established 1889, contains a rather rich collection of Myriapoda (Diplopoda and Chilopoda). The type specimens in this collection come from the following collectors:

1. Material from Bulgaria and Greece (Chilopoda and Diplopoda), collected by Dr Iv. Buresch and his collaborators (N. Radew, D. Adzharov, P. Drenski) from 1914 to 1936, identified by K. Verhoeff.

2. Chilopoda from Bulgaria, collected by Prof. V. Golemansky from 1960 to 1965 and deposited in the

NMNH. Descriptions by Z. Matic and V. Golemansky.

3. Chilopoda and Diplopoda from Bulgaria, Greece, Albania, Turkey, Papua New Guinea, Nepal, China, North Korea, Indonesia, Burma, Thailand, Uganda, collected by P. Beron and his collaborators (Ph. Chapman, V. Beshkov, S. Andreev, B. Petrov, etc.) and identified by Z. Matic, G. Stavropoulos, E. Mikhajlova, Kim J. Pil, K. Strasser, W. Shear, R. Hoffman, H. Enghoff, E.H. Eason, J.-P. Mauriès, A. Heymer and S. Golovatch. The bulk of the collections of P. Beron are still under study. Many more new taxa have been described, but much of the material is still kept by specialists on loan.

4. Diplopoda from Albania, collected by S. Golovatch, P. Stoev, B. Petrov and P. Beron, and identified by S. Golovatch, P. Stoev and J.-P. Mauriès.

5. Diplopoda from the Crimea and Turkmenistan, donated by Dr S. Golovatch and described by himself.

6. Chilopoda from Bulgaria, collected and described by G. Ribarov.

The myriapod collection of the Museum counts hundreds of species, although no special database has been prepared yet. Despite the great number of taxa already being objects of research, there is still a lot of undetermined material originating from New Guinea, the Himalaya, Africa and other exotic regions, taken by one of us (P.B.). Enthusiasts for study of these collections are welcome.

All myriapods in the Museum have been re-examined by P.S. The material not studied yet was sorted out in a way to be easily accessible to specialists willing to work on it. In the process of the work we faced some problems of identification of Verhoeff's and Strasser's types. The specimens determined by Karl Verhoeff were not always designated/labeled as types. Only after a study of the original descriptions, selection of some types was possible. Another problem concerning Verhoeff's types we found was, many labels reading "types" actually represented species published in later papers, i.e., they do not belong to the original type series. In this

case, we selected only those where the label coincided with the one originally published by the author.

Following Verhoeff, Karl Strasser is ranking the second most prolific author dealing with Bulgarian diplopods. He published six papers devoted to Bulgarian millipedes, with about forty new taxa erected. In addition, some of his other papers are partly based on millipede material taken by Bulgarian zoologists from Greece, Turkey and the Caucasus. Most of the types established by Strasser were purchased after his death in 1979 by the Geneva Museum. Now at the NMNH we find one-third at best of the material which he published from Bulgaria, and just two jars of what he described from Greece. Only a few of all his tubes re-examined were labeled "types", while the rest looked undetermined. So we had ca. 100 tubes with a label referring to a locality, date and collector but not a single word on the species inside the tube, although we were pretty sure that the material was studied and published by Strasser. In this case we proceeded by writing down all labels found in the tubes and then comparing them with what Strasser published from a certain locality. Only then we could attribute the specimens to the species found there. In the case when more than one species had been published from a certain locality we attributed material to the species concerned only when we were absolutely sure of the identification.

To put the very complicated myriapod taxonomy to some order, several of the older taxa were restudied and, in case of having no type material selected, formal lectotype designations were made. We did so for thirteen centipede and eight millipede taxa, even for those which had already proved to be junior synonyms of taxa described earlier. Types of some infrasubspecific categories (forms, varieties) were also designated, although none is of any taxonomic value at the moment.

As most of the types described by Strasser are in the Geneva Museum (see above), although some syntypes appear to be present in Sofia, no lectotype designation was attempted for the Sofia share of material.

All *loci typici* were translated into English, although originally published in German or French. We think it better to have them transliterated, as some names have been misspelt or contain information which is wrong to some extent.

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SPECIES LIST

CHILOPODA

Lithobiomorpha

Family Lithobiidae

Eupolybothrus andreevi Matic

Eupolybothrus andreevi Matic, 1964: 507.

LOCALITY: Bulgaria, v. Cerovo, Vodnata peshtera Cave, 28.09.1962, S. Andreev leg.

TYPE: one adult female [Holotype], by monotypy.

Lithobius (Australobius) tenuinguis Eason

Lithobius (Australobius) tenuinguis Eason, 1980: 41.

Now: *Australobius tenuinguis* (Eason)

LOCALITY: Papua New Guinea, Western Province: The Sting, 150 m deep shaft, Finim Tel Plateau, 35 km WSW of Telefomin, 1975, P. Beron leg.

TYPE: one female [Holotype].

REMARKS: Originally described in *Lithobius* Leach. In his last papers, however, Eason resurrected *Australobius* Chamberlin to full generic status.

Lithobius (L.) balcanicus Matic

Lithobius balcanicus Matic, 1973a: 249.

LOCALITY: Bulgaria, Rhodope Mt., Smoljan, 21.06.1965, V. Golemansky leg.

TYPE: one male specimen [Lectotype], by present designation.

REMARKS: Matic failed to designate a holotype in the original description of *L. balcanicus* which was based on two males, one adult and one juvenile female. In the NMNH collection, we found two tubes labeled *L. balcanicus*, both seemingly determined by Matic but only one that appeared to derive from the *locus typicus* as published by the author. Along with a male of *L. balcanicus* the tube contained further two undetermined geophilomorphs, which were transferred to another tube. This male specimen of *L. balcanicus* is herewith designated as lectotype. As far as the species has never been found since its original description, its taxonomic status still remains uncertain.

Lithobius (L.) beschkovi Matic et Golemansky

Lithobius beschkovi Matic & Golemansky, 1967: 126.

Now: *Lithobius (L.) rushovensis* Matic, 1967 [fide Stoev, in press].

LOCALITY: Bulgaria, Lovetch Distr., v. Goljama Zheljazna, "Toplja" Cave, 14.07.1960, VI. Beshkov leg.

TYPES: one adult male [Lectotype], three pseudoadult males and one larval stadium IV [Paralectotypes], by present designation.

REMARKS: In 1967, Matic described two cave lithobiids from "Rushova" Cave; the first was named *L. rushovensis* Matic, 1967, the second, *L. beschkovi*, was published in collaboration with V. Golemansky. There is no any doubt now that *beschkovi*, being described in a later volume of the Bull. Inst. Zool., Sofia, is a junior synonym of *rushovensis*. Here-with an adult female is designated as lectotype, the remaining material as paralectotypes.

Lithobius (L.) borisi Verhoeff

Lithobius borisi Verhoeff, 1928: 116.

LOCALITY: Bulgaria, Pirin Mt., Kameniti Vrah (Peak), 2750 m, under stones, 04.07.1924, King Boris and Iv. Buresch leg.

TYPES: five specimens [Paralectotypes]. The Lectotype is deposited in the collection of the British Museum (Natural History) [Eason, 1983: 133].

REMARKS: Both Eason [1983] and Ribarov [1989] considered *L. borisi* either as a subspecies of or identical to *L. erythrocephalus* C.L. Koch, 1847. Eason was the first to designated the lectotype, a female from the Verhoeff collection in the British Museum (Natural History). Later on, in 1989, when revising some chilopod samples deposited in the

NMNH, Ribarov recovered further five specimens from the Verhoeff series of syntypes and, though being familiar with Eason's work, he did designate this material as paralectotypes.

According to the recommendations of the Code, lectotypes are better to be designated from the museum collections where most of the type specimens are preserved or where the author of the taxon worked. As Eason supported his lectotype designation with a profound analysis and species redescription, his designation is considered as absolutely correct.

The *Lithobius erythrocephalus* group, which is composed of medium-sized species with 2+2 prosternal teeth and coxolateral ventral spines on the 15th pair of legs, presently contains scores of species, subspecies and varieties and is widely distributed all over the Palaearctic. At least seven taxa from this group have hitherto been reported from Bulgaria, but only a more profound analysis is bound to finally assess their true number.

Lithobius (L.) borisi rylaicus Verhoeff

Lithobius borisi rylaicus Verhoeff, 1928: 118.

LOCALITY: Bulgaria, Ryla Mt., near Sara-Gyol Lake, 2500 m, under stones, 20.06.1926, Iv. Buresch leg.

TYPES: one male [Lectotype], four males [Paralectotypes], by present designation.

REMARKS: Ribarov [1989], while revising some material at NMNH, determined the specimens from the Verhoeff series of syntypes as belonging to *L. erythrocephalus* C.L. Koch, 1847, yet without lectotype designation. Herewith we designate one male as lectotype and the others as paralectotypes. We tend to believe that *rylaicus* rather belongs to *L. schuleri* Verhoeff, 1925, a species widespread in the mountains of Southeast Europe. Additional studies only are bound to clarify the issue.

Lithobius (L.) christovici Matic et Golemansky

Lithobius christovici Matic & Golemansky, 1964: 101.

LOCALITY: Bulgaria, Rhodopes, Bachkovsky Monastery, 420–500 m alt., *Carpinus betulus*, *Ostrya carpinifolia*, *Fagus sylvaticus*, 29.04.1961.

TYPES: one adult male [Lectotype], one male, one specimen with missing gonopods [Paralectotypes], by present designation.

REMARKS: Having examined a specimen determined by Matic as *L. christovici*, Stoev [1997] proposed its synonymy with the Turkish species *L. ergus* (Chamberlin, 1952). The whole *Lithobius lakatnicensis* group, where *L. lakatnicensis* Verhoeff, 1926, *L. thracicus* Matic et Golemansky, 1967, *L. hrissiae* Stavropoulos et Matic, 1990 and *L. christovici* are known to belong, badly needs a revision. Herewith one of the adult males of *L. christovici* is designated as lectotype, the other two specimens as paralectotypes.

Lithobius (L.) cretaicus Matic

Lithobius cretaicus Matic, 1980b: 100.

LOCALITY: Greece, Crete, Kamilari Cave, 13.01.1968, P. Beron leg.

TYPES: one adult female with broken legs and antennae [Lectotype], one adult male, two adult females and two juvenile males [Paralectotypes], by present designation.

REMARKS: Although Eason [1990] believed that *L. cretaicus* is a junior synonym of *L. sitianus* Chamberlin, 1956, Zapparoli [1994], following his study of topotypic material, demonstrated that *cretaicus* is a "good" species restricted to the Kamilari Cave on Crete.

Lithobius (L.) diampolisi Ribarov

Lithobius diampolisi Ribarov, 1987a: 45.

LOCALITY: Bulgaria, "Ormana" near Jambol, under logs, 4.11.1981, G. Ribarov leg.

TYPE: male [Holotype].

LOCALITY: Bulgaria, Strandzha Mt., between the villages Goljamo Sharkovo and Malko Sharkovo, humid foliage, 14.04.1982, G. Ribarov leg.

TYPE: one juvenile female [Paratype].

Lithobius (L.) glaciei Verhoeff

Lithobius glaciei Verhoeff, 1928: 119.

LOCALITY: Bulgaria, Ossogovo Mt., Ruen Peak, 2200 m, 21.06.1926, N. Radew leg.

TYPES: one male [Lectotype], one juvenile [Paralectotype], all in tube N1; one damaged male (tube N2) [Paralectotype], by present designation.

REMARKS: The status of *L. glaciei* has never been revised. Eason [1983] stated that it might belong to *L. erythrocephalus* C.L. Koch, 1847. In tube N1, we found a label reading "*L. crassipes*" and in tube N2 "*L. (Monotarsobius)* sp.", both determined so by G. Ribarov. Time to comment on these identifications has not come yet. Herewith the male in tube 1 is designated as lectotype.

Lithobius (L.) golemanskyi Ribarov

Lithobius golemanskyi Ribarov, 1987a: 46.

LOCALITY: Bulgaria, Zaichi Vrach, near Jambol, 150 m, under stones, 26.08.1980, G. Ribarov leg.

TYPES: female [Holotype], two males [Paratypes].

LOCALITY: Bulgaria, Strandzha Mt., near v. G. Sharkovo, 14.04.1982, under stones, G. Ribarov leg.

Lithobius (L.) hrissiae Stavropoulos et Matic

Lithobius hrissiae Stavropoulos & Matic, 1990: 43.

LOCALITY: Greece, Samothraki I., v. Chora, 20.05.1984, P. Beron leg.

TYPE: one male [Holotype].

REMARKS: Four species, *Lithobius hrissiae*, *L. sereensis*, *Hessebius matsakisi* and *Cryptops diana*, all representing type specimens named by Matic & Stavropoulos, were found mixed with other lithobiids and cryptopid species (also from Greece), not in tubes but in a common jar. After a careful re-examination by one of us (P.S.), the types were selected among the other specimens, all clearly labeled and placed in separate tubes.

Lithobius (L.) oglednicus Ribarov

Lithobius oglednicus Ribarov, 1987a: 47.

LOCALITY: Bulgaria, Strandzha Mt., near v. Vizitza, 200 m, under stones, 25.08.1982, G. Ribarov leg.

TYPES: one male [Holotype], one male [Paratype].

Lithobius (L.) pamukkalensis Matic

Lithobius pamukkalensis Matic, 1980a: 94.

LOCALITY: Turkey, Pamukkale, 23 km from Denizli, 18.12.1972, P. Beron leg.

TYPES: one female [Lectotype], one male [Paralectotype], by present designation.

REMARKS: As Matic [1980a] failed to designate a holotype, herewith the female is designated as lectotype.

Lithobius (L.) rushovensensis Matic

Lithobius rushovensensis Matic, 1967: 239.

LOCALITY: Bulgaria, Lovetch Distr., v. Gradeshnitsa, "Rushova" Cave, 6.05.1964, V. Georgiev leg.

TYPES: one adult male [Lectotype] along with one larval stadium IV [Paralectotype], by present designation.

Lithobius (L.) seresensis Matic et Stavropoulos

Lithobius seresensis Matic & Stavropoulos, 1990: 27.

Now: *Lithobius (L.) erythrocephalus* C.L. Koch, 1847 [fide Zapparoli, 1994]

LOCALITY: Greece, Seres District, Strimon Station, 19.05.1987, P. Beron leg.

TYPE: one female [Holotype], by monotypy.

REMARKS: see remarks under *L. hrissiae*.

Lithobius (L.) tiasnatensis Matic

Lithobius tiasnatensis Matic, 1973b: 255.

LOCALITY: Bulgaria, v. Mramor, "Tiasnata propast" Pot hole, 4.08.1970, P. Beron & Vl. Beshkov leg.

TYPE: one male [Holotype].

Lithobius (L.) uniunguis Matic et Golemansky

Lithobius uniunguis Matic & Golemansky, 1967: 18.

LOCALITY: Bulgaria, Chepinsko defile (Gorge), v. Banite, 27.04.1960.

TYPES: one adult female [Lectotype], one pseudoadult male [Paralectotype], by present designation.

REMARKS: Although the original description is based on two females, the Sofia collection was found to harbour an adult female along with a pseudoadult male, so probably the sex of the latter specimen was misidentified by the authors of the species. As in the original paper no holotype was designated, herewith the female is designated as lectotype, and the male as paralectotype. Since its original description, the status of *L. uniunguis* has never been revised.

Lithobius (Monotarsobius) anapurnensis Eason

Lithobius (Monotarsobius) anaopurnensis [lapsus calami] Eason, 1993: 188 (and also *L. anapurnensis*).

LOCALITY: Nepal, Anapurna trek, from Hinku to Tada-pani, 17.10.1984, 2500–3000 m, P. Beron leg.

TYPES: one female [Holotype]; one male, one juvenile male, one juvenile female (fragment) [Paratypes].

REMARKS: The spelling *Lithobius anaopurnensis* must be considered as a lapsus calami and not used further, for in the same paper Eason correctly referred to this name as *anapurnensis*, too.

Monotarsobius bifidus Matic

Monotarsobius bifidus Matic, 1973: 260.

Now: *Lithobius (Monotarsobius) bifidus* (Matic)

LOCALITY: Bulgaria, Strandzha Mt., v. Mladezhko, Izvornata peshtera Cave, 9.08.1970, P. Beron & Vl. Beshkov leg.

TYPES: one adult female, one adult male and a juvenile male [Paratypes].

Lithobius (Monotarsobius) jurinici Matic et Golemansky, 1965

Lithobius (Monotarsobius) jurinici Matic & Golemansky, 1965: 22.

LOCALITY: Bulgaria, Assenovgrad, "Kourou-dere", 370 m alt., 30.04.1961, *Corylus avellana*, collection of the Institute of Zoology, Bulgarian Academy of Science.

TYPES: one female [Lectotype], three males [Paralectotypes], by present designation.

REMARKS: No holotype has been designated by the authors in their original description of *L. jurinici*. Herewith we designate the female as lectotype and the male specimens

as paralectotypes. Since the original description the status of *L. jurinici* has never been revised.

Lithobius (Monotarsobius) lakatnicensis Verhoeff

Lithobius (Monotarsobius) lakatnicensis Verhoeff, 1926d: 295.

Now: *Lithobius (L.) lakatnicensis* Verhoeff

LOCALITY: Bulgaria, Sofia District, Lakatnik Station, Temnata dupka Cave, 04.04.1925, I. Buresch leg.

TYPES: two females [Syntypes].

Lithobius (Monotarsobius) proximus Matic et Golemansky

Lithobius (Monotarsobius) proximus Matic & Golemansky, 1967a: 43.

LOCALITY: Bulgaria, Chepinsko defile (Gorge), v. Banite, 27.04.1960, 18.7.1960, *Juglans regia*, *Tilia* sp., *Clematis* sp., under stones and tree bark.

REMARKS: Unfortunately, the tube labeled *L. proximus* was found broken together with some other tubes, so all the specimens in the jar were mixed up, dried and badly damaged. We tried to recognise and select the respective morphospecies but, due to the very bad condition of some of the material, our attempt failed. All the specimens are still preserved in a common tube for a later, more profound study. One of the fragmented specimens looked very similar to *proximus* indeed.

Lithobius (Monotarsobius) strandzhanicus Ribarov

Lithobius (Monotarsobius) strandzhanicus Ribarov, 1987a: 50.

LOCALITY: Bulgaria, Strandzha Mt., near v. Krushevetz, 350 m, mixed broadleaved forest, under logs and stones, 24.08.1982, G. Ribarov leg.

TYPES: male [Holotype], one male [Paratype].

Lithobius (Monotarsobius) taschevi Matic et Golemansky

Lithobius (Monotarsobius) taschevi Matic & Golemansky, 1965: 19.

LOCALITY: Bulgaria, Assenovgrad, "Kourou-dere", 360 m alt., *Fraxinus excelsior*, *Prunus cerasifera*, *Syringa vulgaris*, *Corylus avellana*, *Evonimus* sp., 30.04.1961.

TYPE: one specimen [Syntype].

REMARKS: In their original paper, the authors designated the Bachkovsky Monastery as the type locality of *L. taschevi* (p. 19). On a later page (p. 22) they stated that the species was also found at "Kourou-dere" near Assenovgrad. Revising the NMNH collections we found a tube with one specimen labeled *L. taschevi* — Kourou dere, Assenovgrad, which undoubtedly belongs to the type series of the species. At present, *L. taschevi* is considered as a junior synonym of *Lithobius (Monotarsobius) beroni* Negrea, 1965 [Negrea, 1971].

Monotarsobius visicae Ribarov

Monotarsobius visicae Ribarov, 1987a: 49.

Now: *Lithobius (Sigibius) visicae* (Ribarov)

LOCALITY: Bulgaria, Strandzha Mt., near v. Vizica, 250 m, *Quercetum*, under stones, 25.08.1982, G. Ribarov leg.

TYPE: female [Holotype].

LOCALITY: Bulgaria, Strandzha Mt., near v. Krushevetz, 350 m, under logs and stones, 24.08.1982, G. Ribarov leg.

TYPES: two males, one female [Paratypes].

Lithobius (Ezembius) quadricalcaratus Eason

Lithobius (Ezembius) quadricalcaratus Eason, 1993: 182.

LOCALITY: Burma, Maymyo, B.E. Falls, 1500 m, 2.11.1984, P. Beron & S. Andreev leg.

TYPES: one female [Holotype]; four males, one female, two juvenile females [Paratypes].

Pleuroolithobius bartsiakasi Matic et Stavropoulos

Pleuroolithobius bartsiakasi Matic & Stavropoulos, 1990: 29.

Now: *Pleuroolithobius patriarchalis* (Berlese, 1894) [fide Zapparoli & Minelli, 1993].

LOCALITY: Greece, Evros Distr., v. Essimi, 18.05.1987, P. Beron leg.

TYPES: one female [Lectotype], one male [Paralectotype], by present designation.

Harpolithobius andreevi Matic et Stavropoulos

Harpolithobius andreevi Matic & Stavropoulos, 1988: 39.

LOCALITY: Greece, Euboea, v. Tharunia, Skotini Cave, 26.12.1982, P. Beron & St. Andreev leg.

TYPES: one female [Lectotype], one male [Paralectotype], by present designation.

REMARKS: *Harpolithobius andreevi* has been erected based on two specimens (a male and a female) taken from the same locality where *Harpolithobius beroni* was found. Undoubtedly, it is identical to *beroni* and, as being described on a later page, it becomes its junior synonym. Furthermore, Zapparoli [1994] believes that both these species are indistinguishable from *Harpolithobius anodus* (Latzel, 1880).

Harpolithobius beroni Matic et Stavropoulos

Harpolithobius beroni Matic & Stavropoulos, 1988: 37.

LOCALITY: Greece, Euboea, v. Tharunia, Skotini Cave, 26.12.1982, P. Beron & St. Andreev leg.

TYPE: one male [Holotype], by monotypy.

REMARKS: *Harpolithobius beroni* has been synonymised by Zapparoli [1994] under *Harpolithobius anodus* (Latzel, 1880). With the type available, the validity of the taxon can be reconsidered, as the entire genus *Harpolithobius* badly needs a revision. It is only then that the status of *beroni* could ultimately be settled.

Harpolithobius samothrakiensis Stavropoulos et Matic

Harpolithobius samothrakiensis Stavropoulos & Matic, 1990: 42.

LOCALITY: Greece, Samothraki I., v. Chora, 20.05.1984, P. Beron leg.

TYPE: one specimen [Holotype], by monotypy.

REMARKS: Like in the case of *H. beroni*, only after a revision of *Harpolithobius* and a re-evaluation of the characters presently used in the systematics of harpolithobiids can the status of *H. samothrakiensis* be justified. According to Zapparoli [1994], this is a junior synonym of *H. anodus* (Latzel, 1880).

Hessebius matsakisi Matic et Stavropoulos

Hessebius matsakisi Matic & Stavropoulos, 1990: 32.

LOCALITY: Greece, Rhodes, Lindos, 30.04.1984, P. Beron leg.

TYPES: one male [Lectotype], two adult females and two adult males [Paralectotypes], by present designation.

REMARKS: Eason [1992] treated *H. matsakisi* as a Rhodian subspecies of *H. barpipes* (Porat, 1893). Zapparoli [1994] believes that it is indistinguishable from *Hessebius barpipes* and proposed their synonymy (see also the remarks under *L. hrissiae*).

Geophilomorpha

Family Dignathodontidae

Henia angelovi Ribarov

Henia angelovi Ribarov, 1987b: 86.

LOCALITY: Bulgaria, Sakar Mt., near v. Sakartzi, 300 m, *Quercetum*, under stones, 5.04.1983, G. Ribarov leg.

TYPES: one female 44 mm long with 95 pairs of legs [Holotype], one female 25 mm long with 93 pairs of legs [Paratype].

Family Himantariidae

Thracophilus chiosensis Stavropoulos et Matic

Thracophilus chiosensis Stavropoulos & Matic, 1990: 37.

LOCALITY: Greece, Chios I., Nea Moni, 13.05.1987, P. Beron leg.

TYPE: one female [Holotype].

Scolopendromorpha

Family Cryptopidae

Cryptops beroni Matic et Stavropoulos

Cryptops beroni Matic & Stavropoulos, 1988: 34.

LOCALITY: Greece, Crete, Akrotiri, Mon. Gouverneto, Katholiko Cave, 22.09.1974, P. Beron & Vl. Beshkov leg.

TYPE: one specimen [Holotype], by monotypy.

Cryptops beshkovi Matic et Stavropoulos

Cryptops beshkovi Matic & Stavropoulos, 1988: 36.

LOCALITY: Greece, Rhodes I., Lindos, 31.04.1984; v. Archangelos, 2.05.1984, P. Beron leg.

TYPES: one specimen [Lectotype], one specimen [Paralectotype], respectively, by present designation.

REMARKS: As far as no holotype has been designated by Matic & Stavropoulos, herewith one of the specimens from the syntype series is designated as lectotype, the other as paralectotype.

Cryptops diana Stavropoulos et Matic

Cryptops diana Stavropoulos & Matic, 1990: 38.

LOCALITY: Greece, Thassos I., Dracotrypa Cave, 28.12.1982, P. Beron & St. Andreev leg.

TYPES: three specimens [Holotype and two Paratypes].

REMARKS: Type material *C. diana* was found mixed up with other lithobiomorph and scolopendromorph species in a common jar. One of us (P.S.) selected the types but, unfortunately, we could not discriminate between the holotype and the paratypes.

Family Scolopendridae

Scolopendra cingulata thracia Verhoeff

Scolopendra cingulata thracia Verhoeff, 1928: 123.

LOCALITY: Western Thrace (Greece), Badoma near Dede Agach, 20.04.1914, I. Buresch leg.

TYPE: one specimen [Holotype], by monotypy.

REMARKS: Ribarov [1989] treated *thracia* as a junior synonym of *Scolopendra cingulata* Latreille, 1829.

DIPLOPODA

Glomerida

Family Glomeridae

Glomeris bureschi Verhoeff

Glomeris (Eurypleuromeris) bureschi Verhoeff, 1926c: 193.

LOCALITY: Bulgaria, Strandzha Mt., near Malko Tarnovo, 3.05.1921, I. Buresch leg.

TYPES: one specimen [Lectotype], two specimens [Paralectotypes] by present designation.

LOCALITY: South Thrace (North Greece), near Xanthi, 26.04.1914, Iv. Buresch leg.

TYPE: two specimens [Paralectotypes], by present designation.

REMARKS: *G. bureschi* has long been treated as a junior synonym of *G. balcanica* Verhoeff, 1906 [Strasser, 1969].

Glomeris bureschi var. *olympiaca* Verhoeff

Glomeris bureschi var. *olympiaca* Verhoeff, 1937: 100.

LOCALITY: Greece, Olympus, 2600 m, near snow-drifts, 05.07.1936, D. Papazov leg.

TYPES: one specimen (male?, telopods missing) [Lectotype], one female [Paralectotype], by present designation.

REMARKS: In his numerous papers devoted to Greek diplopods, Strasser did not mention *olympiaca* but, although no formal synonymy has ever been proposed, it seems a junior synonym of *G. balcanica* Verhoeff, 1906.

Glomeris bureschi var. *sakarensis* Verhoeff

Glomeris bureschi var. *sakarensis* Verhoeff, 1937: 100.

LOCALITY: Bulgaria, Sakar Mt., Manda-tash, 2.05.1926, N. Radew leg.

TYPE: one specimen labeled "type" [Holotype], by monotypy, along with a specimen of terrestrial Isopoda.

REMARKS: Strasser [1969] considered this variety as a junior synonym of *G. balcanica* Verhoeff, 1906.

Glomeris norica var. *vodnatensis* Verhoeff

Glomeris norica var. *vodnatensis* Verhoeff, 1926c: 195.

Now: *Glomeris pustulata* Latreille

LOCALITY: Bulgaria, Iskar Gorge, v. Tzerovo, Vodnata peshtera Cave, 1.03.1925, I. Buresch leg. On the back of the label: "No 8 Der Trockene Gang" [The dry gallery].

TYPE: one specimen labeled "type" [Holotype], by monotypy.

REMARKS: Although Strasser treated *vodnatensis* as a distinct species, Mauriès et al. [1997] have shown it to be nothing else but a junior synonym of *G. pustulata* Latreille, 1804.

Glomeris rhodopina Verhoeff

Glomeris rhodopina Verhoeff, 1937: 101.

Now: *Glomeris balcanica* Verhoeff, 1906

LOCALITY: Bulgaria, Central Rhodope, near Shiroka Laka, 26.06.1924, P. Drensky leg.

TYPES: one specimen [Lectotype], one specimen [Paralectotype], by present designation.

REMARKS: *G. rhodopina* is currently considered as a junior synonym of *G. balcanica* Verhoeff, 1906 [Strasser, 1969].

Hyleoglomeris beroni Mauriès

Hyleoglomeris beroni Mauriès, 1984: 39.

LOCALITY: Greece, Naxos, Cave of Zeus, 17.09.1981, P. Beron leg.

TYPES: one male [Holotype], six males and fourteen females [Paratypes].

Chordeumatida

Family Anthroleucosomatidae

Anamastigona albanensis Mauriès, Golovatch et Stoev

Anamastigona albanensis Mauriès, Golovatch & Stoev, 1997: 266.

LOCALITY: Albania, Mount Petrela, ca. 15 km. SE of Tirana, alt. 350 m, under stones, ruins, shrub, 9.05.1995, Golovatch, Stoev & Petrov leg.

TYPE: one male [Holotype], two males and one female [Paratypes].

Prodicus (Antrodictus) delcevi Strasser

Prodicus (Antrodictus) delcevi Strasser, 1973: 424.

Now: *Anamastigona delcevi* (Strasser)

LOCALITY: Bulgaria, Slavyanka Mt., Gallery near the village Paril, 15.07.1971, Ch. Delchev leg.

TYPES: one specimen in a separate microvial labeled "Holotype" [Holotype], several specimens labeled "Paratypes" [Paratypes].

REMARKS: In his original description of *A. delcevi*, Strasser did not designate a holotype. However, the NMNH collection contains several specimens of *A. delcevi*, one of them kept separate from the others and labeled "Holotype", this obviously being the specimen upon which the author based his description.

Prodicus (Antrodictus) lepenicae Strasser

Prodicus (Antrodictus) lepenicae Strasser, 1975: 72.

Now: *Anamastigona lepenicae* (Strasser)

LOCALITY: Bulgaria, Velingrad Distr., Lepenitza Cave 7.04.1974, P. Beron leg.

TYPE: isolated parts of a specimen (in a separate microvial) along with numerous specimens of the same species [Syntypes].

Bulgarosoma superficiei Strasser

Bulgarosoma superficiei Strasser, 1975: 70.

LOCALITY: Bulgaria, Vitosha Mt., Aleko Hut, 1950 m, 9.05.1973, P. Beron leg.

TYPE: one specimen [Holotype], by monotypy.

Family Craspedosomatidae

Craspedosoma transsilvanicum var. *ledenitzense* Verhoeff

Craspedosoma transsilvanicum var. *ledenitzense* Verhoeff, 1926b: 73.

LOCALITY: Bulgaria, Kotel Distr., Ledenitza Cave, 29.09.1924, N. Radew leg.

TYPE: one specimen [Lectotype], two specimens [Paralectotypes], by present designation.

REMARKS: Herewith, a fragmented male with missing gonopods is designated as lectotype, two immature specimens as paralectotypes.

Craspedosoma transsilvanicum madidum var. *adzharovii* Verhoeff

Craspedosoma transsilvanicum madidum var. *adzharovii* Verhoeff, 1937: 98.

LOCALITY: Bulgaria, Mt. Vitosha, above v. Dragalevci, 1100 m, 3.10.1926, D. Adzharov leg.

TYPE: one specimen [Holotype], by monotypy.

Family Haaseidae

Orobainosoma (Histrosoma) vidinense Strasser

Orobainosoma (Histrosoma) vidinense Strasser, 1973: 419.

Now: *Haasea (Histrosoma) vidinensis* (Strasser)

LOCALITY: Bulgaria, Vidin District, v. Bela, Džamiite Pot hole, 19.10.1969, P. Beron leg.

TYPES: one male specimen [Holotype], several specimens [Paratypes].

REMARKS: Although Strasser [1973] did not designate a holotype in the original description, one specimen in a microvial, with a label reading "holotype", and several others labeled "paratypes" are in the NMNH collection.

Family Heterochordeumatidae

Heterochordeuma petarberoni Shear, 2000

Heterochordeuma petarberoni Shear, 2000: 368.

LOCALITY: Indonesia, Mentawai Islands, Siberut Is., Muaraserut, 15–20.08.1995, P. Beron & T. Ivanova leg.

TYPES: one male [Holotype], two males and one female [Paratypes].

Family Metopidiotrichidae

Malayothrix papuana Shear, 1980

Malayothrix papuana Shear, 1980: 35.

LOCALITY: Papua New Guinea, Western Province, Mt. Fugilil, about 32 km. WSW of Telefomin, at the Camp, 2980 m, 29.09.1975, P. Beron leg.

TYPE: one male [Holotype].

Callipodida

Family Schizopetalidae

Acanthopetalum subpatens Mauriès, Golovatch et Stoev

Acanthopetalum subpatens Mauriès, Golovatch & Stoev, 1997: 264.

LOCALITY: Albania, Leskoviku Distr., cave on the road Permet to Leskoviku, 5 km before Leskoviku, alt. 900 m, 12.05.1995, P. Stoev & B. Petrov leg.

TYPE: one male [Holotype].

Same locality, 1.06.1994, T. Ivanova leg.

TYPES: males (three adults and one juvenile) [Paratypes].

Balkanopetalum armatum Verhoeff

Balkanopetalum armatum Verhoeff, 1926a: 58.

LOCALITY: Bulgaria, Iskar Gorge, Tcherepish Monastery, Studenata peshtera Cave, 4.12.1924, I. Buresch leg.

TYPE: one fragmented specimen with head and gonopods missing [Holotype], by monotypy.

Balkanopetalum beskovi Strasser

Balkanopetalum beskovi Strasser, 1973: 427.

LOCALITY: Bulgaria, Central Rhodopes, v. Dobrostan, Topchika Cave, 27.05.1968, Vl. Beshkov leg.

TYPES: several specimens, one of them fragmented [Syn-types].

Same locality, 24.08.1970, Ch. Delchev leg.

TYPES: one female, one juvenile [Syntypes].

Balkanopetalum rhodopinum Verhoeff

Balkanopetalum rhodopinum Verhoeff, 1937: 95.

LOCALITY: Bulgaria, Central Rhodopes, "Novata" Cave near Peshtera, 15.10.1932, D. Papazov & N. Atanassov leg.

TYPES: one male [Lectotype], one female? [Paralectotype], by present designation.

REMARKS: As Verhoeff did not designate a holotype, a lectotype is selected herewith.

Broelemannia (Bulgaropetalum) bulgaricum [recte: -ca] Verhoeff

Brölemannia (Bulgaropetalum) bulgaricum Verhoeff, 1926c: 197.

Now: *Eurygyrus ochraceus* C.L. Koch, 1847

LOCALITY: Bulgaria, Evxinograd near Varna, 10.10.1925, King Boris III leg.

TYPES: one adult female [Lectotype], one fragmented specimen (male?) [Paralectotype], by present designation.

REMARKS: The status of *B. bulgarica* has already been discussed by Hoffman [1972], with the result that it is a junior synonym of *Eurygyrus ochraceus* C.L. Koch, 1847. As Verhoeff did not select a holotype, herewith a formal lectotype designation is made.

Polydesmida

Family Doratodesmidae

Scolopopyge pholeter Hoffman

Scolopopyge pholeter Hoffman, 1978: 301.

LOCALITY: Papua New Guinea, Western Province: Finim Tel Plateau, Bitip Cave, Upper west chamber 11.10.1975, P. Chapman leg.

TYPES: one male [Holotype], one female [Paratype].

Selminarchus hispidus Hoffman

Selminarchus hispidus Hoffman, 1978: 304.

LOCALITY: Papua New Guinea: Western Province: Finim Tel Plateau, Selminum Tem Cave, 18.10.1975, P. Chapman leg.

TYPES: one male [Holotype], several males and females [Paratypes].

Family Fuhmannodesmidae

Sphaeroparia (Sphaeroparia) petarberoni Mauriès et Heymer

Sphaeroparia (Sphaeroparia) petarberoni Mauriès & Heymer, 1996: 174.

LOCALITY: Uganda, Ruwenzori, Stony slope below Elena Hut, 4100–4200 m, 28.02.1993, P. Beron & Vl. Beshkov leg.

TYPES: one male [Holotype], one male, three females, one juvenile [Paratypes].

Uganda, Ruwenzori, Nyamuleju-John Mate, 3000–3300 m, 4.03.1993, P. Beron & Vl. Beshkov leg.

TYPES: one female, one juvenile (from the type series).

Sphaeroparia (Sphaeroparia) violantennae Mauriès et Heymer

Sphaeroparia (Sphaeroparis) violantennae Mauriès & Heymer, 1996: 172

LOCALITY: Uganda, Ruwenzori, between Yeoman Hut and Nyabitaba Hut, 3200 m, 4.03.1993, P. Beron & Vl. Beshkov leg.

TYPES: one male [Holotype], four females and two juveniles [Paratypes].

Sphaeroparia (Sphaeroparia) beshkovi Mauriès et Heymer

Sphaeroparia (Sphaeroparia) beshkovi Mauriès & Heymer, 1996: 168

LOCALITY: Uganda, Ruwenzori, between Yeoman Hut and Nyabitaba Hut, 3200 m, 4.03.1993, P. Beron & Vl. Beshkov leg.

TYPE: one male [Holotype].

Sphaeroparia (Physetoparia) nyabitabae Mauriès et Heymer

Sphaeroparia (Physetoparia) nyabitabae Mauriès & Heymer, 1996: 179.

LOCALITY: Uganda, Ruwenzori, Nyabitaba Hut, 2650–2800 m, 4.03.1993, P. Beron & Vl. Beshkov leg.

TYPES: one male [Holotype] and three females [Paratypes].

Family Paradoxosomatidae

Astromontosoma jeekeli Hoffman

Astromontosoma jeekeli Hoffman, 1978: 288.

LOCALITY: Papua New Guinea: Western Province: Finim Tel Plateau, Upper Bitip Cave, West chamber, 11.10.1975, British Speleological Expedition FT-11

TYPE: one male [Holotype].

Cawjeekelia pyongana Mikhajlova et Kim

Cawjeekelia pyongana Mikhajlova & Kim, 1993: 34.

LOCALITY: North Korea, N. Pyongan Prov., Mt. Myohyang, 10–12.06.1987, P. Beron leg.

TYPES: one male [Holotype], prep. N 341, one juvenile [Paratype].

Cleptomorpha sumatrana Golovatch

Cleptomorpha sumatrana Golovatch, 1996: 134.

LOCALITY: Indonesia, Sumatra, Mt. Kerinci, Kerinci-Seblat Nat. Park, ca. 1400–2600 m, 25.05.1994, P. Beron & Vl. Beshkov leg.

TYPES: one male [Holotype], six females [Paratypes].

Eustrongylosoma exiguum Hoffman

Eustrongylosoma exiguum Hoffman, 1978: 285.

LOCALITY: Papua New Guinea: Western Province: Finim Tel Plateau, Selminum Tem Cave, 18.10.1975, P. Chapman leg.

TYPE: one male [Holotype].

Metonomastus petrelensis Mauriès, Golovatch et Stoev

Metonomastus petrelensis Mauriès, Golovatch & Stoev, 1997: 271.

LOCALITY: Albania, Mount Petrela, ca. 15 km SE of Tirana, 300 m, artificial galleries near the road, 9.05.1995, P. Stoev & B. Petrov leg.

TYPE: one male [Holotype], six females [Paratypes].

Nothrosoma beroni Hoffman

Nothrosoma beroni Hoffman, 1978: 296.

LOCALITY: Papua New Guinea: Western Province: Finim Tel Plateau, Selminum Tem Cave, 18.10.1975, British Speleological Expedition.

TYPE: one female [Holotype].

Orthomorpha beroni Golovatch

Orthomorpha beroni Golovatch, 1997: 76.

LOCALITY: Indonesia, Java, Puncak Pass, 34 km from Bogor, 1500–1600 m, 6.07.1994, P. Beron & Vl. Beshkov leg.

TYPES: one male [Holotype], two males and one female [Paratypes].

Selminosoma chapmani Hoffman

Selminosoma chapmani Hoffman, 1978: 291.

LOCALITY: Papua New Guinea: Western Province: Finim Tel Plateau, Selminum Tem Cave, 15.10.1975, P. Chapman leg.

TYPES: one male [Holotype], one female [Paratype].

Same locality 18.10.1975, P. Chapman leg.

TYPES: numerous males and females [Paratypes].

Tectoporus aberrans Golovatch

Tectoporus aberrans Golovatch, 1996: 137.

LOCALITY: Indonesia, Sumatra, Mt. Kerinci, Kerinci-Seblat Nat. Park, ca. 1400–2600 m, 25.05.1994, P. Beron & Vl. Beshkov leg.

TYPE: one male [Holotype].

Tectoporus beroni Golovatch

Tectoporus beroni Golovatch, 1996: 137.

LOCALITY: Indonesia, Sumatra, Mt. Kerinci, Kerinci-Seblat Nat. Park, ca. 1400–2600 m, 25.05.1994, P. Beron & Vl. Beshkov leg.

TYPE: one male [Holotype].

Tectoporus beshkovi Golovatch

Tectoporus beshkovi Golovatch, 1996: 139.

LOCALITY: Indonesia, Sumatra, Mt. Kerinci, Kerinci-Seblat Nat. Park, ca. 1400–2600 m, 25.05.1994, P. Beron & Vl. Beshkov leg.

TYPE: one male [Holotype].

Tectoporus lombokensis Golovatch

Tectoporus lombokensis Golovatch, 1995: 95.

LOCALITY: Indonesia, Lombok, Rinjani, rainforest above Satip, 500–800 m, 10.06.1994, P. Beron & Vl. Beshkov leg.

TYPE: one male [Holotype].

Tylopus sinensis Golovatch

Tylopus sinensis Golovatch, 1995: 90.

LOCALITY: China, Yunnan, Menzi County, Pot hole N2 (Ha Fa Tiao Dong), 6.01.1989, P. Beron leg.

TYPE: one male [Holotype].

Vaulogerodesmus beroni Golovatch

Vaulogerodesmus beroni Golovatch, 1995: 92.

LOCALITY: China, Nanjing, Zijin (Purple) Mt., 350–450 m, 9.10.1988, P. Beron leg.

TYPES: one male [Holotype], two males and three females [Paratypes].

Vaulogerodesmus picturatus Golovatch

Vaulogerodesmus picturatus Golovatch, 1995: 92.

LOCALITY: China, Guanxi Zhuangxi County, Zhizhigu Guilin, 6.10.1988, P. Beron leg.

TYPES: one male [Holotype], one female [Paratype].

Family Polydesmidae

Brachydesmus herzegowinensis reflexus Strasser

Brachydesmus herzegowinensis reflexus Strasser, 1975: 74.

LOCALITY: Bulgaria, Sofia District, v. Breze, Marina dupka Cave, 2.05.1974, P. Beron & Vl. Beshkov leg.

TYPE: several specimens [Syntypes].

REMARKS: As the original species name *herzegowinensis* Verhoeff has since been frequently misspelt as *herzegowinensis* or *hercegovinensis*, we use the correct name in the heading [cf. Mauriès et al., 1997]. The same concerns the next heading as well.

Brachydesmus herzegowinensis trifidus Strasser

Brachydesmus herzegowinensis trifidus Strasser, 1973: 415.

LOCALITY: Bulgaria, Kjustendil District, v. Stradalovo, Mecha dupka Cave, 27.02.1969, P. Beron & V. Beshkov leg.

TYPES: one specimen in a separate microvial labeled "Holotype" [Holotype] and two specimens labeled "Paratypes" [Paratypes].

REMARKS: Though Strasser [1973] did not designate a holotype in his paper, the underlying material, in the NMNH, was properly labeled and designated, obviously being the one upon which the author based his description.

Brachydesmus radewi Verhoeff

Brachydesmus radewi Verhoeff, 1926b: 73.

LOCALITY: Bulgaria, Vratza Distr., v. Dolna Beschovitz, Promakinjalo Cave, 6.02.1925, N. Radew leg.

TYPE: one fragmented specimen [Holotype], by monotypy.

Epanerchodus beroni Mikhajlova et Kim

Epanerchodus beroni Mikhajlova & Kim, 1993: 31.

LOCALITY: North Korea, Kangwon Province, Kumgang-san, 400–900 m, 4.06.1987, P. Beron leg.

TYPES: one male [Holotype] prep. N 235, 337 (antennae), 338; two females, prep. N 339 (vulva) and 1 juvenile [Paratypes] (numbers of the authors).

Polydesmus bureschi Verhoeff

Polydesmus bureschi Verhoeff, 1928: 31.

LOCALITY: Bulgaria, Tarnovo Distr., Kaltschowa dupka Cave, 3.04.1926, D. I. Buresch leg.

TYPE: one specimen [Syntype].

Family Xystodesmidae

Leptodesmus vestitus thracicus Verhoeff

Leptodesmus vestitus thracicus Verhoeff, 1926c: 200.

Now: *Melaphe vestita thracia* (Verhoeff)

LOCALITY: European Turkey, Thracia, Kuru-Dagh, 600 m, 1.05.1913, I. Buresch leg.

TYPES: several specimens of both sexes [Paralectotypes].

REMARKS: The lectotype of *M. vestita* has already been designated by Hoffman [1962] from the Verhoeff collection in Munich. The subspecific status of *thracia* is still uncertain. Moreover, this taxon might very readily prove to represent a junior synonym of *Melaphe thrax* (Brandt, 1839).

Julida

Family Julidae

Anaulaciulus koreanus salebrosus Mikhajlova et Kim

Anaulaciulus koreanus salebrosus Mikhajlova & Kim, 1993: 35.

LOCALITY: North Korea, N. Pyongan Province, Mt. Myohyang, 10–12.06.1987, P. Beron leg.

TYPES: one male [Holotype]; three males and one female, prep. N 340 (1, 2 leg pairs, antennae), prep. N 342 (vulva).

Apfelbeckiella (Rhodopiella) beroni saetigera Strasser

Apfelbeckiella (Rhodopiella) beroni saetigera Strasser, 1973: 448.

LOCALITY: Bulgaria, Bourgas Distr., v. Mladezhko, Kaleto Cave, 9.08.1970, P. Beron & V. Beshkov leg.

TYPE: one specimen labeled "Paratype" [Paratype] along with a *Trachysphaera* sp. and other Julida.

REMARKS: The specimen labeled "paratype" undoubtedly belongs to Strasser's original series, although he did not designate a holotype in the paper.

Cylindroiulus (Crenatoiulus) kuschensis Golovatch

Cylindroiulus (Crenatoiulus) kuschensis Golovatch, 1978a: 299.

Now: *Cylindroiulus kuschensis* Golovatch

LOCALITY: Central Asia, Turkmenistan, Kushka, near v. Morgunovka, *Pistacia* shrub, 11.04.1976, S. Golovatch leg.

TYPE: one female [Paratype].

Cylindroiulus ponticus Golovatch

Cylindroiulus ponticus Golovatch, 1978b: 456.

Now: *Cylindroiulus horvathi* (Verhoeff, 1897)

LOCALITY: Ukraine, Crimea, near village Krasnolesye, shrub, litter, 10.08.1976, S. Golovatch leg.

TYPE: one female [Paratype].

REMARKS: *C. ponticus* is now considered as a synonym of *Cylindroiulus horvathi* (Verhoeff, 1897) [Korsós & Read, 1994].

Leptoiulus (Oroiulus) borisi Verhoeff

Leptoiulus (Oroiulus) borisi Verhoeff, 1926c: 205.

LOCALITY: Bulgaria, Pirin Mt., Kameniti vrach (Peak), 2750 m, under stones, 4.07.1924, King Boris III leg.

TYPES: one specimen [Lectotype], one specimen [Paralectotype], by present designation.

REMARKS: We have found two specimens labeled *L. borisi*, both preserved in a glass cylinder prepared for the Museum's exhibition. It appears quite complicated to remove the specimens but herewith the larger is formally designated as lectotype and the smaller as paralectotype.

Leptoiulus trilineatus bureschi Verhoeff

Leptoiulus trilineatus bureschi Verhoeff, 1928: 37.

LOCALITY: Bulgaria, Vitosha Mt., above Knjazhewo, 1400 m, 24.10.1926, Iv. Buresch leg.

TYPES: one fragmented specimen [Lectotype], two fragmented specimens [Paralectotypes], by present designation.

Chromatoiulus (Ch.) beroni Strasser

Chromatoiulus (Ch.) beroni Strasser, 1973: 444.

Now: *Megaphyllum beroni* (Strasser)

LOCALITY: Bulgaria, Rhodope Mt., v. Trigrad, Djavolskoto garlo Cave, 10.07.1969, P. Beron leg.

TYPE: one specimen in microvial [Holotype?], several specimens along with a *Bulgarosoma?* sp. [Paratypes?].

Megaphyllum brachyurum thassensis Mauriès

Megaphyllum brachyurum thassensis Mauriès, 1985: 53.

LOCALITY: Greece, Thassos I., v. Panagia, Drakotrypa Cave, 28.12.1982, P. Beron & St. Andreev leg.

TYPES: one male [Holotype], four males, one female, two juveniles [Paratypes].

Chromatoiulus (Italoilulus) margaritatus var. *cretica* Strasser

Chromatoiulus (Italoilulus) margaritatus var. *cretica* Strasser, 1976: 620.

Now: *Megaphyllum margaritatum* var. *cretica* (Strasser)

LOCALITY: Greece, Crete, Levka Ori, 2200 m, 25.09.1974, P. Beron & St. Andreev leg.

TYPE: one male [Holotype], by monotypy.

Brachyiulus rhodopinus Verhoeff

Brachyiulus rhodopinus Verhoeff, 1928: 33.

Now: *Megaphyllum rhodopinum* (Verhoeff)

LOCALITY: Bulgaria, Central Rhodope, Batak, 20.06.1926, Iv. Buresch leg.

TYPE: one specimen [Syntype].

Syrroiulus andreevi Mauriès*Syrroiulus andreevi* Mauriès, 1984: 44.

LOCALITY: Greece, Paros Isl., v. Marathi, "Grotte-Carrière de Marbre" (Marble Cave—quarry), 23.12.1982, P. Beron & St. Andreev leg.

TYPES: one male [Holotype], one female [Paratype].

Telsonius nycteridonis Strasser*Telsonius nycteridonis* Strasser, 1976: 622.

LOCALITY: Greece, Chalkidiki Peninsula, Spilja Nycteridon Cave near Petralona, 10.10.1974, P. Beron & V.I. Beshkov leg.

TYPE: one male specimen, prep. N 2291 (gnathochilarium, 1, 2, 3, 7 pairs of legs), one female specimen, prep. N 2291 (antenna) [Syntypes].

Typhloiulus beroni Mauriès, Golovatch et Stoev*Typhloiulus beroni* Mauriès, Golovatch et Stoev, 1997: 273.

LOCALITY: Albania, Korca Distr., Pustec (Liquena), artificial gallery, 5.10.1994, P. Beron leg.

TYPES: one male [Holotype]; two males, two females, two juveniles [Paratypes]; male [Paratype] prep. N 35.

Typhloiulus longipes Strasser*Typhloiulus (Inversotyphlus) longipes* Strasser, 1973: 434.

LOCALITY: Bulgaria, Vraca Distr., Beljar Cave, 7.10.1968, P. Beron leg.

TYPES: one adult female, one juvenile female [Syntypes]. Bulgaria, Vratza Distr., v. Chiren, Zvankova dupka Cave, 2.10.1968, P. Beron leg.

TYPE: one juvenile specimen [Syntype].

REMARKS: The specimens from Cave Beljar have been sent for study to Dr. Henrik Enghoff, who identified them as being paratypes of *T. longipes*.

Typhloiulus staregai Strasser*Typhloiulus (?) staregai* Strasser, 1973: 438.

LOCALITY: Bulgaria, Vidin Distr., v. Salash, grotte Rushkovica, 21.10.1969, P. Beron leg.

TYPES: [Syntypes].

Family Blaniulidae

Thassoblaniulus simplarius Mauriès*Thassoblaniulus simplarius* Mauriès, 1985: 53.

LOCALITY: Greece, Thassos I., v. Panagia, Drakotrypa Cave, 28.12.1982, P. Beron & St. Andreev leg.

TYPES: one male [Holotype], four males, seven females [Paratypes].

Nepalmatoiulus generalis Enghoff*Nepalmatoiulus generalis* Enghoff, 1987: 269.

LOCALITY: Nepal, Langtang Valley, Kyongjin Gompa, forest, 3800–4000 m, 23.09.1984, P. Beron leg.

TYPES: eight males, two females, seven juvenile males, three juvenile females, one asex. [Paratypes].

Nepal, Anapurna region, Trekking from New Dobhan Lodge to Hinku, 2500–3000 m, 12.10.1984, P. Beron leg.

TYPES: eleven males, five females, one juvenile female [Paratypes].

Nepal, Anapurna trek, from Hinku to Tadapani, 17.10.1984, 2500–3000 m, P. Beron leg.

TYPES: six males, seven females [Paratypes].

Nepal, Anapurna region, Machhapuchhre Base Camp to Hinku, 3400–3800 m, 13.10.1984, P. Beron leg.

TYPES: one male, one female [Paratypes].

Nepal, Anapurna Base Camp, 3800–4300 m, 14.10.1984, P. Beron leg.

TYPES: two males, one female [Paratypes].

Nepalmatoiulus pygmaeus Enghoff*Nepalmatoiulus pygmaeus* Enghoff, 1987: 311.

LOCALITY: Thailand, Doi Inthanon Nat. Park, 2000–2540 m, 13.11.1984, P. Beron & St. Andreev leg.

TYPES: two males, two females [Paratypes].

Conclusions

CHILOPODA

The chilopod types kept at the Sofia Museum were treated by Verhoeff [1926d, 1928], Matic [1973a, b, 1980a, b], Matic & Stavropoulos [1988, 1990], Stavropoulos & Matic [1990], Eason [1993] and Ribarov [1987a, b]. Altogether, 38 taxa belonging to five families, Lithobiidae (32), Scolopendridae (1), Cryptopidae (3), Dignathodontidae (1), and Himantariidae (1), are deposited in the Museum; of these, 31 taxa have been described from Bulgaria, 13 from Greece, and one each from Turkey, Nepal, Burma and New Guinea. Approximately one-third of these are now considered synonyms of species named earlier, some of the remaining taxa are of uncertain identity. The Museum keeps also some specimens of *Lithobius lakatnicensis* Verhoeff, 1926, *Lithobius beschkovi* Matic & Golemsky, 1967, *Lithobius popovi* Matic, 1973, etc. which have been collected from the *loci typici*, i.e. topotypes.

DIPLOPODA

The diplopod types preserved at the NMNH in Sofia are more numerous compared to these of centipedes. Also, the type localities cover as many as fourteen countries. The type materials were treated by Verhoeff [1926a, b, c, 1928, 1937], Strasser [1969, 1973, 1975, 1976], Shear [1980, 2000], Hoffman [1977/78], Mauriès [1984, 1985], Mauriès & Heymer [1996], Mauriès et al. [1997], Mikhajlova & Kim [1993], Enghoff [1987] and Golovatch [1978a, b, 1995, 1996, 1997]. In total, types of 65 millipede taxa representing 14 families have been deposited in the Museum: 25 from Bulgaria, eight from Greece, seven each from Papua New Guinea and from Indonesia, four each from Albania and Uganda, three each from North Korea and China, and one each from European Turkey, the Ukraine, Turkmenistan, Thailand, and Nepal. In addition, specimens of several species such as *Bulgarosoma bureschi* Verhoeff, 1926, *Anamastigona alba* (Strasser, 1960), *Typhloiulus bureschi* Verhoeff, 1926, *Szechuanella grandis* Golovatch, 1984, etc. taken from their type localities, i.e. topotypes, are also in the collection of the Museum, thus reinforcing its importance as a repository.

In conclusion, at present the NMNH in Sofia houses type material of 103 taxa of Myriapoda originating from fifteen countries in Europe, Asia, Africa, and Australasia. Although samples from the Americas kept in the Museum are fairly numerous as well, no type specimens have been described/designated among them yet.

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A review of the millipede fauna of Siberia (Diplopoda)

Обзор двупарноногих многоножек фауны Сибири (Diplopoda)

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KEY WORDS: Diplopoda, fauna, distribution, taxonomy, new species, new family, Siberia, Russia.

КЛЮЧЕВЫЕ СЛОВА: Diplopoda, фауна, распространение, таксономия, новый вид, новое семейство, Сибирь, Россия.

ABSTRACT: A new review of the millipede fauna of Siberia, Russia is provided, with 46 species or subspecies involved. Numerous new faunistic records are given. *Sibiriulus multiradicis* sp.n. is described as new, while *Altajella pallida* Gulička, 1972 and *Teleckophoron montanum* Gulička, 1972, both redescribed based on new material, as well as the oligotypic Central Asian genus *Elongeuma* Golovatch, 1982 are assigned to a new family, Altajellidae fam.n. The following new synonymy is advanced: *Craspedosoma dahuricum* Gerstfeldt, 1859 = *Orientylla mikhajlovae* (Shear, 1990) = *Orientylla dahurica* (Gerstfeldt, 1859), syn.n. Variation in both subspecies of *Julus ghilarovi* Gulička, 1963 is elucidated and discussed. Both *Cylindroiulus latestriatus* (Curtis, 1845) and *Asiatyella communicantis* (Golovatch, 1977) are formally new to the fauna of Siberia. A brief zoogeographical analysis is presented.

РЕЗЮМЕ: Дан новый обзор фауны многоножек-диплопод Сибири (Россия), где обнаружено 46 видов и подвидов. Приведены многочисленные новые фаунистические данные. Вид *Sibiriulus multiradicis* sp.n. описан как новый для науки, а *Teleckophoron montanum* Gulička, 1972 и *Altajella pallida* Gulička, 1972, переопределяемые по новому материалу, помещены наряду с олиготипическим среднеазиатским родом *Elongeuma* Golovatch, 1982 в состав нового семейства Altajellidae fam.n. Предложена следующая новая синонимика: *Craspedosoma dahuricum* Gerstfeldt, 1859 = *Orientylla mikhajlovae* (Shear, 1990) = *Orientylla dahurica* (Gerstfeldt, 1859), syn.n. У обоих подвидов *Julus ghilarovi* Gulička, 1963 прослежена морфологическая изменчивость. Виды *Cylindroiulus latestriatus* (Curtis, 1845) и *Asiatyella communicantis* (Golovatch, 1977) формально впервые указаны для территории Сибири. Представлен краткий зоогеографический анализ.

Introduction

Knowledge of the diplopod fauna of Siberia, Russia is still highly incomplete and fragmentary, although the first

relevant publications appeared long ago, in the 19th century [Gerstfeldt, 1859; Stuxberg, 1876a, b; Haase, 1880]. Later, Lohmander [1933] indirectly mentioned a few forms from that territory, followed by the works of Gulička [1963, 1972], Hoffman [1975], Lokšina & Golovatch [1979], Mikhajlova [1979, 1981, 1984, 1998a, 2000], Golovatch [1979, 1992], Enghoff [1985], Shear [1988, 1990], and Shelley [1998]. Mikhajlova [1993] provided a review of the diplopod fauna of Siberia and the Russian Far East, with 36 species listed in Siberia alone. In addition, the ecology of some of Siberian millipedes has been addressed [Kozlovskaya, 1965; Rybalov, 1991; Vorobiova, 1999]. Finally Mikhajlova [1998b], in her newest review of the fauna of the Far East of Russia, referred to a few species shared with the fauna of Siberia.

The present paper focuses on the diplopod fauna of Siberia, an extremely vast territory lying between the Ural Mountains and the Russian Far East [cp. Mikhajlova, 1993, 1998b], as based on abundant material accumulated during the last few years. A few old samples have been located and properly treated here as well. All illustrations have been executed by the first author.

Material

Material treated herein has been collected by and/or received through S.K. Alekseyev (S.A.) (Kaluga), E. Anisova (E.A.) (Moscow), A.E. Brinev (A.B.) (Moscow), N. Chumerina (N.Ch.) (Moscow), R.Yu. Dudko (R.D.) (Moscow), S.I. Golovatch (S.G.) (Moscow), V.G. Gratshev (V.G.) (Moscow), D.H. Kavanaugh (D.K.) (San Francisco, California, U.S.A.), D.V. Logunov (D.L.) (Novosibirsk), I. Lyubchanskyy (I.L.) (Moscow), Yu.M. Marusik (Y.M.) (Magadan), A.V. Matalin (A.M.) (Moscow), D.V. Obyedkov (D.O.) (Moscow), S.V. Ovchinnikov (S.O.) (Bishkek), L.B. Rybalov (L.R.) (Moscow), A.B. Ryvkin (A.R.) (Moscow), A.V. Tanasevitch (A.T.) (Moscow), and I.A. Ushakov (I.U.) (Moscow). These collections have been returned to or shared with the Zoological Museum of the State University of Moscow (ZMUM), Institute of Biology and Soil Science, Vladivostok (IBSV), Siberian Zoological Museum, Novosibirsk (ZMN), Department of Entomology, California Academy of Sciences (CAS).

Taxonomic part

Angarozonium amurense (Gerstfeldt, 1859)

Polyzonium germanicum — Stuxberg, 1876a: 36; 1876b: 317.
Polyzonium cyathiferum Mikhajlova, 1981: 781, figs.

Polyzonium cyathiferum — Rybalov, 1991: 87; Mikhajlova, 1993: 8, map.

Angarozonium amurense — Shelley, 1998: 29; Mikhajlova, 1998a: 4; 1998b: 12, map, figs.

Material: 23 ♂♂, 12 ♀♀, 5 juv. (IBSV) 15 ♂♂, 3 ♀♀, 6 juv. (ZMUM), Russia, Krasnoyarsk Prov., Turukhansk Distr., Mirmoe, 13-23.VI.1988. — 5 ♂♂, 3 ♀♀ (IBSV), same locality, 8-18.VIII.1988. — 1 ♀ (ZMUM), same locality, 10-20.VIII.1988. — 10 ♂♂, 6 ♀♀ (ZMUM), same locality, 8-18.VI.1989. — 21 ♂♂, 12 ♀♀ (IBSV), 5 ♂♂, 3 ♀♀, 2 juv. (ZMUM), same locality, pitfall traps, 9-19.VI.1989. — 5 ♂♂, 2 ♀♀ (ZMUM), same locality, pitfall traps, 10-20.VI.1989. — 7 ♂♂, 10 ♀♀, 15 juv. (ZMUM), same locality, 1-11.VII.1989. — 3 ♂♂, 5 ♀♀, 1 juv. (ZMUM), same locality, 2-12.VII.1989. — 1 ♂, 1 juv. (ZMUM), same locality, 3.VII.1989. — 1 ♂, 3 ♀♀, 2 juv. (ZMUM), same locality, 4.VII.1989. — 13 ♂♂, 13 ♀♀, 4 juv. (ZMUM), same locality, 5-15.VIII.1989. — 1 ♀, 4 juv. (ZMUM), same locality, 6.VIII.1989. — 2 ♂♂, 1 ♀ (ZMUM), same locality, 7.VIII.1989. — 4 ♂♂, 2 ♀♀, 1 juv. (ZMUM), same locality, 9.VIII.1989. — 57 ♂♂, 37 ♀♀, 20 juv. (ZMUM), same locality, 18-28.VI.1990. — 20 ♂♂, 7 ♀♀, 3 juv. (ZMUM), same locality, 19-29.VI.1990. — 10 ♂♂, 13 ♀♀, 9 juv. (ZMUM), same locality, 20-30.VI.1990. — 2 ♀♀, 7 juv. (ZMUM), same locality, 23.VI.1990. — 1 ♂, 1 juv. (ZMUM), same locality, 25.VI.1990. — 1 ♂, 3 ♀♀, 4 juv. (ZMUM), same locality, 26.VI.1990. — 1 juv. (ZMUM), same locality, 4.VII.1990. — 2 juv. (ZMUM), same locality, 8.VII.1990. — 9 ♂♂, 5 ♀♀, 3 juv. (ZMUM), same locality, 6-17.VII.1990. — 7 ♂♂, 6 ♀♀ (ZMUM), same locality, 6-20.VII.1990. — 1 ♀ (ZMUM), same locality, 7.VII.1990. — 9 ♂♂, 2 ♀♀ (ZMUM), same locality, 1-11.VIII.1990. — 1 juv. (ZMUM), same locality, 13.VIII.1990. — 1 ♂, 2 ♀♀, 3 juv. (ZMUM), same locality, 4.VIII.1990. — 5 ♂♂, 2 ♀♀, 2 juv. (ZMUM), same locality, 2-12.VIII.1990. — 7 ♂♂, 1 ♀, 1 juv. (ZMUM), same locality, 8.VIII.1990. — 1 ♂, 1 juv. (ZMUM), same locality, VI.1991. — 6 ♂♂, 4 ♀♀, 1 juv. (ZMUM), same locality, 12-22.VI.1991. — 2 ♂♂ (ZMUM), same locality, 5-15.VII.1991. — 4 ♂♂, 3 ♀♀, 3 juv. (IBSV), same locality, Elogui, 7-17.VII.1989. — 1 ♂, 4 ♀♀, 4 juv. (ZMUM), same locality, 23.VII.1990. — 3 ♂♂, 2 ♀♀ (ZMUM), same locality, environs of Bakhta, 12-15.VII.1995. — 1 ♀, 2 juv. (ZMUM), same locality, 13.VII.1995. — 10 ♂♂, 13 ♀♀ (ZMUM), same locality, environs of Goroshikha, 24-30.VIII.1994. — 18 ♂♂, 14 ♀♀ (ZMUM), same locality, 25-31.VIII.1994. — 2 ♀♀ (ZMUM), same locality, 27.VIII.1994. — 4 ♀♀ (ZMUM), same locality, 18-22.VII.1995. — 2 ♂♂ (ZMUM), same locality, 21.VII.1995. — 1 ♀ (ZMUM), same Province, Yeniseysk Distr., environs of Ust-Pit, 29-30.VII.1994. — 51 ♂♂, 49 ♀♀, 6 juv. (ZMUM), same locality, 30.VII-6.IX.1994. — 1 ♀ (ZMUM), same locality, 6.IX.1994. — 18 ♂♂, 10 ♀♀ (ZMUM), same locality, 7-6.IX.1994. — 3 ♂♂, 1 ♀, 1 juv. (ZMUM), same locality, 8.IX.1994. — 6 ♂♂, 6 ♀♀ (ZMUM), same locality, 2-10.VII.1995. — 2 ♂♂, 4 ♀♀, 4 juv. (ZMUM), same locality, 9.VII.1995. — 4 ♂♂, 11 ♀♀, 2 juv. (ZMUM), same locality, 10.VII-26.VIII.1995. — 3 ♂♂, 1 ♀ (ZMUM), same Province, Predivinsk, VI.1995. — 1 ♀ (ZMUM), same Province, Evenkiya, Birobchana River, 13-23.VII.1989. — 1 ♂, 1 ♀ (ZMUM), same locality, 14-23.VII.1989. — 1 ♂, 1 ♀ (ZMUM), same locality, 14-24.VII.1990. — 3 ♂♂, 3 ♀♀ (ZMUM), same locality, 15-25.VII.1990. — 3 ♂♂, 5 ♀♀ (ZMUM), same locality, 16-26.VII.1990; all leg. LR. — 1 ♂ (ZMUM), same Province, Tungusko-Chumsk Distr., Tungusky Nature Reserve, Kulik's huts, 28.VIII.1994. — 2 ♂♂, 2 ♀♀, 1 juv. (ZMUM), same locality, near Vanavara, 19.VIII.1994. — 1 ♂, 1 ♀ (ZMUM), same locality, 21.VIII.1994; all leg. A.R. — 1 ♀ (ZMUM), same Prov., Turukhansk Distr., Central Siberian Biosphere Nature Reserve, Yuzhnyi, 7.X.1994. — 1 ♂, 1 ♀ (ZMUM), same locality, 8.X.1994. — 1 ♂, 1 ♀, 1 juv. (ZMUM), same locality, near Komsa, 10.IX.1994; all leg. I.U. — 6 ♂♂, 3 ♀♀ (ZMUM), central Yakutia, Nizhny Bestyakh, Tomtor, 62°9'N 130°1'E, *Abies* forest, 8-27.VII.1990, leg. S.A.

REMARKS: Originally described as *Platydesmus amurenensis* from near the mouth of Songari River, China [Gerstfeldt, 1859], then transferred to *Polyzonium* [Mikhajlova, 1981], finally reassigned to *Angarozonium* and also considered as a senior subjective synonym of *Polyzonium cyathiferum* Mikhajlova, 1981 [Shelley, 1998].

Cylindroiulus latestriatus (Curtis, 1845)

Material: 1 ♂ (IBSV), 1 ♂, 4 ♀♀ (ZMUM), Altai Mts, Chonbiliuli, 27.VII.1988; leg. S.O.

REMARKS: This anthropochorous species widely distributed in Europe and introduced to the Americas is herewith recorded in mainland Asia for the first time. In Asia, *C. latestriatus* has hitherto been reported only from the Kunashir Island, Kuriles [Mikhajlova, 1998a, b]. Both Asian records are definitely introductions through human agency.

Julus ghilarovi ghilarovi Gulička, 1963

Julus ghilarovi Gulička, 1963: 521, figs

Julus ghilarovi ghilarovi — Lokšina & Golovatch, 1979: 386; Mikhajlova, 1993: 11, figs.

Material: 3 ♂♂, 4 ♀♀, 1 juv. (ZMUM), Russia, Krasnoyarsk Prov., Sayano-Shushensky Nature Reserve, mouth of Ottug-Sug River, 8-19.VII.1990. — 4 ♂♂, 33 ♀♀, 3 juv. (ZMUM), same locality, 12.VII.1990. — 1 ♂, 2 ♀♀, 6 juv. (ZMUM), same locality, 27.VII-6.VIII.1990. — 1 ♂, 5 ♀♀, 39 juv. (ZMUM), same locality, 7-17.VII.1991. — 2 ♂♂, 6 ♀♀, 21 juv. (ZMUM), same locality, 5-15.VIII.1991. — 2 ♂♂, 1 juv. (ZMUM), same locality, 6.VII.1992. — 3 ♀♀, 2 juv. (ZMUM), same locality, 2-12.VII.1992. — 1 ♂, 10 juv. (ZMUM), same locality, 5-15.VIII.1993. — 3 ♀♀ (ZMUM), same locality, Lake Ekspeditsionnoe, 14.VII.1992. — 1 ♂, 5 ♀♀ (ZMUM), same locality, 25.VII-20.VIII.1993; all leg. L.R. — 1 ♀ (ZMN), Republic Khakassia, Shira Distr., ca. 1 km S of Kommunar, 1,300-1,400 m a.s.l., montane moss-stony tundra, 23.VII.1990. — 4 ♂♂, 3 ♀♀, 1 juv. (ZMN), Novosibirsk Area, 30-35 km E of Novosibirsk, Koltsovo, humid glades in *Betula* woodland, 2.IX.1994. — 5 ♂♂, 8 ♀♀, 8 juv. (ZMN), same Area, Iskitim Distr., Malinovka, mesophytous meadow, 15.VIII.1987; all leg. D.L. — 1 ♂ (ZMUM), Kemerovo Area, Tashtagol, 17.VIII.1990; leg. N.Ch. & E.A. — 1 ♀ (ZMUM), same Area, near Belogorsk, Kuznetsky Alatau Nature Reserve, near mouth of Bezymianka River, 14.VII.1994. — 2 ♂♂, 5 ♀♀ (ZMUM), same locality, 16.VII.1994. — 1 ♂, 1 ♀, 19 juv. (ZMUM), same locality, 1.5-2 km upstream of Bezymianka River mouth, Kiya River, 17.VII.1994; all leg. A.R. — 3 ♂♂, 5 ♀♀, 23 juv. (ZMUM), same locality, ca. 16 air-km SW Belogorsk, Kiya River, Bezymianka River delta, riverine taiga, 14-17.VII.1994; leg. S.G. & A.R. — 22 ♂♂, 17 ♀♀, 25 juv. (ZMUM), same locality, Mt. Bolshaya Tserkovnaya, 26 air-km SSW Belogorsk, 1,300-1,450 m a.s.l., upper timberline, 26.VIII.1993. — 17 ♂♂, 11 ♀♀, 25 juv. (ZMUM), same locality, delta of Malaya Bezymianka River, ca. 19 air-km SSW of Belogorsk, *Abies* + *Pinus* taiga, 500 m a.s.l., 27-31.VIII.1993. — 1 ♀ (ZMUM), same locality, ca. 16 air-km SW of Belogorsk, *Abies* + *Pinus* taiga with *Betula*, *Salix* etc. along stream, 420 m a.s.l., 1-5.IX.1993; all leg. S.G. & V.G. — 4 juv. (ZMUM), same locality, Mt. Tigirtish, upper reaches of Amzas River, 1,000 m a.s.l., taiga, 26.IX.1997; leg. R.D. & I.L. — 2 ♀♀ (ZMUM), same Area, Novokuznetsk Distr., *Tilia* insular forest (= Lipovyi ostrov), Malyy Tesh River, ca. 10 km E of Kuzedeyevo, 19.VII.1994. — 2 ♂♂, 9 ♀♀, 7 juv. (ZMUM), same locality, 20.VII.1994; leg. A.R. — 5 ♂♂, 18 ♀♀, 103 juv. (ZMUM), same locality, 20-24.VII.1994; leg. S.G. & A.R. — 1 ♂ (IBSV), 8 ♂♂, 5 ♀♀, 4 juv. (ZMUM), same locality, 21.VII.1994; all leg. A.R. — 1 ♀ (ZMUM), same locality, environs of Mezhdurechensk, right bank of Uis River, 3 km upstream of mouth, 23.IX.1997; leg. R.D. & I.L. — 1 ♀ (ZMUM), Altai Mts, Pass Seminsky, 27.VII.1990. — 4 ♀♀ (ZMUM), Altai Mts, Altaiskoe, VI.1992; all leg. S.O. — 1 ♂, 2 ♀♀ (ZMUM), Altai Mts, environs of Gorno-Altai, 29.V.1996. — 4

juv. (ZMUM), same locality, dry *Pinus* woodland, litter, 31.V.1998. — 2 ♂♂, 2 ♀♀, 1 juv. (ZMUM), Altai Mts, environs of Aktash, ca. 600 m a.s.l., 30.V.1996; all leg. A.M. & A.B. — 1 ♂, 1 ♀, 1 juv. (ZMUM), Altai Mts, Lake Teletskoe, Artybash, 21.VII.1990; leg. S.O. — 7 ♂♂, 15 ♀♀, 48 juv. (ZMUM), 2 ♂♂, 2 ♀♀ (IBSV), same locality, *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 500–800 m a.s.l., 13–24.VII.1997. — 3 ♀♀, 8 juv. (ZMUM), same locality, high bog in *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 800 m a.s.l., 20.VII.1997; all leg. S.G. & A.T. — 27 ♂♂, 19 ♀♀, 15 juv. (ZMUM), same locality, near Lake Chiri, subalpine belt (= goltsy), 1,750–2,000 m a.s.l., 29–30.VII.1997. — 7 ♂♂, 4 ♀♀, 7 juv. (ZMUM), same locality, upper timberline of *Picea obovata* + *Pinus sibirica* taiga, mainly near water, 1,700–1,750 m a.s.l., 29.VII–1.VIII.1997. — 30 ♂♂, 20 ♀♀, 63 juv. (ZMUM), 2 ♂♂ (IBSV), same locality, Chiri, upper reaches of Chiri River, *Picea obovata* + *Pinus sibirica* taiga forest, 1,350 m a.s.l., 28–29.VII and 2.VIII.1997; all leg. S.G. & A.T.

REMARKS: This subspecies, originally described from the Kemerovo Area [Gulička, 1963] and, later, redescribed from new samples [Mikhaljova, 1993], appears to be rather variable. Body coloration varies from dark brown via reddish castaneous to light brown. The flagella of the anterior gonopods are very long and well projecting beyond the gonopod tips in specimens from both Iskitim District, Novosibirsk Area and Altaisky Nature Reserve (near Lake Chiri), Altai Mts, in contrast to short flagella in the males from other places of the Novosibirsk Area and the Altai as well as the Kemerovo Area, the Republic of Khakassia, and the Krasnoyarsk Province. The shape of the outer outgrowth of the opisthomerite varies from styletiform to relatively broad, while the notch between both outgrowths is as deep as 1/3 to 2/3 opisthomerite height. The large coxal process of ♂ leg 2 is provided with a posterior uncus which is absent from both subadult males and *J. g. brachydactylus*. The vulva is quite constant in shape and structure.

Julus ghilarovi brachydactylus Gulička, 1972
Figs 1–3.

Julus ghilarovi brachydactylus Gulička, 1972: 44, figs.

Julus ghilarovi brachydactylus — Lokšina & Golovatch, 1979: 386; Mikhaljova, 1993: 10.

Material: 2 ♂♂, 3 ♀♀, 2 juv. (ZMUM), W-Altai, Ivanovsky Mt. Range, Mt. "Rossypnoi Belok", 2,000–2,300 m a.s.l., mountainous tundra, 1–2.VI.1996. — 2 ♀♀ (ZMUM), same locality, Gromotukha River, 1,400–1,600 m a.s.l., sparse *Larix* forest, 3–5.VI.1996; all leg. R.D. — 2 ♀♀ (ZMUM), Altai, Ust-Kan, ca. 1,400 m a.s.l., 27.VII.1994; leg. A.R. — 4 ♂♂, 2 ♀♀, 4 juv. (IBSV), 4 ♂♂ (ZMUM), same locality, E slope of Korgon Mt. Ridge, lower flow of Kuterghen River, 2 km S of Ust-Kan, ca. 1,200 m a.s.l., 12.VI.1998. — 3 ♂♂, 15 juv. (ZMUM), same locality, lower flow of Kuterghen River, 25 km S of Ust-Kan, ca. 2,000 m a.s.l., 15.VI.1998; all leg. A.M.

REMARKS: This subspecies, described from the Southeast Altai, was stated to only differ from the nominotypical *J. ghilarovi ghilarovi* by the shorter and broader outer opisthomerite outgrowth coupled with the relatively shallow (only as deep as 1/3 opisthomerite height) notch between both outgrowths of the opisthomerite [Gulička, 1972]. The fresh material from the West Altai displays the following variation in opisthomerite shape: the notch is a little deeper than shown in the illustrations accompanying the original description. In addition, the ♂ telopodite 1 is setose throughout, not only externally (Fig. 1); the large coxal process of ♂ leg 2 is devoid of a posterior uncus both in adults and subadults, while the second coxal process is short and very slender (Figs 2, 3). The vulva is not distinguishable from that of *J. g. ghilarovi*.

It still remains to be proved that both Southwest Siberian forms of *Julus* are indeed subspecies, not just varieties of a

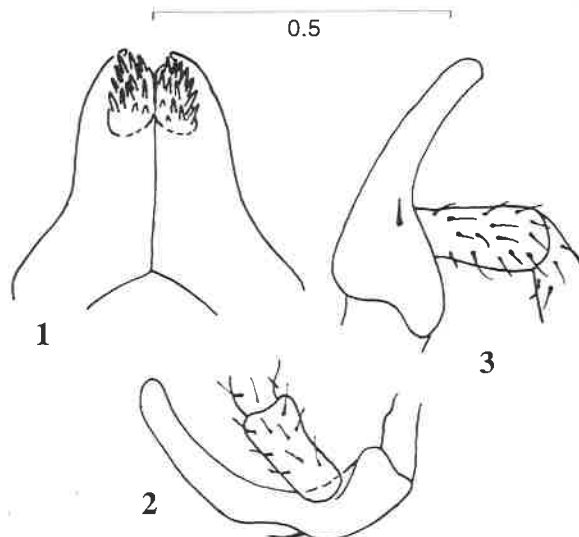


Fig. 1–3. *Julus ghilarovi brachydactylus* Gulička, 1972, ♂: 1 — leg-pair 1; 2, 3 — coxal processes of leg pair 2 (lateral and front views, respectively). Scale bar in mm.

Рис. 1–3. *Julus ghilarovi brachydactylus* Gulička, 1972, ♂: 1 — пара ног 1; 2, 3 — коксальные отростки пары ног 2 (соответственно снаружи и спереди). Масштаб в мм.

single species. More material is necessary to reveal the variation range, both individual and geographical, of these two taxa, as the distinctions between them are quite shaky [cp. Mikhaljova, 1993].

Megaphyllum aff. *sjaelandicum* (Meinert, 1868)

Megaphyllum aff. *sjaelandicum* — Golovatch, 1992: 380; Mikhaljova, 1993: 12.

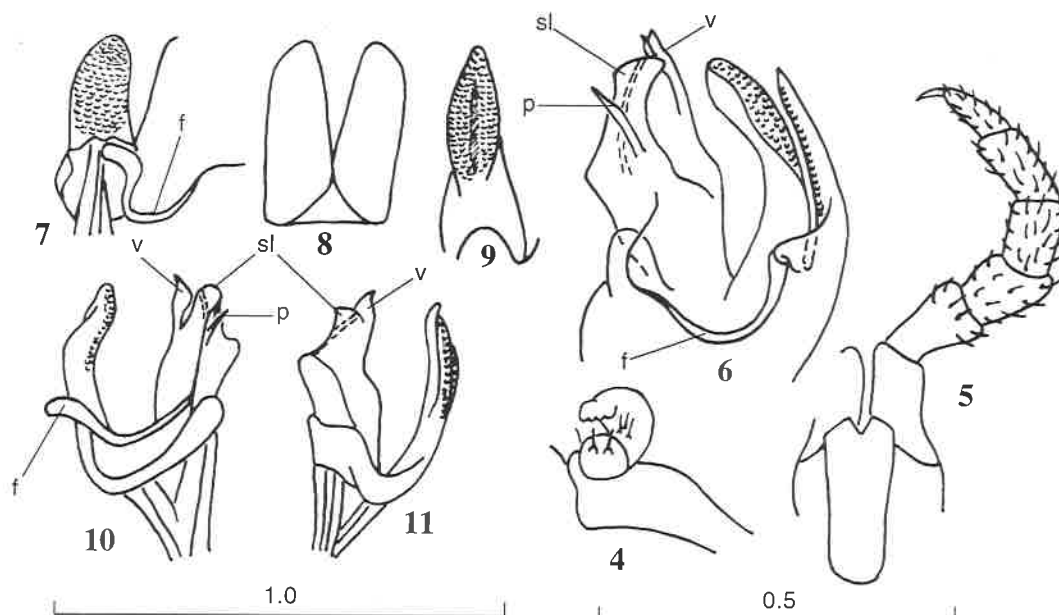
REMARKS: The only record of this still undescribed species is in the West (= Rudnyi) Altai, East Kazakhstan [Golovatch, 1992]. Formally, this administrative area lies a little beyond Siberia proper but biogeographically as well as geologically it definitely belongs to the Altai system.

Pacifiulus amurensis (Gerstfeldt, 1859)

Pacifiulus imbricatus — Mikhaljova, 1993: 12.

Pacifiulus amurensis — Mikhaljova, 1998a: 5; 1998b: 64, map, figs.

Material: 2 ♂♂, 23 ♀♀, 11 juv. (ZMN), Republic Tuva, Pit-Khem Distr., Uyuksky Mt. Range, 800–1,000 m a.s.l., *Larix-Betula* forest, 21–23.V.1989; leg. D.L. — 1 ♂ (IBSV), Altai Mts, Lake Teletskoe, Altaisky Nature Reserve, near Lake Chiri, upper timberline of *Picea obovata* + *Pinus sibirica* taiga, mainly near water, 1,700–1,750 m a.s.l., 29.VII–1.VIII.1997; leg. S.G. & A.T. — 1 ♂, 1 ♀ (ZMUM), Krasnoyarsk Prov., Ermakovo Distr., West Sayan, 2–3 km N of Aradan, shingly bank of Belyi Us River, 840–850 m a.s.l., 8–9.VII.1990. — 2 ♂♂, 2 ♀♀ (ZMN), same locality, Oisky Mts, 8–10 km S of Lake Oiskoe, 1,600–1,700 m a.s.l., subalpine meadow + montane tundra, 10–11.VII.1990; leg. D.L. — 5 ♂♂, 2 ♀♀, 6 juv. (IBSV), 2 ♀♀ (ZMUM), same locality, Arghidzhek Station, 11.VIII.1994. — 6 ♂♂, 3 ♀♀ (IBSV), same locality, 13.VIII.1994. — 2 ♂♂, 2 ♀♀, 2 juv. (ZMUM), same locality, 15.VIII.1994; all leg. I.U. — 3 ♂♂, 7 ♀♀, 3 juv. (ZMUM), Sayano-Shushensky Nature Reserve, mouth of Ottug-Sug River, 12.VII.1990. — 2 ♂♂, 2 ♀♀ (ZMUM), same locality, 19.VII–26.VII.1990. — 1 ♂, 2 juv. (ZMUM), same locality, 9.VII.1991. —



Figs 4–11. *Sibirulius multiradicatus* sp.n., ♂ paratype: 4 — leg pair 1 (caudal view); 5 — leg pair 2 (caudal view); 6 — gonopods (mesal view); 7 — promerite (caudal view); 8 — same (front view); 9 — mesomerite (front view); 10 — mesomerite and opisthomerite (mesal view); 11 — same (lateral view); f — flagellum; p — process of opisthomerite; sl — "solenomerite"; v — velum. Scale bar in mm.

Рис. 4–11. *Sibirulius multiradicatus* sp.n., ♂ паратип: 4 — пара ног 1 (вид сзади); 5 — пара ног 2 (вид сзади); 6 — гоноподии (вид изнутри); 7 — промерит (вид сзади); 8 — то же (вид спереди); 9 — мезомерит (вид спереди); 10 — мезомерит и опистомерит (вид изнутри); 11 — то же (вид сбоку); f — жгутик; p — отросток опистомерита; sl — соленомерит; v — велум. Масштаб в мм.

1 ♂ (ZMUM), same locality, 5–15.VIII.1991. — 2 ♂♂, 2 ♀♀, 13 juv. (ZMUM), same locality, 2–12.VII.1992. — 3 juv. (ZMUM), same locality, 31.VII–10.VIII.1992. — 1 ♀, 4 juv. (ZMUM), same locality, 17–27.VII.1993. — 2 ♂♂, 2 ♀♀ (IBSV), 21 ♂♂, 40 ♀♀, 34 juv. (ZMUM), same locality, Lake Ekspeditsionnoe, 14.VII.1992. — 3 ♂♂ (IBSV), 1 ♂, 3 ♀♀ (ZMUM), same locality, 14–19.VII.1992. — 10 ♂♂, 5 ♀♀, 18 juv. (ZMUM), 2 ♀♀, 5 juv. (IBSV), same locality, 18.VII.1992; all leg. LR.

REMARKS: This species is widespread in Asian Russia, with *P. imbricatus* [cp. Mikhajlova, 1982] being its junior synonym [Mikhajlova, 1998a]. In the Far East of Russia, only parthenogenetic populations have been revealed while in Siberia, from the Altai Mts to the Republic of Tuva, only bisexual populations are known to occur. The above synonymy is currently reconfirmed based on type material (see below Remarks under *Orientyla dahurica*).

Sibirulius altaicus Gulička, 1972

Cylindroiulus (Sibirulius) altaicus Gulička, 1972: 44, fig.

Sibirulius altaicus — Lokšina & Golovatch, 1979: 387; Mikhajlova, 1993: 13.

REMARKS: Originally described from the environs of Lake Ayu-Kol, southeastern Altai [Gulička, 1972], this species seems to be restricted to its terra typica.

Sibirulius dentiger Gulička, 1963

Cylindroiulus (Sibirulius) dentiger Gulička, 1963: 519, figs.

Sibirulius dentiger — Lokšina & Golovatch, 1979: 386; Mikhajlova, 1993: 14, figs.

Material: 1 ♂, 1 ♀ (ZMN), Novosibirsk, near Koltsovo, *Betula* forest, litter, 26.IV.1987. — 3 ♂♂, 6 ♀♀ (ZMN), 30–35 km E of Novosibirsk, Koltsovo, humid glades in *Betula* woodland, 2.IX.1994. — 1 ♂, 1 ♀ (ZMN), same locality, *Betula* forest, litter, 26.IV.1987; all leg. DL. — 3 ♂♂, 20 ♀♀, 13 juv. (ZMUM), Kemerovo Area,

Kuznetsky Alatau Nature Reserve, Mt. Bolshaya Tserkovnaya, 26 air-km SSW Belogorsk, 1,300–1,450 m a.s.l., upper timberline, 26.VIII.1993. — 5 ♂♂, 9 ♀♀, 13 juv. (ZMUM), same locality, delta of Malaya Bezymianka River, ca. 19 air-km SSW of Belogorsk, *Abies* + *Pinus sibirica* taiga, 500 m a.s.l., 27–31.VIII.1993. — 1 ♂, 2 ♀♀, 5 juv. (ZMUM), same locality, ca. 16 air-km SW of Belogorsk, *Abies* + *Pinus sibirica* taiga with *Betula Salix* etc. along the stream, 420 m a.s.l., 1–5.IX.1993; all leg. S.G. & V.G. — 2 ♂♂, 9 juv. (ZMUM), same locality, near mouth of Bezymianka River, 14.VII.1994. — 1 ♀ (ZMUM), same locality, 1 km upstream of Kiya River mouth, 15.VII.1994. — 1 ♂, 6 ♀♀, 9 juv. (ZMUM), same locality, mouth of Bezymianka River, 16.VII.1994. — 1 ♀ (ZMUM), same locality, Kiya River, 1.5–2.0 km upstream of Bezymianka River mouth, 17.VII.1994; all leg. A.R. — 5 ♂♂, 5 ♀♀, 9 juv. (ZMUM), same locality, ca. 16 air-km SW of Belogorsk, Kiya River, Bezymianka River delta, riverine taiga, 14–17.VIII.1994; leg. S.G. & A.R. — 1 ♂, 8 juv. (ZMUM), same Area, Novokuznetsk Distr., ca. 10 air-km E of Kuzedeyev, *Tilia* insular forest (= Lipovyi ostrov), 450–550 m a.s.l., 19.VII.1994; leg. A.R. — 1 ♂, 5 ♀♀, 14 juv. (ZMUM), same locality, 20–24.VII.1994; leg. S.G. & A.R. — 1 ♂, 1 ♀, 1 juv. (ZMUM), same locality, 23.VII.1994. — 1 ♀ (ZMUM), same locality, 23.VIII.1994; all leg. A.R.

REMARKS: This species, originally described from near Prokopyevsk, Kemerovo Area, Siberia [Gulička, 1963], has already been redescribed elsewhere [Mikhajlova, 1993]. It appears to be quite widespread in West and Southwest Siberia.

Sibirulius multiradicatus Mikhajlova, sp.n.

Figs 4–11.

Holotype: 1 ♂ (ZMUM), Altai Mts, Katunsky Mt. Range, Katunsky Nature Reserve, near Multa, Lake Sredneye Multinskoye, ca. 30 air-km SE of Ust-Koksa, 1,600–2,200 m a.s.l., 30.VII–5.VIII.1994; leg. S.G. & A.R. — Paratypes: 1 ♂, 5 ♀♀, 3 juv. (IBSV), same locality, together with holotype. — 1 ♀ (ZMUM), Altai Mts, upper reaches of Charysh River, Ust-Kan, 1,400 m a.s.l., *Larix* + *Picea* forest, litter and rotten wood, 27.VII.1994; all leg.

S.G. & A.R. — 2♀♀, 2 juv. (ZMUM), same locality, Lake Teletskoe, near delta of Chulyshman River, *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 650 m a.s.l., 13–24.VII.1997. — 1 ♀ (ZMUM), same locality, Altaisky Nature Reserve, Korbu Waterfalls, *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 600 m a.s.l., 17.VII.1997; all leg. S.G.

NAME: The specific epithet refers to the locus typicus (Lake Sredneye Multinskoye near Multa).

DIAGNOSIS: Differs from congeners by the absence of setae on nearly all metazonites except for a few in front of the telson, the absence of a massive inner process in the distal part of the opisthomerite, and the unmodified apex of the mesomerite.

DESCRIPTION: Male body 15–17 mm long, 0.8–0.9 mm in diameter, with 41(–1) to 42(–1) segments regardless of telson. Female body 17–18.5 mm long, 1.1–1.2 mm in diameter. Coloration in alcohol from dark brown with reddish tinge to pale brown; venter paler. A thin, dark, axial line on dorsum distinguishable. Each ring with a dark spot level to ozopore. Pro- and metazonites with oval marble spots closer to venter. Collum almost entirely marble brown, only fore and rear margins dark brown. Legs pale brown. Antennae brown.

Ca. 30 black ocelli in a subquadrate-rounded eye on each side of head. Vertigial setae 1+1. Antennae medium-sized, rather slender and clavate. Male and female antennomere 5 with an incomplete distodorsal corolla of six minute sensory bacilli.

Cardo not swollen, without setae, rather poorly visible when head viewed from above. Gnathochilarium normal, with 1 seta on outer sides and with several short setae in mesal part of distipites, lamellae linguales contiguous, each with 2 long distal setae.

Body somewhat compressed laterally, slightly tapering toward telson. Suture dividing pro- and metazona thin, rather well constricting both zonites. Ozopores small, lying behind suture without touching latter. Metazona entirely striate longitudinally, with striae failing to reach hind margin; 5 striae in a lateral square with its side equal to midbody metazonal length. Prozonital surface smooth, only on male somite 7 delicately striate ventrally. Most of metazonites bare, only 2–3 metazona immediately in front of telson with a few thin setae subventrally; a thin seta at hind tergal edge on each of metazonites 1, 3, 4 or 5 just in front of telson. Telson with several thin setae on preanal ring. Anal valves densely setose, with a short, cylindrical, straight epiproct carrying a small claw directed caudad and somewhat ventrad. Anal scale subtriangular, setose only along caudad edge.

Legs thin, short; claws normal. ♂ leg 1 (Fig. 4) unciform, setose ventrally, papillate apically. ♂ legs 2 (Fig. 5) unmodified, penes flattened, notched triangularly at tip.

Gonopods with meso- and opisthomerites of subequal height (Fig. 6). Promerite (Figs 7, 8) flattened, caudally papillate, its flagellum (f) filiform distally. Mesomerite (Fig. 9) slightly and regularly bent caudad, its front surface papillate, its apex simple. Opisthomerite (Figs 10, 11) with a simple and broad solenomerite (sl). Velum (v) membranous with a pointed tip. A midway mesal stylétiform process (p) (?phylacum) on inner side of opisthomerite.

Orinisobates microthylax Enghoff, 1985

Orinisobates microthylax Enghoff, 1985: 51, figs.

Orinisobates microthylax — Mikhajlova, 1993: 12, map, 16; 1998b: 73, map, figs.

REMARKS: This parthenogenetic species is widespread over the Far East of Russia (Kamchatka, Sakhalin, Kuriles, Maritime and Khabarovsk provinces), also recorded in Buryatia, East Siberia [Enghoff, 1985; Mikhajlova, 1993, 1998b].

Orinisobates sibiricus (Gulička, 1963)

Isobates sibiricus Gulička, 1963: 522, figs.

Isobates (Orinisobates) sibiricus — Gulička, 1972: 45, fig.

Orinisobates sibiricus — Lokšina & Golovatch, 1979: 387; Enghoff, 1985: 53, figs; Mikhajlova, 1993: 16.

Material: 1 ♂, 1 ♀, 1 juv. (ZMN), Republic Tuva, Pit-Khem Distr., Uyuksky Mt. Range, 800–1,000 m a.s.l., *Larix* + *Betula* forest, 21–23.V.1989. — 13 ♂♂, 6 ♀♀, 4 juv. (ZMN), same locality, ca. 5 km NW of Sesserlig, 1,000–1,100 m a.s.l., mixed forest, litter, 24–25.VII.1989. — 3 ♂♂, 1 ♀ (IBSV), 2 ♂♂, 2 ♀♀, 1 juv. (ZMUM), same Republic, Todzhinskoe Upland, NW environs of Lake Azas, ca. 900 m a.s.l., under barks of *Betula*, *Populus tremula* and *Larix dahurica*, 19–23.VI.1989; all leg. D.I. — 2 juv. (ZMUM), S. Altai Mts, Katunsky Nature Reserve, 1–3.VII.1994; 1 juv. (ZMUM), same locality, 1.VIII.1994; all leg. A.R. — 1 ♂, 2 ♀♀ (ZMUM), Altai Mts, Ust-Kan Distr., Tyuguryuk Mt. Range, Pass Akhsas, ca. 15 air-km SE of Yabogan, 1,700 m a.s.l., *Larix dahurica*, *Picea obovata* & *Pinus sibirica* taiga, 28–29.VIII.1996; leg. S.G. — 1 ♂ (IBSV), Krasnoyarsk Prov., "Stolby" Nature Reserve, Canyon Synzhup, 12.VIII.1994; leg. A.R. — 1 ♀ (ZMUM), same locality, 18.VIII.1994. — 1 ♂ (IBSV), same locality, 22.VIII.1994; all leg. I.U. — 1 ♀ (ZMUM), Kemerovo Area, Novokuznetsk Distr., *Tilia cordata* insular forest (= Lipovyi ostrov), 10 km E of Kuzedeyevo, Malyi Tesh River, 19.VII.1994. — 2 ♂♂, 5 ♀♀, 1 juv. (ZMUM), same locality, 20.VII.1994; all leg. A.R.

REMARKS: Originally described from the Kemerovo Area [Gulička, 1963], this species appears to be widespread in Siberia (Krasnoyarsk Province, Altai Mts and Chita Area) [Mikhajlova, 1993] as well as in the Dzhungarsky Alatau Mts, East Kazakhstan and Tian-Shan Mts, Kirghizia. Redescribed in due detail by Enghoff [1985].

Ghilarovia kygae Gulička, 1972

Ghilarovia kygae Gulička, 1972: 40, figs.

Ghilarovia kygae — Lokšina & Golovatch, 1979: 383; Shear, 1988: 55, figs; Mikhajlova, 1993: 16.

Material: 7 ♂♂, 18 ♀♀, 46 juv. (ZMUM), Kemerovo Area, Kuznetsky Alatau Nature Reserve, Mt. Bolshaya Tserkovnaya, 26 air-km SSW of Belogorsk, 1,300–1,450 m a.s.l., upper timberline, 26.VIII.1993; leg. S.G. & V.G. — 2 ♂♂, 3 ♀♀, 4 juv. (IBSV), same locality, near mouth of Bezymianka River, 14.VII.1994. — 5 ♀♀, 7 juv. (ZMUM), same locality, 16.VII.1994. — 1 ♂, 1 ♀ (ZMUM), same locality, 1.5–2.0 km upstream of Bezymianka River mouth, 17.VII.1994; all leg. A.R. — 3 ♂♂, 10 ♀♀, 32 juv. (ZMUM), same locality, ca. 16 air-km SW of Belogorsk, Kiya River, Bezymianka River delta, riverine taiga, 14–17.VII.1994; leg. S.G. & A.R. — 1 ♀ (ZMUM), same locality, *Abies sibirica* + *Pinus sibirica* taiga with *Betula*, *Salix* etc. along the stream, 420 m a.s.l., 1–5.IX.1993; leg. S.G. & V.G. — 3 ♂♂, 17 ♀♀, 25 juv. (ZMUM), same Area, Novokuznetsk Distr., ca. 10 air-km N of Kuzedeyevo, *Tilia* insular forest (= Lipovyi ostrov), 450–550 m a.s.l., 20–24.VII.1994; leg. S.G. & A.R. — 20 ♀♀, 6 juv. (ZMUM), same locality, 20.VII.1994. — 1 juv. (ZMUM), same locality, 23.VII.1994; all leg. A.R. — 4 ♂♂, 10 ♀♀, 15 juv. (ZMUM), Altai Mts, Ust-Kan Distr., Tyuguryuk Mt. Range, Pass Akhsas ca. 15 air-km SE of Yabogan, 1,700 m a.s.l., *Larix*, *Picea obovata* & *Pinus sibirica* taiga, 28–29.VIII.1996. — 2 ♀♀, 27 juv. (ZMUM), Altai Mts, Lake Teletskoe, near delta of Chulyshman River, *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 650 m a.s.l., 13–24.VII.1997; all leg. S.G. — 7 ♂♂, 25 ♀♀, 70 juv. (ZMUM), same locality, near Artybash, *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 500–800 m a.s.l., 13–24.VII.1997; leg. S.G. & A.T. — 1 ♂, 8 ♀♀, 20 juv. (ZMUM), same locality, high bog in *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 800 m a.s.l., 20.VII.1997. — 9 juv. (ZMUM), same locality, Altaisky Nature Reserve, Korbu Waterfalls, *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 600 m a.s.l., 17.VII.1997; all leg. S.G. — 3 ♂♂, 7 ♀♀, 1 juv. (ZMUM), same locality, near Lake Chiri, subalpine belt (= goltsy), 1,750–

2,000 m a.s.l., 29–30.VII.1997. — 12 ♂♂, 5 ♀♀, 7 juv. (ZMUM), same locality, upper timberline of *Picea obovata* + *Pinus sibirica* taiga, mainly near water, 1,700–1,750 m a.s.l., 29.VII–1.VIII.1997. — 31 ♂♂, 30 ♀♀, 39 juv. (ZMUM), same locality, Lake Chiri, upper reaches of Chiri River, *Picea obovata* + *Pinus sibirica* taiga forest, 1,350 m a.s.l., 28–29.VII and 2.VIII.1997; all leg. S.G. & A.T.

REMARKS: Up to now, this species has only been known from the environs of Lake Teletskoe, Altai [Gulička, 1972] whence it has since been adequately redescribed by Shear [1988] as based on topotypes. As the above material shows, this species is quite widely distributed in the Altai Mts as well as in the Kuznetsky Alatau Mts and Gornaya Shoriya, southwestern Siberia.

Gulička [1972], when proposing his new genus *Ghilarovia*, assigned it to the new monotypic family Ghilaroviidae, with its diagnosis coinciding with that of the genus. By transferring *Ghilarovia* to Anthroleucosomatidae, Shear [1988] has implicitly synonymized the Ghilaroviidae with the Anthroleucosomatidae.

Ghilarovia novosibirica Shear, 1988

Ghilarovia novosibirica Shear, 1988: 56, figs.

Ghilarovia novosibirica — Mikhajlova, 1993: 16.

Material: 1 ♂ (IBSV), 2 ♂♂, 4 ♀♀ (ZMN), Novosibirsk Area, Iskitim Distr., Malinovka, mesophytous meadow, 15.VIII.1987; leg. D.L.

REMARKS: This species has hitherto been known only from the terra typica (Toguchin Distr., Novosibirsk Area) [Shear, 1988]. The above is a second locality, yet both seem to be confined to the northwestern spurs of Salair Mts.

Altajosoma bakurovi (Shear, 1990)

Diplomaragna bakurovi Shear, 1990: 23, figs.

Diplomaragna bakurovi — Mikhajlova, 1993: 18.

Altajosoma bakurovi — Mikhajlova, 2000: 161.

Material: 3 ♂♂, 3 ♀♀ (ZMN), Novosibirsk Area, Iskitim Distr., Malinovka, mesophytous meadow, 15.VIII.1987; leg. D.L. — 1 ♂, 1 ♀, 2 juv. (ZMUM), Krasnoyarsk Prov., Sayano-Shushensky Nature Reserve, Lake Ekspeditsionnoe, pitfall traps, 14–19.VII.1992; leg. L.R. — 3 ♂♂, 1 ♀ (IBSV), Kemerovo Area, Novokuznetsk Distr., ca. 10 air-km E of Kuzedeyevo, *Tilia* insular forest (= Lipovyi ostrov), 450–550 m a.s.l., 20–24.VII.1994; leg. S.G. & A.R. — 1 ♂ (IBSV), Altai Mts, Pass Seminsky, 27.VII.1990; leg. S.O. — 3 ♂♂, 3 ♀♀, 2 juv. (ZMUM), Altai Mts, Lake Teletskoe, near Artybash, *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 500–800 m a.s.l., 13–24.VII.1997. — 4 ♂♂ (IBSV), 1 ♂ (ZMUM), same locality, high bog in *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 800 m a.s.l., 20.VII.1997; all leg. S.G. & A.T.

REMARKS: This species, originally described in *Diplomaragna* [Shear, 1990] and, later, transferred to *Altajosoma* [Mikhajlova, 2000], is currently known from the Novosibirsk Area, Altai Mts and Krasnoyarsk Province, Siberia. There are two subspecies differing mainly in length of the front angio-coxal process of the posterior gonopods. The subspecies *longiproceus* Mikhajlova, 2000 is known to occur in the Sayano-Shushensky Nature Reserve, West Sayan Mts, Krasnoyarsk Province.

Altajosoma coxale (Shear, 1990)

Diplomaragna coxalis Shear, 1990: 25, figs.

Diplomaragna coxalis — Mikhajlova, 1993: 18.

Altajosoma coxale — Mikhajlova, 2000: 161.

REMARKS: This species, originally described in *Diplomaragna* [Shear, 1990] and, later, transferred to *Altajosoma*

[Mikhajlova, 2000], is only known from the original description from the Irkutsk Area, eastern Siberia.

Altajosoma deplanatum (Stuxberg, 1876)

Craspedosoma deplanatum Stuxberg, 1876a: 34, figs.

Craspedosoma deplanatum — Stuxberg, 1876b: 317; Lokšina & Golovatch, 1979: 382.

Altajosoma pinetorum Gulička, 1972: 37, fig.

Altajosoma pinetorum — Lokšina & Golovatch, 1979: 382.

Diplomaragna deplanata — Shear, 1990: 20, figs; Mikhajlova, 1993: 22.

Diplomaragna pinetorum — Shear, 1990: 38; Mikhajlova, 1993: 25.

Altajosoma deplanatum — Mikhajlova, 2000: 160.

Material: 2 ♂♂, 2 ♀♀ (ZMN), Novosibirsk Area, Iskitim Distr., Malinovka, mesophytous meadow, 15.VIII.1987; leg. D.L.

REMARKS: This species, originally described as *Craspedosoma deplanatum* from between Achinsk, Krasnoyarsk Prov. and Mariinsk, Kemerovo Area [Stuxberg, 1876a], has since been redescribed and transferred first to *Diplomaragna* [Shear, 1990] and, very recently, to the resurrected *Altajosoma*, with *A. pinetorum*, a species described from the Altai Mts, serving as its junior subjective synonym [Mikhajlova, 2000]. Hitherto reported from the Kemerovo and Novosibirsk areas, the Krasnoyarsk Province and Altai Mts.

Altajosoma golovatchi (Shear, 1990)

Diplomaragna golovatchi Shear, 1990: 23, figs.

Diplomaragna golovatchi — Mikhajlova, 1993: 24.

Altajosoma golovatchi — Mikhajlova, 2000: 161.

REMARKS: This species, originally described in *Diplomaragna* [Shear, 1990] and, later, transferred to *Altajosoma* [Mikhajlova, 2000], is currently known from the Krasnoyarsk Province, Siberia as well as in the Urals (Republic of Bashkiriya as well as both Ekaterinburg and Chelyabinsk areas) and Cisuralia (Perm Area).

Altajosoma katunicum Mikhajlova, 2000

Altajosoma katunicum Mikhajlova, 2000: 162, figs.

REMARKS: The species is only known from the original description from the Katunsky Nature Reserve, southern Altai Mts, Siberia.

Altajosoma kemerovo (Shear, 1990)

Diplomaragna kemerovo Shear, 1990: 20, figs.

Diplomaragna kemerovo — Mikhajlova, 1993: 25.

Altajosoma kemerovo — Mikhajlova, 2000: 161.

Material: 1 ♂, 1 ♀, 1 juv. (IBSV), Altai, Lake Teletskoe, Artybash, 21.VII.1990; leg. S.O. — 1 ♂, 2 ♀♀, 1 juv. (ZMUM), same locality, *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 500–800 m a.s.l., 13–24.VII.1997. — 1 ♂, 1 ♀, 9 juv. (ZMUM), same locality, Altaisky Nature Reserve, near Lake Chiri, upper timberline of *Picea obovata* + *Pinus sibirica* taiga, mainly near water, 1,700–1,750 m a.s.l., 29.VII–1.VIII.1997; all leg. S.G. & A.T. — 1 ♂, 2 ♀♀ (ZMUM), Krasnoyarsk Prov., Predivinsk, pitfall traps, 29.VI–19.VIII.1995. — 3 ♂♂, 7 ♀♀, 6 juv. (ZMUM), same Province, Yeniseysk Distr., environs of Ust-Pit, pitfall traps, 30.VII–6.IX.1994. — 1 ♀, 2 juv. (ZMUM), same locality, 2–10.VII.1995. — 1 ♂ (ZMUM), same locality, 1995; all leg. L.R.

REMARKS: Originally described in *Diplomaragna* [Shear, 1990], this species is now in *Altajosoma* [Mikhajlova, 2000], and is known from the Kemerovo and Novosibirsk areas, the Altai and the Krasnoyarsk Province. At Artybash, a single male has been taken which differs a little from the

typical form in shape of the side lamella of the lateral sheath process of the posterior gonopods.

Altajosoma shilenkovi (Shear, 1990)

Diplomaragna shilenkovi Shear, 1990: 23, figs.

Diplomaragna shilenkovi — Mikhajlova, 1993: 28.

Altajosoma shilenkovi — Mikhajlova, 2000: 161.

Material: 1 ♂, 1 ♀ (CAS), Republic Buryatia, Tunkinskies Mountains, eastern branch of Kingara River, 1,500–1,520 m a.s.l., 51°58'N 102°26'E, 21.VII.1995. — 1 ♂ (CAS), Irkutsk Area, Lake Baikal, Bolshie Kory, 480 m a.s.l., 51°54.9'N 105°43'E, 5.VIII.1995; all leg. D.K.

REMARKS: This species, originally described in *Diplomaragna* [Shear, 1990] and, later, transferred to *Altajosoma* [Mikhajlova, 2000], is currently known only from the Irkutsk Area, the terra typica. The length of the anterior gonopod telopodites varies, i.e. these are shorter in the above males as compared to those from the type series from the Khamar-Daban Mts.

Ancestreuma feynmani (Shear, 1990)

Diplomaragna feynmani Shear, 1990: 17, figs.

Diplomaragna feynmani — Mikhajlova, 1993: 22.

Ancestreuma feynmani — Mikhajlova, 2000: 155.

Material: 3 ♂♂, 6 ♀♀, 2 juv. (ZMUM), Krasnoyarsk Prov., Predivinsk, pitfall traps, 29.VI–15.VIII.1995. — 1 ♂ (ZMUM), 1 ♂ (IBSV), same locality, pitfall traps, 29.VI–19.VIII.1995; all leg. L.R. — 1 ♂, 1 ♀ (IBSV), 1 ♂, 2 ♀♀, 3 juv. (ZMN), Republic Tuva, Pit-Khem Distr., ca. 5 km NW of Sesserlig, Uyuksky Mt. Range, 1,000–1,100 m a.s.l., mixed forest, litter, 24–25.VII.1989; leg. D.L.

REMARKS: Originally described in *Diplomaragna* [Shear, 1990], this species has since been transferred to *Ancestreuma* [Mikhajlova, 2000]. Hitherto known from Tuva, its terra typica, and the Krasnoyarsk Province.

Ancestreuma longibrachiatum (Shear, 1990)

Diplomaragna longibrachiata Shear, 1990: 14, figs.

Diplomaragna longibrachiata — Mikhajlova, 1993: 25.

Ancestreuma longibrachiatum — Mikhajlova, 2000: 155.

Material: 1 ♂ (IBSV), 1 ♂ (ZMN), Republic Tuva, West Sayan, Kurtushibinsky Mt. Range, ca. 10 km NW of Shivilig, 1,100–1,200 m a.s.l., mixed forest, litter, 6.VII.1990; leg. D.L.

REMARKS: Originally described in *Diplomaragna* [Shear, 1990], this species has since been transferred to *Ancestreuma* [Mikhajlova, 2000]. Hitherto known from Mongolia and the Krasnoyarsk Province of Siberia. The record in Evenkia by Mikhajlova [1993] actually refers to *A. ryvkini*.

Ancestreuma ramiferum Mikhajlova, 2000

Ancestreuma ramiferum Mikhajlova, 2000: 156, figs.

REMARKS: The species is only known from the original description from the Republic of Tuva, Siberia.

Ancestreuma ryvkini (Shear, 1990)

Diplomaragna ryvkini Shear, 1990: 14, figs.

Diplomaragna ryvkini — Mikhajlova, 1993: 25.

Ancestreuma ryvkini — Mikhajlova, 2000: 156.

Material: 1 ♂ (IBSV), SE Tuva, middle flow of Karghy River, 50°31'N 97°03'E, 1,400 m a.s.l., 28–30.VI.1996; leg. Y.M. — 4 ♂♂, 3 ♀♀, 5 juv. (ZMUM), Irkutsk Area, Lake Baikal, environs of Maritui, *Betula* forest with fern undergrowth, litter + moss, 10.VII.1988; leg. A.T. — 8 ♂♂, 16 ♀♀ (CAS), same locality, Lake

Baikal, Bolshie Kory, 480 m a.s.l., 51°54.9'N 105°43'E, 5.VIII.1995; leg. D.K. — 4 ♂♂, 2 ♀♀ (ZMUM), Krasnoyarsk Prov., Yeniseysk Distr., environs of Ust-Pit, 30.VII–6.IX.1994. — 1 ♂, 3 juv. (ZMUM), same locality, 1995. — 14 ♂♂, 14 ♀♀, 10 juv. (ZMUM), same locality, pitfall traps, 10.VII–26.VIII.1995; all leg. L.R.

REMARKS: Originally described in *Diplomaragna* [Shear, 1990], this species has since been transferred to *Ancestreuma* [Mikhajlova, 2000]. This is a widespread species known from Mongolia as well as Evenkia, Tuva, Buryatia and the Irkutsk Area, Siberia.

Ancestreuma subulatum Mikhajlova, 2000

Ancestreuma subulatum Mikhajlova, 2000: 157, figs.

REMARKS: Originally described from the Irkutsk Area, Siberia, this species seems to be confined to its terra typica.

Asiatyla communicantis (Golovatch, 1977)

Ancestreuma communicantis Golovatch, 1977: 738, figs; Mongolia.

Diplomaragna communicantis — Shear, 1990: 17, figs; Mongolia.

Asiatyla communicantis — Mikhajlova, 2000: 159; Mongolia. Material: 2 ♂♂, 15 ♀♀ (CAS), Irkutsk Area, Lake Baikal, Bolshie Kory, 480 m a.s.l., 51°54.9'N 105°43'E, 5.VIII.1995; leg. D.K.

REMARKS: This species, originally described in *Ancestreuma* from Mongolia [Golovatch, 1977], has since been transferred to *Diplomaragna* [Shear, 1990] and, very recently, to *Asiatyla* [Mikhajlova, 2000]. The above is the first record of the species in the fauna of Russia.

Asiatyla sajanica (Gulička, 1972)

Altajosoma sajanicum Gulička, 1972: 37, fig.

Altajosoma sajanicum — Lokšina & Golovatch, 1979: 382.

Ancestreuma boreale — Golovatch, 1979: 336, figs; Lokšina & Golovatch, 1979: 382.

Diplomaragna borealis — Shear, 1990: 17, fig; Mikhajlova, 1993: 18.

Diplomaragna sajanica — Shear, 1990: 38; Mikhajlova, 1993: 25.

Asiatyla sajanica — Mikhajlova, 2000: 159.

Material: 4 juv. (ZMUM), Krasnoyarsk Prov., Turukhansk Distr., Mirnoe, 13–23.VI.1988. — 6 ♂♂, 4 ♀, 2 juv. (ZMUM), same locality, 8–18.VII.1988. — 1 ♂, 2 ♀♀ (ZMUM), same locality, pitfall traps, 10–20.VIII.1988. — 1 ♀, 1 juv. (ZMUM), same locality, 8–18.VI.1989. — 1 ♀, 11 juv. (ZMUM), same locality, 9–19.VI.1989. — 2 juv. (ZMUM), same locality, 10–20.VI.1989. — 1 ♀ (ZMUM), same locality, 1–11.VII.1989. — 6 ♂♂ (ZMUM), same locality, 2–12.VII.1989. — 3 ♂♂, 1 ♀ (ZMUM), 2 ♂♂, 3 ♀♀ (IBSV), same locality, 5–15.VIII.1989. — 1 ♀, 2 juv. (ZMUM), same locality, 6.VIII.1989. — 1 ♀ (ZMUM), same locality, 11.VIII.1989. — 1 juv. (ZMUM), same locality, 18–28.VI.1990. — 1 juv. (ZMUM), same locality, 20–30.VI.1990. — 4 juv. (ZMUM), same locality, 25.VI.1990. — 1 ♂, 3 juv. (ZMUM), same locality, 6–16.VII.1990. — 6 ♂♂, 13 ♀♀, 26 juv. (ZMUM), same locality, 6–17.VII.1990. — 1 ♂, 4 ♀♀, 5 juv. (ZMUM), same locality, 6–20.VII.1990. — 3 juv. (ZMUM), same locality, 11.VII.1990. — 1 ♀ (ZMUM), same locality, 13.VII.1990. — 5 ♂♂, 9 ♀♀, 2 juv. (ZMUM), same locality, 1–11.VIII.1990. — 1 ♂, 2 ♀♀ (ZMUM), same locality, 2–12.VIII.1990. — 1 ♀ (ZMUM), same locality, 8.VIII.1990. — 4 juv. (ZMUM), same locality, 12–22.VI.1991. — 1 ♂ (IBSV), 1 ♂, 1 ♀, 4 juv. (ZMUM), same locality, VII.1991. — 8 ♂♂, 7 ♀♀, 2 juv. (ZMUM), same locality, 5–15.VII.1991; all leg. L.R. — 2 ♂♂, 1 juv. (ZMUM), same locality, Arghidzhek Station, 10.VIII.1994; leg. L.L. — 2 ♂♂, 2 ♀♀, 1 juv. (ZMN), Republic Tuva, Tandinsk Distr., East Tannu-Ola Mt. Range, opposite Lake Chaghytai, ca. 2,000 m a.s.l., moss litter in *Larix dahurica* forest, 27.VI.1989; leg. D.L. — 2 ♂♂,

2♀♀, 5 juv. (IBSV), SE Tuva, middle flow of Karghy River, 50°31'N 97°03'E, 1400 m a.s.l., 28–30.VI.1996. — 9 ♂♂, 16 ♀♀ (IBSV), same locality, Sanghelen Mt. Range, 50°28.96'N 95°24.37'E, 2030 m a.s.l., mountainous bush tundra, 16–18.VII.1996; all leg. Y.M.

REMARKS: This species, originally described in *Altajosoma* from Tuva [Gulička, 1972] and, later, transferred to *Diplomaragna* [Shear, 1990], is a senior subjective synonym of *Ancestreuma boreale*, a form described from the middle flow region of Yenisey River, Krasnoyarsk Province. Both the synonymy and the reassignment to *Asiatyla* have been established by Mikhaljova [2000].

Asiatyla similata Mikhaljova, 2000

Asiatyla similata Mikhaljova, 2000: 158, figs.

REMARKS: Known from the Irkutsk Area only, its terra typica. Close to *A. sajanica* (see just below).

Orientyla dahurica (Gerstfeldt, 1859), **comb.n.**

Craspedosoma dahuricum Gerstfeldt, 1859: 272.

Diplomaragna mikhaljovae Shear, 1990: 20, figs; **syn n.**; Russian Far East.

Diplomaragna mikhaljovae — Mikhaljova, 1993: 25; Russian Far East.

Orientyla mikhaljovae — Mikhaljova, 2000: 171, figs; Russian Far East.

REMARKS: Due to the courtesy of Dr. V.A. Krivokhatsky, the Keeper of Arachnida and Myriapoda at the Zoological Institute of the Russian Academy of Sciences in St. Petersburg, we have recently been privileged to re-examine two samples in a jar labeled "Original specimens of Gerstfeldt's "Platoden, Crustaceen, Myriapoden etc. Sibiriens"" and "Myriapoda Specimena origin. oed Gerstfeldt Platoden etc.". However, the labels inside the tubes had faded so that they were almost or fully impossible to decipher.

One of the tubes contained a well-preserved male of what could readily be identified as *Orientyla mikhaljovae*, a species first described in *Diplomaragna*, from the southern Russian Far East [Shear, 1990], and very recently transferred to *Orientyla* [Mikhaljova, 2000]. The externally curved, unciform distal ends of the lateral sheath process of the posterior gonopods represent the sole difference of this specimen from the types, but this variation is obviously infraspecific.

This male is provided with an almost completely faded label reading "Platy...cimi (Lucas)", which does not correspond to any of the species named or identified by Gerstfeldt [1859].

Gerstfeldt proposed two new species names in the order Chordeumatida, i.e., *Julus armatus* (later transferred to *Craspedosoma* by Haase [1880]), from Irkutsk, Siberia and *Craspedosoma dahuricum*, from near the mouth of Shilka River, Chita Area, i.e. just at the border between the Chita Area, Siberia proper and the Amurskaya Area, Russian Far East. Both were described too poorly to suggest more than their actual assignment to the family Diplomaragnidae [Mikhaljova, 1993].

Based on geographical evidence alone, it seems thus fairly safe to surmise that the above male actually represents a syntype (herewith designated as lectotype) of *Craspedosoma dahuricum*, because *Orientyla mikhaljovae* does occur both in the Amurskaya Area (i.e. quite close to the Chita Area) and Maritime Province, Russian Far East, whereas Irkutsk/Cisbaikalia seems too far away in the west to seriously consider the sample as a syntype of *Julus armatus*. This formally results in the following: *Craspedosoma dahuricum* Gerstfeldt, 1859 = *Orientyla dahurica* (Gerstfeldt, 1859), **comb.n.** = *Orientyla mikhaljovae* (Shear, 1990), **syn.n.**

The second tube contained a female and fragments of a juvenile of what is currently accepted as *Pacifiulus amurensis* (Gerstfeldt, 1859), hence fully confirming the earlier synonymization made as based on circumstantial evidence alone [Mikhaljova, 1998a]. Although the label enclosed was impossible to read, the traces of ink being too faint, this material seems likewise type. The female is herewith designated as lectotype, thus apparently deriving from between what is currently known as Khabarovsk and Komsomolsk-on-Amur, Russian Far East [Mikhaljova, 1993, 1998b].

Shearia calycina Mikhaljova, 2000

Shearia calycina Mikhaljova, 2000: 167, figs.

REMARKS: The species is only known from the original description from the southern Altai, Siberia.

Shearia densecava (Gulička, 1972)

Altajosoma densecavum Gulička, 1972: 37, fig.

Altajosoma densecavum — Lokšina & Golovatch, 1979: 382.

Diplomaragna densecava — Shear, 1990: 38; Mikhaljova, 1993: 22.

Shearia densecava — Mikhaljova, 2000: 166, figs.

REMARKS: This species, originally described in *Altajosoma* from several places in the southeastern Altai within Russia [Gulička, 1972], has since been transferred, first to *Diplomaragna* [Shear, 1990], very recently to *Shearia* [Mikhaljova, 2000].

Shearia khakassica Mikhaljova, 2000

Shearia khakassica Mikhaljova, 2000: 163, figs.

REMARKS: Originally described and currently known only from the Republic of Khakassia, Siberia.

Shearia oiskaya Mikhaljova, 2000

Shearia oiskaya Mikhaljova, 2000: 165, figs.

REMARKS: This species has hitherto been described only from the Krasnoyarsk Province, Siberia, its locus typicus lying in Yermakovo Distr., Oisky Mt. Range.

Shearia rybalovi Mikhaljova, 2000

Shearia rybalovi Mikhaljova, 2000: 164, figs.

Material: 3 ♂♂, 4 ♀♀ (ZMUM), Krasnoyarsk Prov., Sayano-Shushensky Nature Reserve, mouth of Ottug-Sug River, 7–18.VII.1990. — 6 ♂♂, 5 ♀♀ (ZMUM), same locality, 8–19.VII.1990. — 1 ♂, 1 ♀, 1 juv. (ZMUM), same locality, 19–26.VII.1990. — 5 ♂♂, 9 ♀♀, 3 juv. (ZMUM), same locality, 26.VII–5.VIII.1990. — 1 ♂, 7 ♀♀, 1 juv. (ZMUM), same locality, 28.VII–7.VIII.1990. — 5 ♂♂, 31 ♀♀, 22 juv. (ZMUM), same locality, 7–17.VII.1991. — 3 ♂♂, 1 ♀, 2 juv. (ZMUM), same locality, pitfall traps, 8–18.VII.1991. — 1 ♂ (ZMUM), same locality, 5–15.VIII.1991. — 7 ♂♂, 8 ♀♀, 1 juv. (ZMUM), same locality, 6–16.VIII.1991. — 1 ♂, 1 ♀ (ZMUM), same locality, 2–12.VII.1992. — 5 ♂♂, 3 ♀♀, 2 juv. (ZMUM), same locality, 31.VII–10.VIII.1992. — 4 ♂♂, 5 ♀♀, 8 juv. (ZMUM), same locality, 17–27.VII.1993; all leg. L.R.

REMARKS: The species is only known from the original description from the West Sayan Mts, Krasnoyarsk Province [Mikhaljova, 2000].

Shearia shushenskaya Mikhaljova, 2000

Shearia shushenskaya Mikhaljova, 2000: 168, figs.

Material: 2 ♂♂ (ZMUM), Krasnoyarsk Prov., Sayano-Shushensky Nature Reserve, mouth of Ottug-Sug River, 7–17.VII.1991. — 3 ♂♂ (ZMUM), same locality, 5–15.VIII.1991. — 1 ♂ (ZMUM), same locality, 31.VII–10.VIII.1992; all leg. L.R.

REMARKS: The species has been described from the West Sayan Mts in Krasnoyarsk Province, Siberia.

Shearia teletskaya Mikhajlova, 2000

Shearia teletskaya Mikhajlova, 2000: 167, figs.

REMARKS: The species is only known from the original description from the Altai, Siberia, the environs of Lake Teletskoe being the locus typicus.

Altajella pallida Gulička, 1972

Figs 12–29.

Altajella pallida Gulička, 1972: 43, figs.

Material: 1 ♂ (ZMUM), Altai Mts, Lake Teletskoe, Altaysky Nature Reserve, Chiri, upper reaches of Chiri River, *Picea obovata* + *Pinus sibirica* taiga forest, 1,350 m a.s.l., 28–29.VII & 2.VIII.1997; leg. S.G. & A.T.

REDESCRIPTION: Male. Length 7 mm, width 0.7 mm. Colouration in alcohol pale yellowish with a marble anterior part, maybe so because freshly moulted. Antennae light brown, legs pale, ocelli black.

Body with 28 segments, subcylindrical, juloid, smooth. Head densely setose, vertigial suture well visible. Genae strongly convex, pilose. Labrum usual, with three median teeth at fore margin, without prominent spines. Eye patches oval-triangular, rather small, composed of 12–13 ocelli. 13 ocelli on right side, 12 on left one. Antennae long and slender, clavate, antennomere 3 longest (Fig. 12). Gnathochilarium without promentum, with several strong distal setae on outer sides of stipes. Remaining parts of stipes beset with short to medium-sized setae, shorter ones more basally. Lamellae linguales likewise with short setae basally and longer ones distally. Collum semi-circular, with 3+3 macrochaetae, not covering the head from above. Paraterga/bulges on metazonites absent (Figs 13 & 14). Transverse suture between pro- and metazona well-developed. Metazonal 3+3 macrochaetae short, always pointed, on each side usually forming an extended transverse triangle (Fig. 13); macrochaetae on a few posteriormost metazona forming a transverse row. Axial dorsal suture well-developed.

Legs short and slender. Legs 1 and 2 a little reduced, normal, coxa as usual pierced with vas deferens, tarsal setae on ventral side brush-like, stout. ♂ legs 3–7 slightly but increasingly enlarged, coxa 7 particularly incrassate dorsoventrally. Tarsal papillae (Fig. 17) present from ♂ leg 3 until legs of somite 20, onward absent. From ♂ leg 10 on, ventral patch immediately proximally of claw lacking tarsal papillae. Claws of ♂ legs 1 and 2 each with a very delicate ventral and dorsal midway spinicle (Figs 15 & 16); onward both spinicles increasingly reduced, ventral one being absent already from leg 4 on (Figs 17 & 18), dorsal spinicle retained until legs of somite 11 where barely traceable. ♂ legs 10 and 11 with coxal glands, coxa 10 (Fig. 19) somewhat enlarged, with a curved distomedian process (cx), sternite (st10) with a long, lateral, unciform outgrowth on each side and a caudomedian protuberance. Sternite (st11) of ♂ leg-pair 11 (Fig. 20) with a distinct caudomedian protuberance. Somite 27 legless. Each anal valve with three setae at caudal margin. Subanal scale with 1+1 setae.

Anterior gonopods (Figs 21–26) placed on a membranous sternite (p) devoid of tracheal apodemes as well as of structures both medially and laterally; coxites tripartite, indepen-

dent, not contiguous medially, suberect. External piece of coxite bifid (b1 and b2) (Figs 21 & 22). Branch b2 (= “solenomerite”) distally micropilose, with variously shaped outgrowths; prostatic groove terminating on a caudo-parabasal outgrowth (s) (Fig. 24). Branch b1 smooth, slender, simple, a little higher than b2. Inner piece of coxite (ch) narrowed distally, broadly lobe-shaped parabasally (Fig. 21 & 25). At base, both these pieces of coxite embracing a glandular globule (?coxal glands) (g) (Figs 22 & 26). Third piece represented by a paramedian pair of flagella (f) originating in basal part of coxites, each forming a U-shaped loop, lying inside prostatic groove along “solenomerite” and finally ending in a free coiled spiral; tip of each flagellum slightly concave and with a subterminal incision. Posterior gonopods strongly reduced (Figs 27–29), placed on a narrow plate-like sternite supplied with evident tracheal apodemes, coxites contiguous medially, each coxite with two conical processes (c), telopodite strongly reduced, 3-segmented, pubescent.

Female unknown.

REMARKS: This genus and species has been described based on a single male holotype taken from near Kiga (= Kyga) River, Lake Teletskoe, Altai [Gulička, 1972]. So the above material can be considered as strictly topotypic, because both localities are only a few air-km away from one another. Regrettably, the holotype, now in St. Petersburg, was returned incomplete, with the gonopods missing, thus preventing any attempt at a revision [Mikhajlova, 1993].

Gulička [1972], when proposing his *Altajella*, stated that a new family could be established for this genus alone, but he never formalized the issue. As the original description and illustrations given by Gulička were too incomplete, often even misleading, until now this form remained among nomina dubia [cf. Mikhajlova, 1993]. It is only due to the fresh topotypic sample that the species could finally be revised, and the allocation and affinities of *Altajella* somewhat clarified. The necessity to create a new family to accommodate *Altajella* is reconfirmed, too, and the issue is formalized.

Below is a new diagnosis of this genus, followed by a discussion and a diagnosis of a new family proposed for accommodation of this and further two genera.

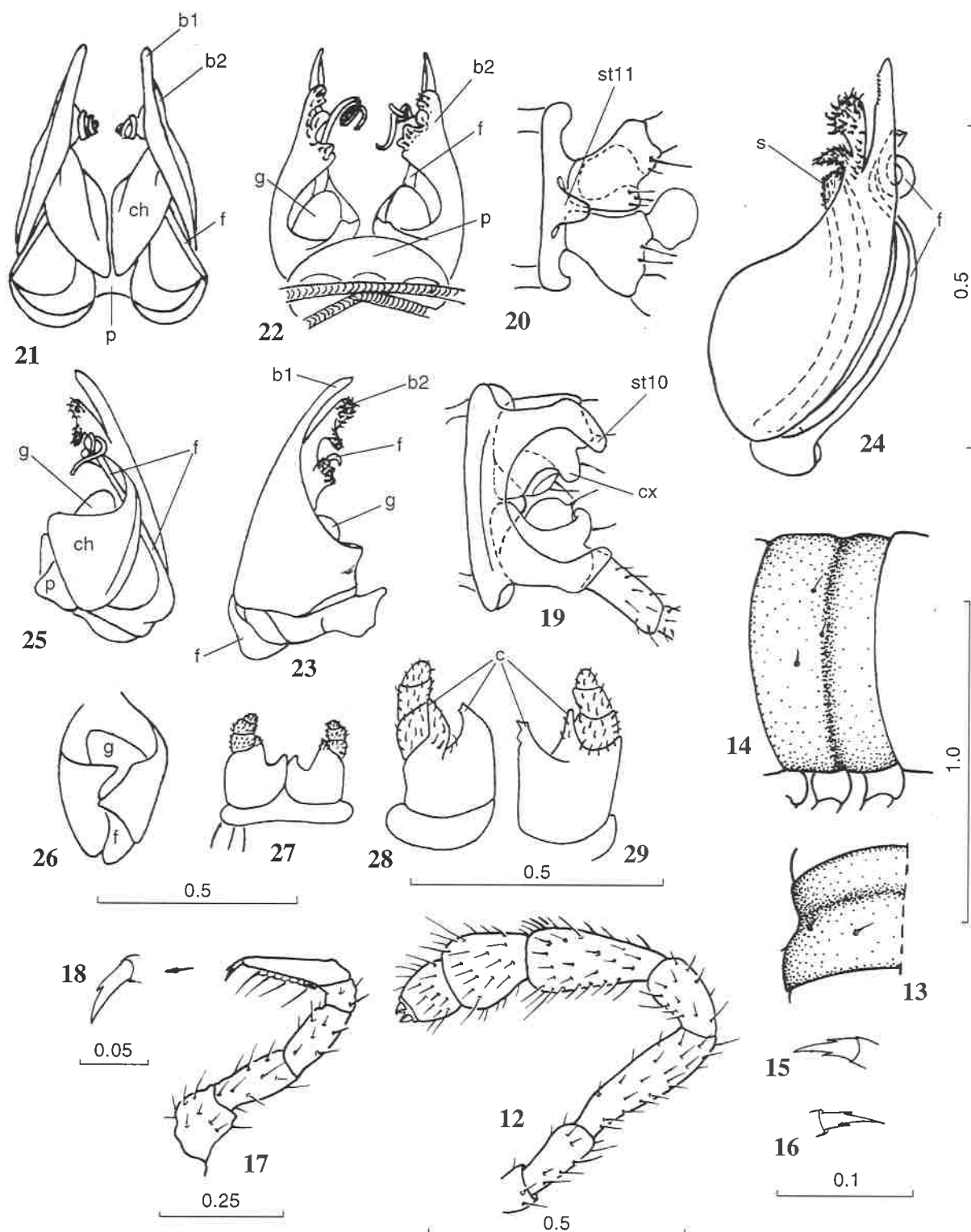
Altajella Gulička, 1972

Altajella Gulička, 1972: 42.

DIAGNOSIS: Body with 28 segments, juloid (subcylindrical). Gnathochilarium without promentum. Collum usual. Metazonites with neither paraterga nor lateral bulges, each with usual 3+3 macrochaetae. Teguments smooth.

Legs short, in ♂ with tarsal papillae coming to naught toward caudal body end. ♂ leg-pairs 3–7 slightly but increasingly enlarged, ♂ legs 10 and 11 virtually normal, with coxal glands, coxa 10 with a distomedial process. One additional spinicle on claw either both middorsally and midventrally (legs 1–3) or only middorsally (from leg 4 until about mid-body). Sternite of ♂ leg-pair 10 with a long unciform outgrowth laterally on each side and a protuberance caudomedially. Sternite of ♂ leg-pair 11 with a protuberance caudomedially.

Anterior gonopods placed on a membranous sternite devoid of tracheal apodemes as well as structures medially and laterally; coxites independent, elongate, tripartite, each divided into an external and an internal (= “solenomerite”) piece, these both embracing a glandular globule at base, and a pair of paramedian flagella beginning near base of coxite, mostly attached to “solenomerite” and ending in a free coil. Posterior gonopods rather strongly reduced, lying on a narrow



Figs 12-29. *Altajella pallida* Gulička, 1972, ♂ topotype: 12 — antenna; 13 — somite 15 (left half, dorsal view); 14 — same (lateral view); 15 — claw of leg-pair 1; 16 — claw of leg-pair 2; 17 — leg-pair 15 (tarsal setation largely omitted); 18 — claw of leg-pair 15; 19 — basal part of leg-pair 10 (front view); 20 — basal part of leg-pair 11 (caudal view); 21 — anterior gonopods (front view); 22 — same (caudal view); 23 — same (lateral view); 24 — same (anterolateral view, flagellum displaced); 25 — same (mesal view); 26 — basal part of anterior gonopods (ventral view); 27 — posterior gonopods (front view); 28 — left posterior gonopod (front view); 29 — right posterior gonopod (front view); b1, b2 — branches of external piece of coxite (b2 = "solenomerite"); c — coxal processes of posterior gonopods; ch — inner piece of coxite; cx — coxal process of leg-pair 10; f — flagellum; g — glandular globule (?coxal glands); p — membranous sternite; s — caudo-parabasal outgrowth of "solenomerite" terminating the seminal groove; st10 — caudal outgrowth on sternite of leg-pair 10; st11 — caudal outgrowth on sternite of leg-pair 11. Scale bars in mm.

plate-like sternite with readily recognizable tracheal apodemes; coxites small, contiguous medially, each with two more or less conical outgrowths; telopodites short, few-segmented.

Type species: *Altajella pallida* Gulička, 1972.

Teleckophoron montanum Gulička, 1972

Figs 30–40.

Teleckophoron montanum Gulička, 1972: 41, figs.

Material: 1 ♂ (IBSV, Krasnoyarsk Prov., Yermakovo Distr., Sayano-Shushenskii Nature Reserve, Ottug-Sug River, 8–19.VII.1990. — 1 juv. (ZMUM), same locality, 7–17.VII.1991. — 1 ♂, 3 ♀♀ (ZMUM), same locality, 2–12.VII.1992. — 1 ♂, 1 ♀, 1 juv. (IBSV), same locality, 17–27.VII.1993. — 1 ♀ (ZMUM), Lake Ekspeditsionnoe, montane tundra, 28.VIII.1991. — 1 ♂, 3 ♀♀ (ZMUM), same locality, pitfall trapping, 14–19.VII.1992. — 1 ♀ (ZMUM), same locality, 18.VII.1992; all leg. L.R.

REDESCRIPTION: Male. Length 13–14 mm, width 0.9–1.2 mm. Colouration in alcohol brown, with oval marble spots laterally on pro- and metazona (Figs 31 & 32). Frons and vertex dark brown, antennae and legs brown, ocelli black.

Body with 28 segments, subcylindrical, juloid, smooth. Head setose, vertical suture hardly visible. Labrum usual, with three median teeth at fore margin, devoid of spines. Genae strongly convex. Eye patches triangular, each composed of 22–23 ocelli. Antennae (Fig. 30) long and slender, clavate, antennomere 3 longest. Gnathochilarium without promentum, with several strong setae on outer sides of distal parts of stipes. Remaining parts of stipes beset with setae, latter shorter and more numerous basally than distad. Each lamella lingualis with several medium-sized setae, a long seta only distally. Collum not covering the head from above, oval, with 3+3 macrochaetae. Paraterga/bulges on metazonites absent. Transverse suture between pro- and metazona rather well-developed, 3+3 macrochaetae on metazonites relatively short, pointed, usually forming an extended transverse triangle on each side of body (Figs 31 & 32). Axial dorsal suture well-developed. Each anal valve with three setae at caudal margin. Subanal scale with 1+1 setae.

Legs slender but not very long, claws long, slightly curved, at least from pair 3 on with two minute, poorly traceable accessory claws dorsally at base (Fig. 33). Legs 1 and 2 typically reduced, normal, coxa 2 as usual pierced with vas deferens, latter's orifice opening apically on a small knob; claws 1 and 2 each not only with two minute accessory claws dorsally but often with a spinicle (= filament) ventrally at base (this spinicle absent only from a ♂ from Lake Ekspeditsionnoe). ♂ legs 3–7 slightly but increasingly enlarged, without any further modifications. Tarsal papillae present from ♂ leg 3 until legs of somite 24, onward missing, especially strongly developed on pairs 3–7, missing just proximally of claw from ♂ leg 10 on. Somite 27 legless. ♂ legs 10 and 11 with coxal glands; pair 10 with sternite (st10) supplied with a median outgrowth curved caudally (Fig. 34); coxa 11 with a strong,

distomesal, unciform protuberance (u) and a caudal, lobe-shaped, papillate outgrowth (bl), sternite 11 (st11) with a similar but larger median outgrowth caudally (Fig. 35).

Anterior gonopods (Figs 36–39) positioned on a narrow, plate-like, strongly sclerotized sternite devoid of median structures (except for 1+1 minute paramedian setae) but with clearly traceable tracheal apodemes; coxites independent, not contiguous medially, tripartite, curved distocaudally. External branch of coxite (e) slenderer, representing a relatively simple "solenomerite", prostatic groove terminating at a curved apex. Inner branch (i) higher than both other branches, divided distally into an outer lobe (b) and an inner flagelliform process (p). Third branch (t) lying in between, lamelliform, of irregular shape. Posterior gonopods (Fig. 40) placed on a nearly normal, plate-like sternite with clearly expressed tracheal apodemes; coxites curved distocaudally, setose terminally, each with a front groove (g) and a parabasal styletiform process (o); telopodite totally reduced.

Female. Length 14 mm, width 1.3 mm. Body with 28 segments. Ocelli 21. Tarsal papillae absent. Leg-pair 2 normal, not reduced, coxa with a small distocaudal knob. Prefemur 3 with a small but distinct distolateral outgrowth. Other nonsexual characters as in male. Vulvae not dissected for examination.

REMARKS: Like the previous species, *T. montanum* has hitherto been known only from the environs of Lake Teletskoe, Altai Mts [Gulička, 1972]. So the above record extends the distribution of this species and genus to the West Sayan Mts as well. Although Gulička's original description and accompanying illustrations of this species are quite poor, while the holotype (now in St. Petersburg) has been returned without gonopods, thus discouraging any revisionary attempt, there is no doubt that the new samples are conspecific with *T. montanum*, a form heretofore considered among nomina dubia [cf. Mikhajlova, 1993].

Gulička [1972], when proposing *Teleckophoron*, stated that a new family could be established for this genus alone. However, he refrained from formalizing the issue. So the opportunity is taken here to both adequately diagnose *Teleckophoron* and to formally advance a new family to incorporate this and further two genera.

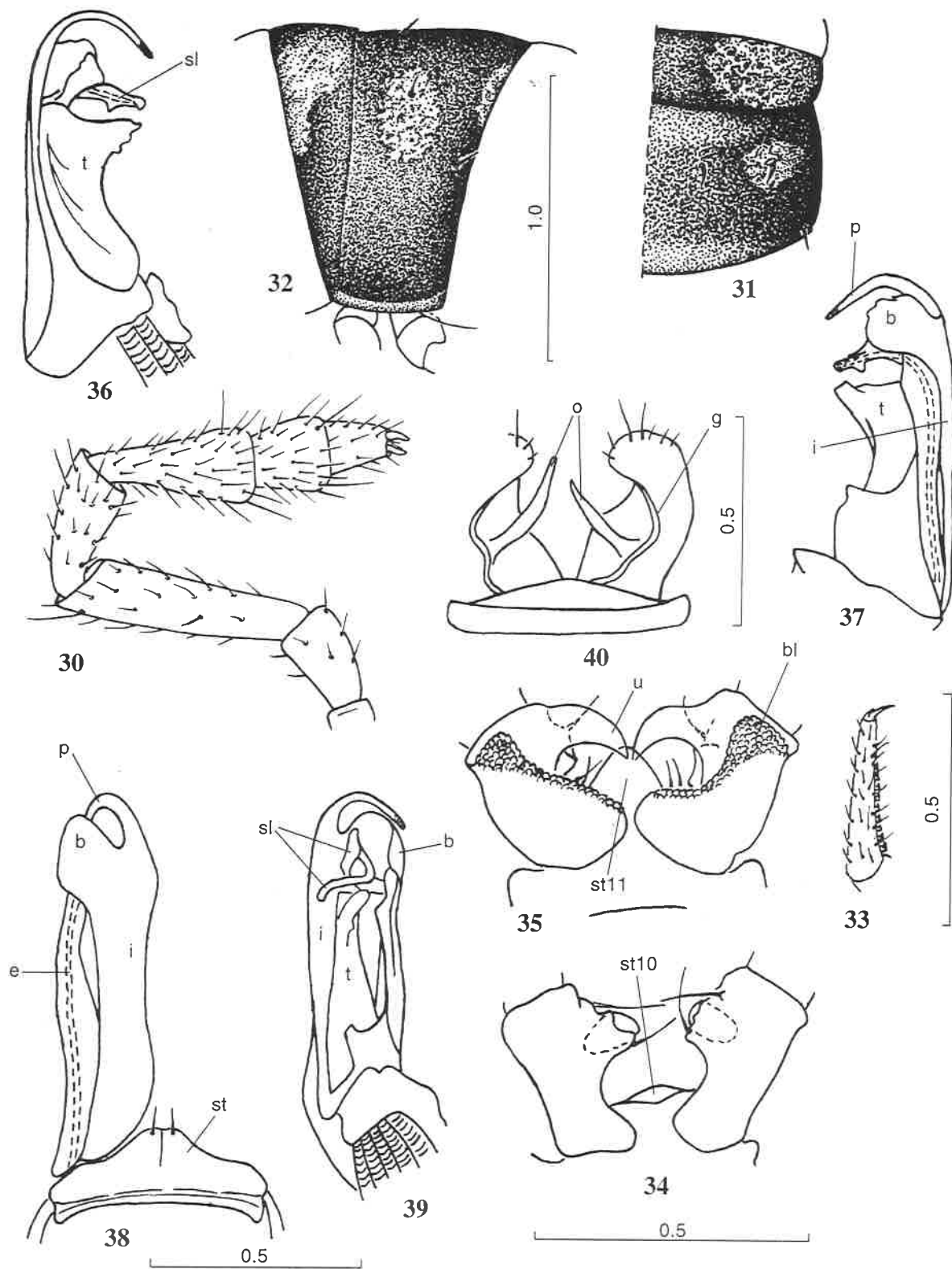
Teleckophoron Gulička, 1972

Teleckophoron Gulička, 1972: 41.

DIAGNOSIS: Body with 28 segments, juloid (subcylindrical). Gnathochilarium without promentum. Collum usual. Metazonites without paraterga/bulges, each with usual 3+3 macrochaetae. Teguments smooth.

Legs not particularly long, in ♂ with tarsal papillae, ♂ leg-pairs 3–7 slightly but increasingly incassate, ♂ legs 10 and 11 virtually normal, with coxal glands, each of their sterna with a caudal protuberance caudomedially, coxa 11 with a distomedian process. Each claw usually with two minute accessory claws dorsally at base.

Рис. 12–29. *Altajella pallida* Gulička, 1972, топоним ♂: 12 — антенна; 13 — 15-й сомит (левая половина, вид сверху); 14 — то же (вид сбоку); 15 — коготок 1-й пары ног; 16 — коготок 2-й пары ног; 17 — 15-я пара ног (тарсальное опушение в основном не изображено); 18 — коготок 15-й пары ног; 19 — базальная часть 10-й пары ног (вид спереди); 20 — базальная часть 11-й пары ног (вид сзади); 21 — передние гоноподии (вид спереди); 22 — то же (вид сзади); 23 — то же (вид сбоку); 24 — то же (вид сбоку и немного спереди, жгут отогнут); 25 — то же (вид изнутри); 26 — базальная часть передних гоноподий (вид снизу); 27 — задние гоноподии (вид спереди); 28 — левый задний гоноподий (вид спереди); 29 — правый задний гоноподий (вид спереди); b1, b2 — ветви наружной части коксита (b2 = соленомерит); c — коксальные выросты задних гоноподий; ch — внутренняя часть коксита; cx — коксальный отросток 10-й пары ног; f — жгут; g — овальные железистые образования (коксальные железы?); p — перепончатый стернит; s — задний парабазальный вырост соленомерита с семенной бороздкой; st10 — вырост стернита 10-й пары ног; st11 — вырост стернита 11-й пары ног. Масштаб в мм.



Figs 30–40. *Teleckophoron montanum* Gulička, 1972, ♂ from West Sayan: 30 — antenna; 31 — somite 15 (dorsal view); 32 — same (right half, lateral view); 33 — tarsus 15; 34 — basal part of leg-pair 10; 35 — basal part of leg-pair 11; 36 — anterior gonopods (mesal view); 37 — same (lateral view); 38 — same (front view); 39 — same (caudal view); 40 — posterior gonopods (front view); b — lobe of inner piece; bl — lobe of coxite 11; e — external piece (= "solenomerite") of anterior gonopod coxite; g — groove on posterior gonopod coxite; i — inner piece of anterior gonopod coxite; o — parabasal process of posterior gonopod coxite; p — process of inner piece; sl — distal part of "solenomerite"; st — sternite of anterior gonopods; st10 — sternite of leg-pair 10; st11 — sternite of leg-pair 11; t — third piece of anterior gonopod coxite; u — coxal process of leg-pair 11. Scale bars in mm.

Anterior gonopods placed on a narrow, plate-like, sclerotized sternite with clearly traceable tracheal apodemes; coxites independent, not contiguous medially, tripartite, curved disto-caudally, flagella absent. External branch of coxite slenderer, representing a relatively simple "solenomerite", prostatic groove terminating at apex. Inner branch higher than both other branches, subdivided distally. Third branch lying in between, lamelliform, of irregular shape. Posterior gonopods placed on a nearly normal, plate-like sternite with tracheal apodemes, coxites relatively simple, telopodite totally reduced.

Type species: *Teleckophoron montanum* Gulička, 1972.

REMARKS: In contrast to Gulička [1972], who tended to treat both monobasic *Altajella* and *Teleckophoron* as warranting separation into a new family each, these two South Siberian genera plus the Tian-Shan *Elongeuma* Golovatch, 1982 appear to show such a degree of similarity as to be assigned to a single familial category, Altajellidae fam.n. Originally, *Elongeuma*, still monobasic but actually containing at least further two Tian-Shan species to be described, was treated in the basically European Haaseidae [cf. Golovatch, 1982] but it has since been considered as without clear familial placement [Spelda & Golovatch, in preparation]. Also, Golovatch [1982] miscounted the segments in *Elongeuma*, which are actually 28, not 30.

Indeed, the new family can be diagnosed by a unique combination of characters such as the juloid body with 28 segments (apparently related to the small size), the absence of a promentum, the presence of tarsal papillae and accessory claws on certain ♂ legs, and of coxal glands on both scarcely modified ♂ legs 10 and 11, the complex, tripartite though fully independent anterior gonopods supporting no median sternal structures but supplied by a solenomerite-like structure (= a branch supporting a prostatic groove) and, in *Altajella* and *Elongeuma*, a paramedian pair of long flagella sheathed by some other elements of the coxite, and the strongly reduced, barely functional posterior gonopods. The anterior gonopods are placed either on a membranous sternite devoid of tracheal apodemes (apomorphy, *Altajella*) or on a sclerotized plate-like sternum supplied with tracheal apodemes (plesiomorphy, *Teleckophoron* and *Elongeuma*). Posterior gonopods simple, placed on a plate-like, virtually unmodified sternum, nearly to totally contiguous medially, with coxal processes, reduced, telopodites few-segmented or absent. In addition, the claws of *Altajella* with their midway spinicle(s) seem unique in the entire order [cf. Attems, 1959]. The posterior gonopods of *Teleckophoron* and *Elongeuma* are nearly identical, a character currently treated of paramount importance for revealing high-level affinities within the entire order Chordeumatida [Shear, 2000].

In general, such a combination of characters seems to be particularly close to that of the Euro-Caucasian family Mastigophorophyllidae but the latter is distinct in the reduced ♀ leg-pair 2 as well as the presence of a promentum, paraterga and long paramedian flagella on both gonopod pairs. However, one must not exaggerate the importance of flagella on this or that gonopod pair in Chordeumatida, as this character appears to vary considerably even within Altajellidae (branch

p being far from too flagelliform in *Teleckophoron*) and is only of generic rank at least within the family Metopidiotrichidae, suborder Heterochordeumatidea [Shear & Tanabe, 1994; Shear, 2000]. Similarly, a very strongly to totally reduced ♀ leg-pair 2 is likewise characteristic not only of the Mastigophorophyllidae but also of certain species of Kashmireumatidae [Shear, in preparation]. On the other hand, considering the absence of both a promentum and paraterga in Altajellidae, the entire combination of the above traits plus the coherent distribution seem sufficiently strong to maintain this family as probably especially similar to but still independent from the Mastigophorophyllidae.

In the recent family-level reclassification of the order Chordeumatida [Shear, 2000], the Altajellidae fam.n. is to be assigned to the suborder Craspedosomatidea, being disjunct in the juloid body devoid of paraterga combined with the missing promentum, the non-reduced ♂ leg-pair 10 and ♀ leg-pair 2, the presence of ♂ tarsal papillae, the rather complex though fully independent anterior gonopods often supplied with a paramedian pair of long flagella, and the reduced, barely functional posterior gonopods. Formally, the following diagnosis can be advanced.

Altajellidae fam.n.

DIAGNOSIS: Body with 28 segments, juloid (= subcylindrical), neither being common among Chordeumatida. Antennae slender (versus clavate in Trachygonidae and Trichopetalidae). Gnathochilarium without promentum (with a promentum in all other families of Craspedosomatidea). Collum not covering the head from above (versus covering in Rhiscosomidae and Striariidae). Metazonites devoid of paraterga or bulges (versus more or less well-developed paraterga or bulges in most members of Chordeumatida). Teguments smooth as in the bulk of Chordeumatida (coarsely tuberculate in Rhiscosomidae and some Cleidogonidae, striate in Striariidae).

Legs not very long, ♂ coxae 2, 3 and 7 virtually unmodified (versus coxa 2 with a strong distomedian process in Caseyidae, and coxa 7 with a similar process in Attemsiidae and Urochordeumatidae), penes absent (present only in Urochordeumatidae). ♀ leg-pair 2 virtually normal, tarsal papillae present from ♂ leg-pair 3 at least until midbody legs; ♂ pairs 3–7 increasingly enlarged. ♂ legs 10 and 11 virtually normal in size, with coxal glands, their sternites and coxae often slightly modified, never reduced. At least some claws with minute accessory spinicle(s) or claw(s).

Anterior gonopods placed either on a plate-like sternum with tracheal apodemes laterally or on a membranous sternite devoid of tracheal apodemes laterally, never with considerable structures medially so that coxites, however complex, remaining fully independent, more or less elongate, each more or less tripartite, often one branch represented by a long paramedian flagellum and always another branch being a solenomerite-like structure supporting a prostatic groove, then both these branches being in tight contact at least over most of their extent and sheathed by remaining parts of coxite. Posterior gonopods rather strongly reduced, barely function-

Рис. 30–40. *Teleckophoron montanum* Gulička, 1972, ♂ с Западного Саяна: 30 — антенна; 31 — 15-й сомит (правая половина, вид сверху); 32 — то же (вид сбоку); 33 — лапка 15-й пары ног; 34 — базальная часть 10-й пары ног; 35 — базальная часть 11-й пары ног; 36 — передние гоноподии (вид изнутри); 37 — то же (вид сбоку); 38 — то же (вид спереди); 39 — то же (вид сзади); 40 — задние гоноподии (вид спереди); b — лопасть внутренней части; bl — лопасть коксита 11-й пары ног; e — наружная часть (= "соломерит") коксита передних гоноподий; g — бороздка на коксите задних гоноподий; i — внутренняя часть коксита передних гоноподий; o — отросток на коксите задних гоноподий; p — отросток внутренней части; sl — дистальная часть "соломерита"; st — стернит передних гоноподий; st10 — стернит 10-й пары ног; st11 — стернит 11-й пары ног; t — третья часть коксита передних гоноподий; u — коксальный отросток 11-й пары ног. Масштаб в мм.

al, lying on a narrow plate-like sternite supplied with tracheal apodemes; coxites small, each with 1–2 median processes; telopodites short, few-segmented to totally missing.

Type genus: *Altajella* Gulička, 1972.

Other genera included: *Teleckophoron* Gulička, 1972 and *Elongeuma* Golovatch, 1982.

Schizoturanus clavatipes (Stuxberg, 1876)

Polydesmus clavatipes Stuxberg, 1876a: 34, figs.

Polydesmus clavatipes — Stuxberg, 1876b: 316.

Schizoturanus clavatipes — Lohmander, 1933: 27; Hoffman, 1975: 82, figs; Lokšina & Golovatch, 1979: 384; Mikhajlova, 1993: 32, fig.

Material: 2 ♂♂, 1 ♀ (IBSV), 3 ♂♂, 1 ♀ (ZMN), Novosibirsk Area, Iskitim Distr., Malinovka, mesophytous meadow, 15.VIII.1987. — 5 ♂♂, 1 ♀ (ZMN), 30–35 km S of Novosibirsk, Koltsovo, mesophytous meadow, 27.VIII.1994 all leg. D.L. — 1 ♀, 2 juv. (ZMUM), Krasnoyarsk Prov., Yeniseysk Distr., environs of Ust-Pit, pitfall traps, 30.VII–6.IX.1994. — 1 ♀ (ZMUM), same locality, 2–10.VII.1995. — 3 ♀♀, 3 juv. (ZMUM), same locality, 10.VII–26.VIII.1995. — 2 juv. (ZMUM), same Province, Predivinsk, 28.VI.1995; all leg. L.R. — 1 ♀ (ZMUM), same Province, environs of Krasnoyarsk, "Stolby" Nature Reserve, 25.VIII.1994. — 2 ♂♂ (IBSV), same Province, Turukhansk Distr., Central Siberian Nature Reserve, Canyon Yuzhnyi, 30.X.1994; all leg. I.U. — 10 ♂♂, 3 ♀♀ (ZMUM), Kemerovo Area, Kuznetsky Alatau Nature Reserve, delta of Malaya Bezymianka River ca. 19 air-km SSW of Belogorsk, *Abies sibirica* + *Pinus sibirica* taiga, 500 m a.s.l., 27–31.08.1993, leg. S.G. & V.G. — 1 ♀, 8 juv. (ZMUM), same locality, ca. 16 air-km SW of Belogorsk, Kiya River, Bezymianka River delta, riverine taiga, 14–17.07.1994. — 1 ♂, 1 ♀, 26 juv. (ZMUM), same Area, Novokuznetsk District, ca. 10 air-km S of Kuzedeyevo, *Tilia* insular forest (= Lipovyi ostrov), 450–550 m a.s.l., 20–24.07.1994, all leg. S.G. & A.R. — 1 ♀, 8 juv. (ZMUM), Altai Mts., Lake Teletskoe, near delta of Chulyshman River, *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 650 m a.s.l., 13–24.07.1997, leg. S.G. — 4 ♂♂, 4 ♀♀, 26 juv. (ZMUM), same locality, near Artybash, *Picea obovata* + *Abies sibirica* + *Pinus sibirica* taiga forest, 500–800 m a.s.l., 13–24.07.1997, leg. S.G. & A.T.

REMARKS: This species, originally described from between Mariinsk, Kemerovo Area and Achinsk, Krasnoyarsk Province [Stuxberg, 1876a], has since been reported from the Novosibirsk Area as well [Mikhajlova, 1993]. The above material shows that *S. clavatipes* is quite widespread in West and Southwest Siberia, including the Altai Mts, Gornaya Shoriya, and Kuznetsky Alatau Mts.

Schizoturanus salairicus (Gulička, 1963)

Turanodesmus salairicus Gulička, 1963: 522, figs.

Schizoturanus salairicus — Lokšina & Golovatch, 1979: 384; Mikhajlova, 1993: 31.

Material: 20 ♂♂, 4 ♀♀, 26 juv. (ZMUM), Kemerovo Area, Kuznetsky Alatau Nature Reserve, Mt. Bolshaya Tserkovnaya, 26 air-km SSW of Belogorsk, 1,300–1,450 m a.s.l., upper timberline, 26.08.1993, leg. S.G. & V.G. — 1 ♀, 7 juv. (ZMUM), same locality, ca. 16 air-km SW of Belogorsk, Kiya River, Bezymianka River delta, riverine taiga, 14–17.07.1994, leg. S.G. & A.R. — 2 ♂♂ (ZMUM), same locality, delta of Bezymianka River, ca. 16 air-km SW of Belogorsk, *Abies sibirica* + *Pinus sibirica* taiga with *Betula*, *Salix* etc. along the stream, 420 m a.s.l., 01–05.09.1993. — 11 ♂♂, 10 juv. (ZMUM), same locality, delta of Malaya Bezymianka River, ca. 19 air-km SSW of Belogorsk, *Abies sibirica* + *Pinus sibirica* taiga, 500 m a.s.l., 27–31.08.1993, all leg. S.G. & V.G. — 25 juv. (ZMUM), same Area, Novokuznetsk District, ca. 10 air-km S of Kuzedeyevo, *Tilia* insular forest (= Lipovyi ostrov), 450–550 m a.s.l., 20–24.07.1994, leg. S.G. & A.R.

REMARKS: The species is only known from the Kemerovo Area, Siberia, its terra typica [Gulička, 1963], being quite

common in the Salair, Gornaya Shoriya, and Kuznetsky Alatau Mts.

Schizoturanus tabescens (Stuxberg, 1876)

Polydesmus tabescens Stuxberg, 1876a: 27, figs.

Polydesmus tabescens — Stuxberg, 1876b: 316.

Schizoturanus tabescens — Mikhajlova, 1993: 32, fig.

Material: 2 ♀♀ (ZMUM), Krasnoyarsk Prov., Turukhansk Distr., Mirnoe, 13–23.VI.1988. — 6 ♀♀, 6 juv. (ZMUM), same locality, 23.VI.1990. — 3 ♀♀, 3 juv. (ZMUM), same locality, 25.VI.1990. — 7 ♀♀ (ZMUM), same locality, 6–17.VII.1990. — 3 ♀♀, 2 juv. (ZMUM), same locality, 7.VII.1990. — 3 ♀♀, 1 juv. (ZMUM), same locality, 11.VII.1990. — 3 ♀♀, 2 juv. (ZMUM), same locality, environs of Bakhta, 13.VII.1995. — 5 juv. (ZMUM), same locality, Yeniseysk Distr., environs of Ust-Pit, 1995. — 1 ♀ (ZMUM), same Province, Predivinsk, 28.VI.1996; all leg. L.R.

REMARKS: Only known from several places in the Krasnoyarsk Province [cp. Mikhajlova, 1993]. As among the rather numerous samples only a single male has hitherto been encountered, perhaps this is evidence of parthenogenesis.

Uniramidesmus perplexus Mikhajlova, 1984

Uniramidesmus perplexus Mikhajlova, 1984: 456, figs.

Uniramidesmus perplexus — Mikhajlova, 1993: 33.

Material: 1 ♂ (IBSV), Irkutsk Area, Lake Baikal, environs of Bolshie Koty, *Pinus* + *Betula* forest, litter, 21.VI.1988. — 1 ♂ (ZMUM), same locality, environs of Maritui, *Betula* + *Alnus* forest, litter, moss, 9.VII.1988; all leg. A.T.

REMARKS: This species is only known from the Irkutsk Area, its terra typica [Mikhajlova, 1984].

A provisional list of Siberian Diplopoda

ORDER POLYZONIIDA

Family Polyzoneiidae

Genus *Angarozonium* Shelley, 1998

1. *Angarozonium amurense* (Gerstfeldt, 1859)

ORDER JULIDA

Family Julidae

Genus *Cylindroiulus* Verhoeff, 1894

2. *Cylindroiulus latestriatus* (Curtis, 1845)

Genus *Julus* Linnaeus, 1758

3. *Julus ghilarovi* Gulička, 1963

3a. *J. ghilarovi ghilarovi* Gulička, 1963

3b. *J. ghilarovi brachydactylus* Gulička, 1972

Genus *Megaphyllum* Verhoeff, 1894

4. *Megaphyllum* aff. *sjaelandicum* (Meinert, 1868)

Genus *Pacifiulus* Mikhajlova, 1982

5. *Pacifiulus amurensis* (Gerstfeldt, 1859)

Genus *Sibiriulus* Gulička, 1972

6. *Sibiriulus altaicus* Gulička, 1972

7. *S. dentiger* Gulička, 1963

8. *S. multiradicis* sp.n.

Family Nemasomatidae

Genus *Orinisobates* Lohmander, 1933

9. *Orinisobates microthylax* Enghoff, 1985

10. *O. sibiricus* (Gulička, 1963)

Julida nomina dubia

11. *Julus profugus* Stuxberg, 1876

12. *J. terrestris* Linnaeus, 1758

ORDER CHORDEUMATIDA

Family Altajellidae

Genus *Altajella* Gulička, 197213. *Altajella pallida* Gulička, 1972Genus *Teleckophoron* Gulička, 197214. *Teleckophoron montanum* Gulička, 1972

Family Anthroleucosomatidae

Genus *Ghilarovia* Gulička, 197215. *Ghilarovia kygae* Gulička, 197216. *G. novosibirica* Shear, 1988

Family Diplomaragnidae

Genus *Altajosoma* Gulička, 197217. *Altajosoma bakurovi* (Shear, 1990)18. *A. coxale* (Shear, 1990)19. *A. deplanatum* (Stuxberg, 1876)20. *A. golovatchi* (Shear, 1990)21. *A. katunicum* Mikhaljova, 200022. *A. kemerovo* (Shear, 1990)23. *A. shilenkovi* (Shear, 1990)Genus *Ancestreuma* Golovatch, 197724. *Ancestreuma feynmani* (Shear, 1990)25. *A. longibrachiatum* (Shear, 1990)26. *A. ramiferum* Mikhaljova, 200027. *A. ryvkini* (Shear, 1990)28. *A. subulatum* Mikhaljova, 2000Genus *Asiatyla* Mikhaljova, 200029. *Asiatyla communicantis* (Golovatch, 1977)30. *A. sajanica* (Gulička, 1972)31. *A. similata* Mikhaljova, 2000Genus *Orientyla* Mikhaljova, 200032. *Orientyla dahurica* (Gerstfeldt, 1859)Genus *Shearia* Mikhaljova, 200033. *Shearia calycina* Mikhaljova, 200034. *S. densecava* (Gulička, 1972)35. *S. khakassica* Mikhaljova, 200036. *S. oiskaya* Mikhaljova, 200037. *S. rybalovi* Mikhaljova, 200038. *S. shushenskaya* Mikhaljova, 200039. *S. teletskaya* Mikhaljova, 2000

Chordeumatida nomina dubia

40. *Craspedosoma armatum* (Gerstfeldt, 1859)41. *C. cylindricum* Stuxberg, 1876

ORDER POLYDESMIDA

Family Polydesmidae

Genus *Schizoturanius* Verhoeff, 193142. *Schizoturanius clavipes* (Stuxberg, 1876)43. *S. salairicus* (Gulička, 1963)44. *S. tabescens* (Stuxberg, 1876)Genus *Uniramidesmus* Golovatch, 197945. *Uniramidesmus perplexus* Mikhaljova, 1984

Conclusions

The millipede fauna of Siberia, an extremely vast region ranging from Transuralia in the west to the Chita and Irkutsk areas in the east, all known to be dominated by a very severe, sharply continental climate, permafrost and taiga or tundra vegetation on bogs, appears to be

unexpectedly relatively rich and diverse. This fauna is quite comparable to, though definitely somewhat poorer than, that of the Russian Far East: ca. 45 species or subspecies, 17 genera, 7 families and 4 orders versus 63 species, 26 genera, 15 families and 5 orders [Mikhaljova, 1998, 2000]. The bulk of millipede diversity is actually confined to the montane formations lying in the south of Siberia, where also endemism is particularly profound: Altai, Sayan, Khamar-Daban etc. In these mountains millipedes, first of all members of the order Chordeumatida, commonly reach the (sub)alpine belt.

Further to the north, especially over the vast plains of western, central and eastern Siberia, the fauna is particularly strongly impoverished and, though containing a few relatively widespread boreal/taiga forms like *Polyzonium amurense* or *Altajosoma golovatchi*, it seems to enjoy very few to no endemic species. Furthermore, not only the tundra belt in the Extreme North but also several regions in West Siberia like the Omsk, Tomsk and Tyumen areas which support taiga and/or small-leaved forest-steppe woodlands appear to be almost to totally devoid of Diplopoda. Several large rivers such as the Ob, Yenisey and some others seem to have served as the main pathways for northward dispersal of Diplopoda in Siberia. This is so because all major Siberian rivers run from south to north while their beds are about the only places in northern Siberia which are both rich in arboreal riverine vegetation and devoid of permafrost. In any event, permafrost seems to represent an environmental factor totally suppressing any diplopod fauna.

The Yenisey Valley, or Stegmann's line, appears to serve as a marked biogeographical barrier for certain millipedes as well [cf. Stegmann, 1938], the distribution of *Angarozonium* being a nice example of such a western range limit.

Endemism in Siberian Diplopoda is largely low-level, with four genera (*Sibiriulus*, *Ghilarovia*, *Altajella*, and *Teleckophoron*) and a single subendemic family (Altajellidae), largely in the order Chordeumatida, more or less restricted to the Altai Mountains with the adjacent Gornaya Shoriya, Salair, Kuznetsky Alatau Mts and, partly, West Sayan Mts. The fauna of these mountainous lands, though dominated by purely Siberian/local forms, still harbours several elements of the European faunal nucleus (e.g., *Julus*, *Megaphyllum*) [cp. Kime & Golovatch, 2000]. Some others are shared with Central Asia (*Orinisobates sibiricus*, *Schizoturanius*, Altajellidae) or the ancient Mediterranean (Anthroleucomatidae) [cf. Golovatch, 1984]. Regrettably, the faunas of the Rudnyi Altai, Tarbagatai and Saur mountains in the adjacent parts of East Kazakhstan are too poorly known to be properly compared in this context. In contrast, east of the Altai Mountains, endemism appears to decrease to finally become species-level only. Very few genera (*Angarozonium*, *Pacifiulus*, *Uniramidesmus*) and almost no species are shared by the diplopod faunas of Siberia and the Russian Far East; yet both regions are dominated by members of the family Diplomaragnidae. This family seems to have originated in Mongolia and/or adjacent parts of East Siberia whence several waves of eastward

and westward dispersal waves have obviously taken place [Shear, 1990; Mikhajlova, 2000]. The influence of the Siberian faunal nucleus in the west is currently delimited by the Siberian *Altajosoma golovatchi* encountered in the Urals and Cisuralia, and the neoendemic *Schizoturanus dmitriewi* (Timotheew, 1897) in the forest-steppe belt of the Russian Plain, Eastern Europe [Golovatch, 1992].

On the other hand, the Siberian fauna is still relatively poorly known. Not only do several species require a revision but also about any reasonable millipede collection from Siberia appears to yield new taxa. So both further collecting efforts over this vast territory and much more identification work are necessary to finally assess the fauna and distributions of Siberian Diplopoda.

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A new species of the millipede genus *Skleroprotopus* Attems, 1901 (Diplopoda: Julida: Mongoliulidae) from Korea

Новый вид двупарноногих многоножек рода *Skleroprotopus* Attems, 1901 (Diplopoda: Julida: Mongoliulidae) из Кореи

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KEY WORDS: Diplopoda, *Skleroprotopus*, new species, South Korea.

КЛЮЧЕВЫЕ СЛОВА: Diplopoda, *Skleroprotopus*, новый вид, Южная Корея.

ABSTRACT: A new millipede species, *Skleroprotopus ramuliferus* sp.n., is described from South Korea. It differs from congeners mainly by shape of the anterior branch of the posterior gonopod which is supplied with a pair of apical outgrowths, of which the external one looks like a slender serrate twig and the inner one oval, as well as by the rounded, semi-ellipsoid terminal segment of the male leg-pair 1.

РЕЗЮМЕ: Из Южной Кореи описан новый вид диплопод: *Skleroprotopus ramuliferus* sp.n. Этот вид отличается от других членов рода, главным образом, формой передней ветви задних гоноподий, которая заканчивается парой выростов, наружный из которых похож на зазубренную веточку, а внутренний округлен. Кроме того, вид отличается формой последнего членика первой пары ног самца в виде полуэллипса.

Like the entire family Mongoliulidae it belongs in, the prolific diplopod genus *Skleroprotopus* Attems, 1901 is typically Manchurian in terms of its distribution pattern, with its about 15 valid species restricted to Japan, Korea, northeastern China, and the Russian Far East [Attems, 1901; Verhoeff, 1939, 1941; Takakuwa, 1940a, 1940b, 1942; Takakuwa & Takashima, 1949; Miyosi, 1957a, 1957b; Shinohara, 1960; Murakami & Paik, 1968; Golovatch, 1979; Mikhailjova, 1982; Zhang, 1985]. Although the bulk of *Skleroprotopus* species diversity is confined to Japan, we would not claim this as the ultimate truth, since the diplopod fauna of China is too poorly known. Basically, the same concerns Korea whence only three species of *Skleroprotopus* have hitherto been recorded. The present paper puts on record a fourth Korean member of this genus described from the southern part of the peninsula. Yet even this discovery hardly changes the general picture that the distribution of *Skleroprotopus*, and of the Mongoliulidae as a whole,

displays a gradual but obvious decline toward the Sikhotealin Mountains in the north. Indeed, two species each of *Kopidoiulus* Attems, 1909 and *Skleroprotopus*, as well as a single species of *Ussuriulus* Golovatch, 1980, are the only representatives of Mongoliulidae occurring in the Russian Far East, all restricted to its southern part only [Mikhailjova, 1998].

Most of the type material is kept at the Chonbuk National University, Jeonju, Republic of Korea (ChNU), while a few duplicates have been shared with the collections of the Zoological Museum of the State University of Moscow, Russia (ZMUM) and of the Institute of Biology and Soil Science, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russia (IBSV), as indicated hereafter.

Skleroprotopus ramuliferus sp.n.

Figs 1–12.

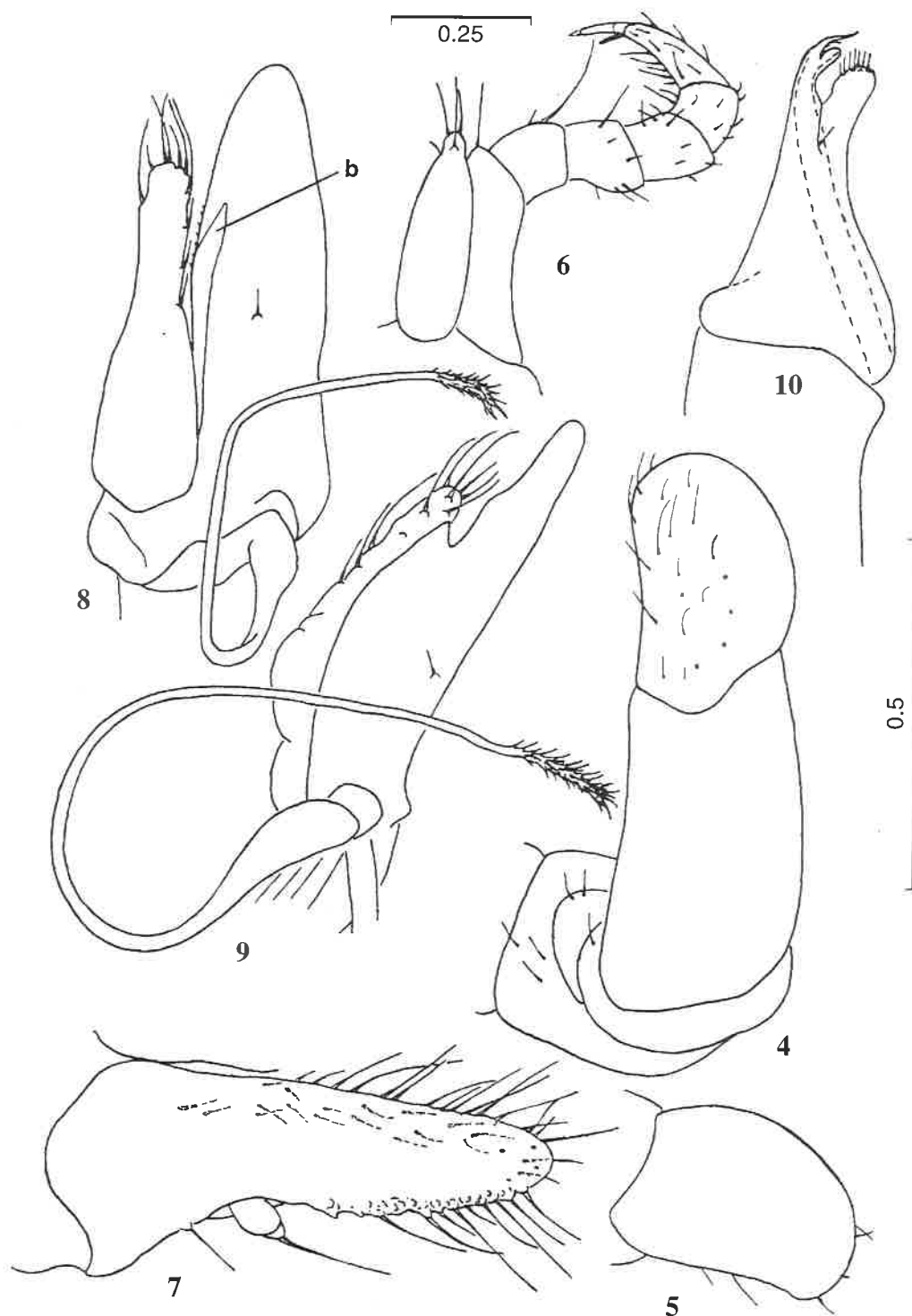
Holotype: ♂ (ChNU), Gyeonggi-do, Yangpyeong, 18.V.1991; leg. K.Y. Lim. — Paratypes: 1 ♂, 1 ♀ (IBPV), 1 ♂, 1 ♀ (ZMUM), 5 ♂♂, 2 ♀♀, 1 juv. (ChNU), same locality, together with holotype, 18.V.1991; leg. K.Y. Lim.

NAME: The species epithet refers to the serrate twig of the posterior gonopod anterior branch.

DIAGNOSIS: The shape of the posterior gonopod anterior branch with a pair of apical outgrowths, of which the external one like a slender serrate twig and the inner one oval, as well as the rounded semi-ellipsoid terminal segment of the male leg-pair 1 separate the new species from others.

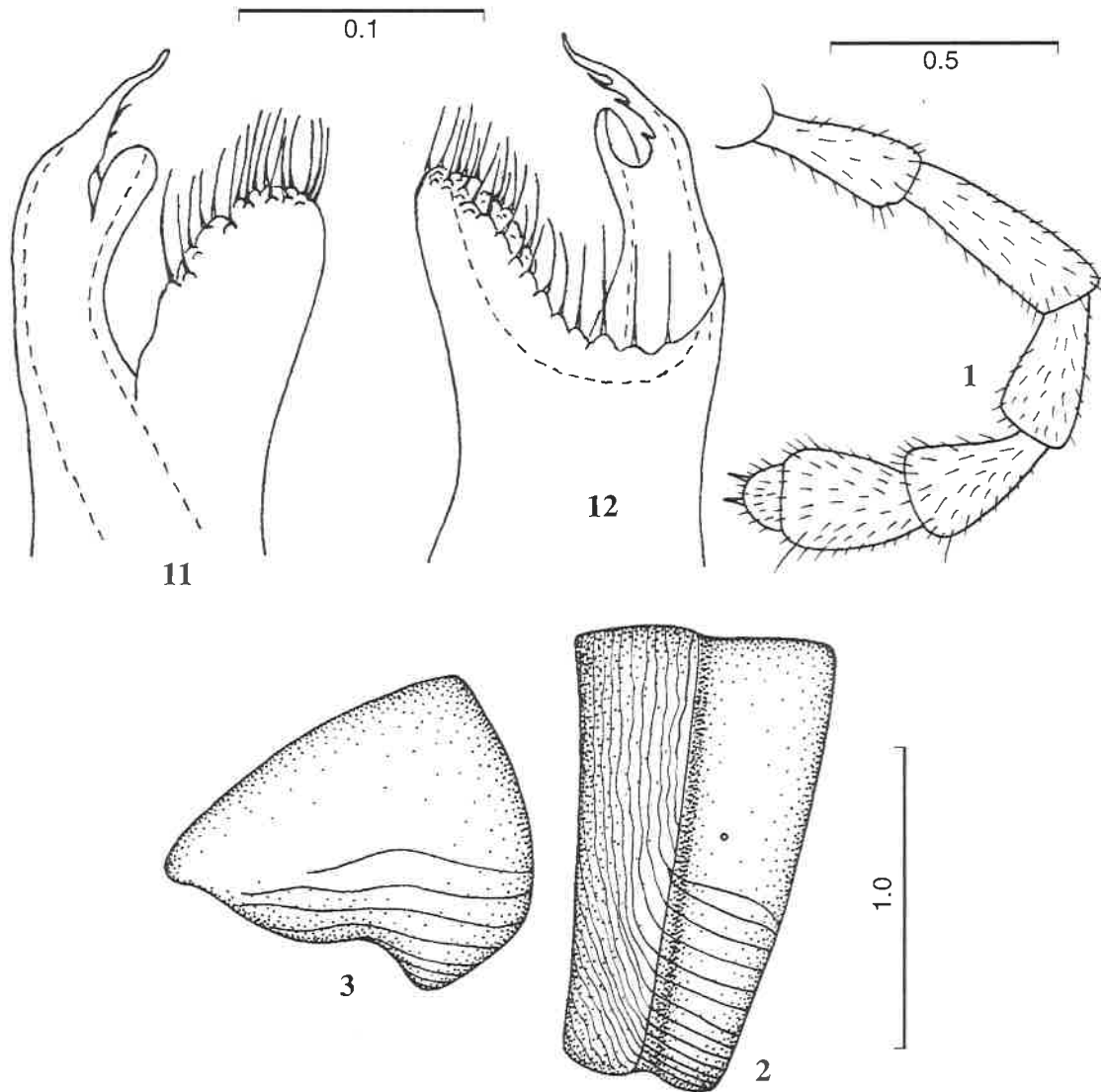
DESCRIPTION: Male. Body 28–38 mm long, 1.5–1.9 mm in diameter. Body segments without telson up to 58(-1), mostly between 47(-2) and 53(-2); in subadult male 47(-4). Prozona dark brown with a light fore portion. Metazona light brown with yellowish or brownish marble spots dorsally and laterally, as well as below and above ozopore. Latter placed in the middle of a small, brownish, vague spot. Legs and antennae brown, eyes black.

Body subcylindrical, smooth. About 40 (in medium-sized examples) to 50 (in larger specimens) ocelli in an oval-triangular eye-patch on each side of head. Vertigial setae absent, epicranial suture poorly developed. Supralabral se-



Figs 1–12. *Skleroprotopus ramuliferus* sp.n., ♂ paratype: 1 — antenna; 2 — somite 8; 3 — collum; 4 — leg-pair 1 (caudoventral view); 5 — terminal segment of leg-pair 1 (frontoventral view); 6 — leg-pair 2 (caudal view, apex of claw broken off); 7 — leg-pair 7 (caudal view); 8 — anterior gonopod (caudal view); 9 — same (mesal view); 10 — posterior gonopod (mesal view); 11 — distal part of posterior gonopod (mesal view); 12 — same (lateral view); b — lobe of anterior gonopod coxal process. — Scale bars in mm.

Рис. 1–12. *Skleroprotopus ramuliferus* sp.n., самец-паратип: 1 — усик; 2 — 8-й сегмент тела; 3 — коллум; 4 — 1-я пара ног (задне-вентральный вид); 5 — последний членик 1-й пары ног (передне-вентральный вид); 6 — 2-я пара ног (вид сзади, вершина коготка обломлена); 7 — 7-я пара ног (вид сзади); 8 — передний гоноподий (вид сзади); 9 — то же (вид изнутри); 10 — задний гоноподий (вид изнутри); 11 — дистальная часть заднего гоноподия (вид изнутри); 12 — то же (вид сбоку); b — лопасть коксального отростка передних гоноподий. — Масштаб в мм.



tae 2+2, labral setae 9+9, 10+10 or 11+11. Genae with two short ventral outgrowths. Gnathochilarium with three setae on stipes, a stretched and prominent promentum, and 6–7 setae on each lamella lingualis. Antennae (Fig. 1) relatively short, clavate, without sensory bacilli. Prozona (Fig. 2) with uneven striations directed obliquely laterally and increasingly transversely dorsad. Metazona (Fig. 2) with distinct striae below ozopores. Collum (Fig. 3) with 8–9 striae of varying length laterally. Ozopores small, beginning from segment 6, lying behind and set off from suture dividing pro- and metazona. Telson setose along hind margin, without epiroct. Each anal valve and an oval subanal scale with two setae.

Legs moderately long, slender, claws long with an additional claw at base. Leg-pair 1 (Figs 4 & 5) very strongly enlarged dorsoventrally, flattened, curved forward. Its terminal segment rounded, half-ellipsoid with thin setae both caudally and mesally, 3th segment longest, covered with tiny setae on front surface and laterally. Penes subconical, with three long setae apically (Fig. 6). Leg-pair 7 (Fig. 7) with a 2-segmented telopodite and a tongue-shaped coxal process

bearing long setae both frontally, mesally and laterally. Anterior gonopods (Figs 8 & 9) with 1-segmented, slightly flattened telopodites bearing long setae both apically and mesally. Coxal process flat, lateral edge curved caudally, lobuliform (b), pointed apically. Lateral surface of coxal process beset with tiny setae. Parabasal long flagella with thin spines apically. Posterior gonopods (Figs 10–12) bifid, anterior branch with a pair of apical outgrowths, of which external one like a slender serrate twig and inner one rounded, posterior branch mesally with a spoon-shaped excavation, latter's both inner surface and external edge covered with long setae.

Female. Body 36–39 mm long, 2.1–2.25 mm in diameter. About 50 ocelli. Body segments without telson up to 63(-1), largely between 52(-2) and 56(-1). Coloration as in male except for lateral and dorsal spots which can be smaller in size. Other nonsexual characters as in ♂.

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On two new and one little-known species of the centipede genus *Geophilus* Leach, 1817 from Kirghizia (Chilopoda: Geophilida: Geophilidae)

Два новых и один малоизвестный виды губоногих рода *Geophilus* Leach, 1817 из Киргизии (Chilopoda: Geophilida: Geophilidae)

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KEY WORDS: Chilopoda, *Geophilus*, taxonomy, new species, Kirghizia, Central Asia.

КЛЮЧЕВЫЕ СЛОВА: Chilopoda, *Geophilus*, таксономия, новые виды, Киргизия, Средняя Азия.

ABSTRACT: Fresh material of *Geophilus* from Kirghizia contains three species, including two new, *G. readae* sp.n. and *G. rouncei* sp.n., and one poorly-known, *G. parthorum* Pocock, 1891. The latter species is redescribed, representing the first formal record in Kirghizia.

РЕЗЮМЕ: Свежий материал, представляющий род *Geophilus* в Киргизии, содержит три вида, включая два новых (*G. readae* sp.n. и *G. rouncei* sp.n.), а также один слабоизученный (*G. parthorum* Pocock, 1891). Последний вид переописан и формально впервые отмечается в Киргизии.

Introduction

Knowledge of the Central Asian myriapod fauna is still very scanty. Not too much of a surprise, any larger expedition to the region, especially to its huge high-montane systems, reveals new and poorly-known species.

In late May to early June of 1993, an international expedition went to the Tien-Shang and Kichik Alai Mountains focusing, among other things, on collecting myriapods [Read & Golovatch, 1994]. Among the centipedes taken by that expedition, only lithobiomorphs have been treated [Eason, 1997]. This, coupled with Zalesskaja's [1978] monograph on the Lithobiomorpha of the former Soviet Union, definitely makes the Central Asian fauna of this centipede order the best known among all Chilopoda.

The present paper puts on record three species of the prolific Holarctic geophilomorph genus *Geophilus* Leach, 1817, all collected in Kirghizia, while species of *Escaryus* Cook & Collins, 1891 will be dealt with at a later date. Amongst the three species concerned, two appear to be new to science while the third proves to be new to the fauna of Kirghizia.

All type and the bulk of non-type material is housed in the collection of the Zoological Museum of the Moscow State University (ZMUM), while some non-type duplicates are retained in the author's personal collection (RJ) and the British Museum of Natural History, London, (BMNH).

Systematics

Family Geophilidae

Genus *Geophilus* Leach, 1817

Pleurogeophilus Verhoeff, 1901

Taschkentia Verhoeff, 1930

Geophilus parthorum Pocock, 1891

Figs 1–11.

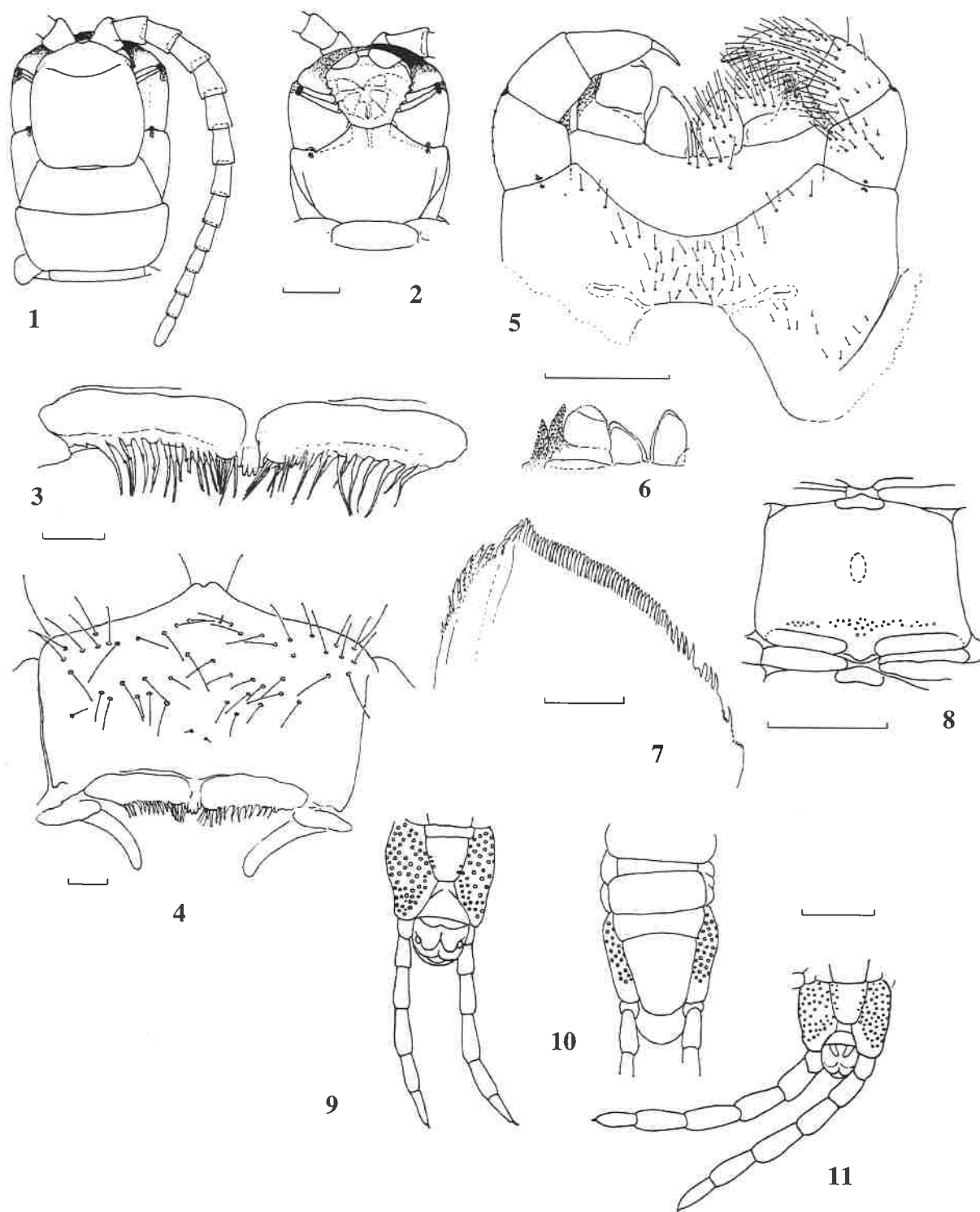
Pleurogeophilus(?) *procerus*(?) (L. Koch) — Lignau, 1929;

Taschkentia armata Verhoeff, 1930;

Taschkentia parthorum (Pocock, 1891) — Crabill, 1962.

Type *Geophilus parthorum* Pocock, 1891. British Museum (Natural History), accession No. [1889.3.28.9]

Material examined: 1 ♀ (ZMUM 6966), Kirghizia, Tien-Shang Mts, Fergansky Mt. Ridge, Baubash-Ata Mts, near Yarodar, 1,400–1,700 m a.s.l., *Juglans regia* forest, litter & under bark 16–17.05.1993, S. Golovatch. — 1 ♀, 1 juv (RJ), same locality, Yarodar Research Station near Arslanbob, 72°58'E 41°22'N, *Juglans regia* woodland, ravine W of research station, under stones, 1,400 m a.s.l., 17.05.1993. — 1 ♀ (ZMUM 6967), same locality, mixed deciduous woodland behind research station, 72°58'E 41°22'N, 1,400 m a.s.l., 18.05.1993, all leg. H. Read. — 1 ♀ (RJ), same locality, 18.05.1993, leg. W. Schawaller. — 1 ♂ (ZMUM 6968), Fergansky Mt. Ridge, Alash-Tau Mts, ca. 6 km S of Alash, 1,250–1,550 m a.s.l., 25–26.5.1993, leg. S. Golovatch. — 1 ♂ (ZMUM 6969), Chatkalsky Mt. Ridge, Sary-Chelek Nature Reserve, 71°57'E 41°51'N, 1,500–1,950 m a.s.l., 28–31.05.1993, leg. D. Milko. — 1 ♂ (ZMUM 6970), same locality, 71°57'E 41°51'N, 1,500–1,600 m a.s.l., 27–31.05.1993, leg. W. Schawaller. — 1 ♂ (ZMUM 6962), same locality, 1,550–2,200 m a.s.l., forest, 29–31.05.1993, leg. S. Golovatch. — 1 ♂ (RJ), same locality, 71°57'E 41°51'N, 1,950 m a.s.l., close to Lake Sary-Chelek, in *Picea* litter,



Figs 1-11. *Geophilus parthorum* Pocock: 1 — head & antenna from above; 2 — head & forcipules from below; 3 — labrum; 4 — clypeus; 5 — 1st & 2nd maxillae; 6 — 1st maxillae; 7 — mandible; 8 — sternite of 10th segment; 9-11 — last segment: 9 — from below, ♀; 10 — from above, ♀; 11 — from below, ♂. Scale bar = 0.1 mm (3,4,7), 0.5 mm (1,2,5,6,8), 10 mm (9-11).

Рис. 1-11. *Geophilus parthorum* Pocock: 1 — голова и антенна сверху; 2 — голова и ногощелюсти снизу; 3 — лабрум; 4 — клипеус; 5 — 1-я и 2-я максиллы; 6 — 1-я максилла; 7 — мандибула; 8 — стернит 10-го сегмента; 9-11 — последний сегмент: 9 — снизу, ♀; 10 — сверху, ♀; 11 — снизу, ♂. Масштаб 0,1 мм (3,4,7), 0,5 мм (1,2,5,6,8), 10 мм (9-11).

28.05.1993. — 1 ♂ (ZMUM 6971), same locality, 71°57'E 41°51'N, 1,200 m a.s.l., deciduous woodland between buffer zone + reserve, under stones. 28.05.1993. — 1 ♂ (ZMUM 6972), same locality, 71°57'E 41°51'N, Tumanyak Valley, 1,500 m a.s.l., open *Juglans regia* woodland, under logs & stones, 29.05.1993. — 1 ♂ (ZMUM 6973), same locality, 71°57'E 41°51'N, Meteorological Station, 1,500 m a.s.l., *Juglans* & *Malus* woodland, under logs & in litter, 31.05.1993. — 1 ♂, 1 ♀ (BMNH Acq.-No. 2000-240), same locality, 71°57'E 41°51'N, Karagaily Valley, 1,500 m a.s.l., *Picea* stand, in *Picea* litter, 29.05.1993. — 1 ♀ (ZMUM 6974), Kichik Alai Mts, Karachoy, 72°38'E 40°3'N, upper reaches of Kirghizata River, W of research station, under stones on edge of meadow + in dry river bed, 2,400 m a.s.l., 21.05.1993, all leg. H. Read.

REDESCRIPTION: Length up to 89 mm. Number of segments: 63–75 (69–75 in this collection, Verhoeff gives 63–67, Lignau 69).

Antennae 4X length of head capsule, each antennomere long (ca. 2:1 length:width), last greatly exceeded by previous two. Covered with short dense hairs throughout.

Head capsule: Length ca. equalling width, sides convex, front edge slightly angled on each side (Fig. 1).

Forcipular tergite 3:1 trapezoid in shape, basal plate present. From above, forcipules very prominent and surrounding the head capsule (Fig. 1).

Forcipular segment broadly oval with coxosternite being broader than long, and femuroid short and unarmed. Concavity of poison claw smooth, basal node small. Poison claws reaching just beyond head capsule, chitin lines abridged (Fig. 2).

Clypeus: A row of 12+15 postantennal setae, 10+11 medial setae and 1+1 prelabral setae (Fig. 4).

Labrum divided into three parts, 4 blunt central teeth plus 1 on each side and 18+21 fimbriae on sides. Some of the fimbriae showing division along their length (possibly due to regrowth after breaking?) (Fig. 3).

First maxillae with long lappets on coxosternum and telopodite. Numerous setae on both telopodite and coxal projections of coxosternum, some on coxosternum proper as well (Figs 5 & 6).

Second maxillae with numerous setae on coxosternum and also on telopodite. Claw of telopodite simple (Fig. 5).

Mandible (Fig. 7) with pectinate lamellae, latter growing more complex at end of row.

Trunk: Carpophagus structure present until transition (at about segment 20) [Eason, 1964]. A slight depression in the centre of each segment. Pores in a transverse band at rear of each segment, the diagram in Verhoeff [1930: Abb. 13] being incorrect. 'Pores' shown over the rest of the segment are actually very small spines which look like pores if not seen in complete focus (Fig. 8). Pores extending to last segment though becoming fewer in number. Pores also present on precoxae and metacoxae.

Metatergite (Fig. 10) longer than broad, with a rounded end.

Metasternite (Figs 9 & 11) similar but much smaller. Coxopleuron containing numerous coxal glands covering the surface both dorsally and ventrally. Last legs of female long and thin (Fig. 9), last legs of male only slightly fatter (Fig. 11).

REMARKS: There is a small specimen 28 mm long, 75 pairs of legs but with only one pore in the centre of the coxae of the last legs. Everything else tallies with *G. parthorum* but has a juvenile feel about it. I submit that it is probably an early adolescens of *G. parthorum* but it will need more research into its life history to be sure.

Geophilus parthorum was described by Pocock [1891] from Samarkand, Russian Turkestan (now in Uzbekistan). Later, Lignau [1929] described rather inadequately what he thought to be *Pleurogeophilus(?) procerus(?)* (L. Koch) but he did not compare it to *G. parthorum*. Verhoeff [1930]

described a new genus and species, *Taschkentia armata*, but did not compare it to *G. parthorum* either. Crabill [1962], in a review of types in the British Museum (Natural History), concluded that *G. parthorum* was the same species as *Taschkentia armata* and called it *Taschkentia parthorum* (Pocock, 1891). I have decided to allocate the species in *Geophilus*, where Pocock originally placed his *G. parthorum*, as I can see no major differences between these species and other members of the genus.

This species is formally new to the fauna of Kirghizia.

Geophilus readae sp.n.

Figs 12–23.

Holotype ♀ (ZMUM 6964), Kirghizia, Tien-Shang Mts, Chatkalsky Mt. Ridge, Sary-Chelek Nature Reserve, 71°57'E 41°51'N, 1,500 m a.s.l., Karagaily Valley, *Picea* stand, in *Picea* litter, 29.05.1993, leg. H. Read. — Paratypes: 2♀♀ (ZMUM 6965), Fergansky Mt. Ridge, Baubash-Ata Mts, near Yarodar, 1,400–1,700 m a.s.l., *Juglans* forest, litter & under bark, 16–17.05.1993, leg. S. Golovatch.

NAME: Dedicated to Dr. Helen Read who, with Dr. Sergei Golovatch, collected most of the specimens.

DIAGNOSIS: 73–75 pairs of legs, chitin lines abridged, basal node of poison claw present, first maxilla with two large lappets, mandible pectinate, carpophagus pits present until the transition, lateral, proximal pore fields becoming fewer in numbers towards the end, coxopleural glands of last legs single, anal glands present.

DESCRIPTION: Length up to 28 mm. Number of segments 73–75.

Antennae just over 3X length of head capsule, 2nd antennomere slightly longer than wide, gradually reducing along antennae until penultimate, latter as long as wide, last antennomere equalling previous two (Fig. 17), setae moderate throughout.

Head capsule slightly longer than wide, with concave sides, front slightly narrower, rear concave (Fig. 12).

Forcipular tergite 2.5:1 roughly trapezoid, basal plate present.

Forcipules reaching the front of head capsule, unarmed and with a very small basal node, concavity of poison claws smooth, chitin lines abridged (Fig. 13).

Clypeus: 1+1 postantennal setae, 4+4 medial setae and 1+1 prelabral setae (Fig. 16).

Labrum divided into three parts, 3–5 blunt central teeth and about 10–13 fimbriae on sides, mostly at central end of side-pieces (Figs 14 & 15).

First maxillae with very long lappets on coxosternum and telopodite. Numerous setae on both telopodite and coxal projections of coxosternum, some on coxosternum proper as well (Figs 18 & 19).

Second maxillae with numerous setae on coxosternum and also telopodite. Claw of telopodite simple (Fig. 18).

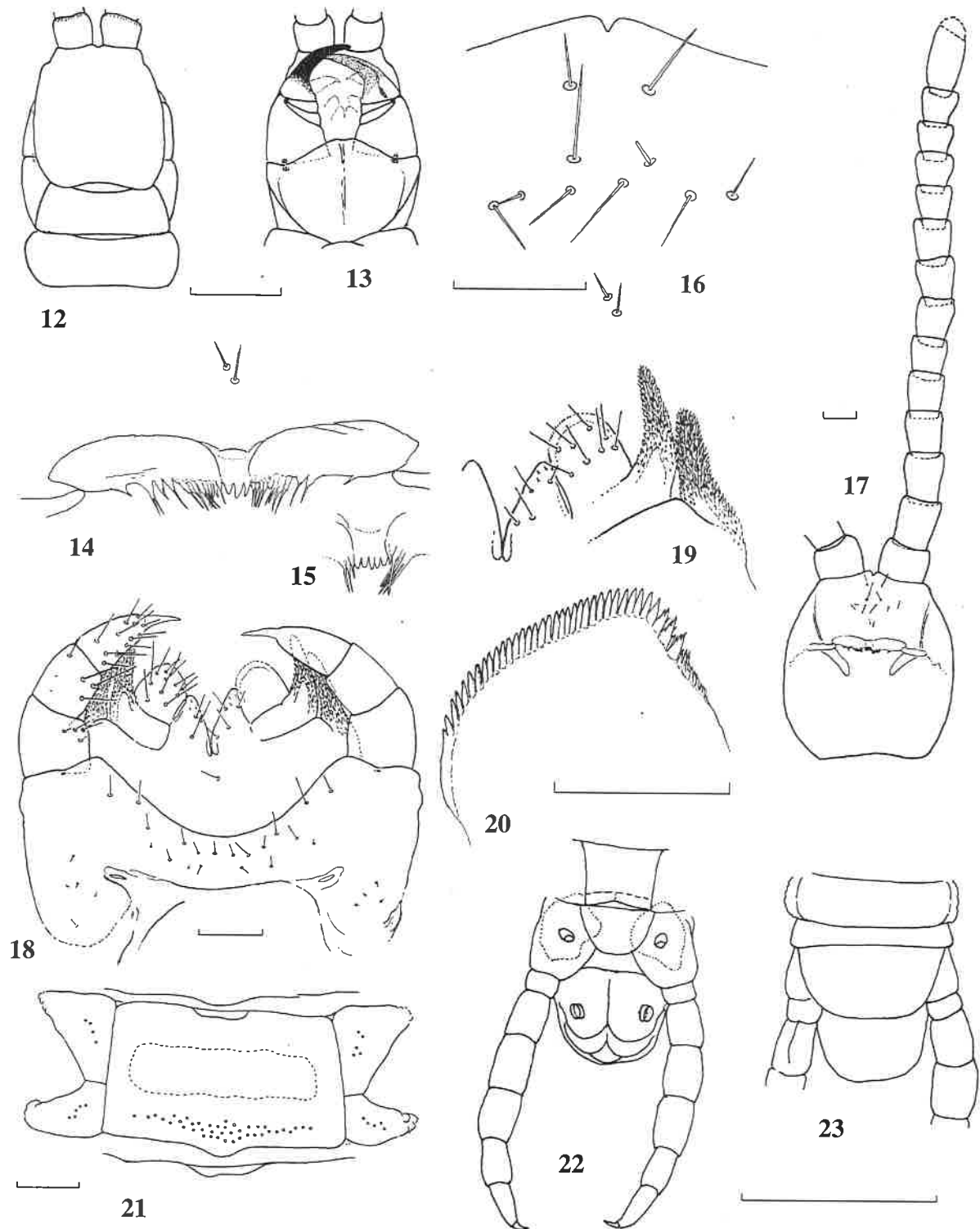
Mandible (Fig. 20) with pectinate lamellae, latter becoming more complex at end of row.

Trunk: Carpophagus structure present until transition and reduced reticulation in the centre of segments. Pores in a band at rear of each segment, extending to last segment though becoming fewer in number (Fig. 21). Pores also present on precoxae and metacoxae.

Metatergite (Fig. 23) broader than long (about 2:1), with rounded corners.

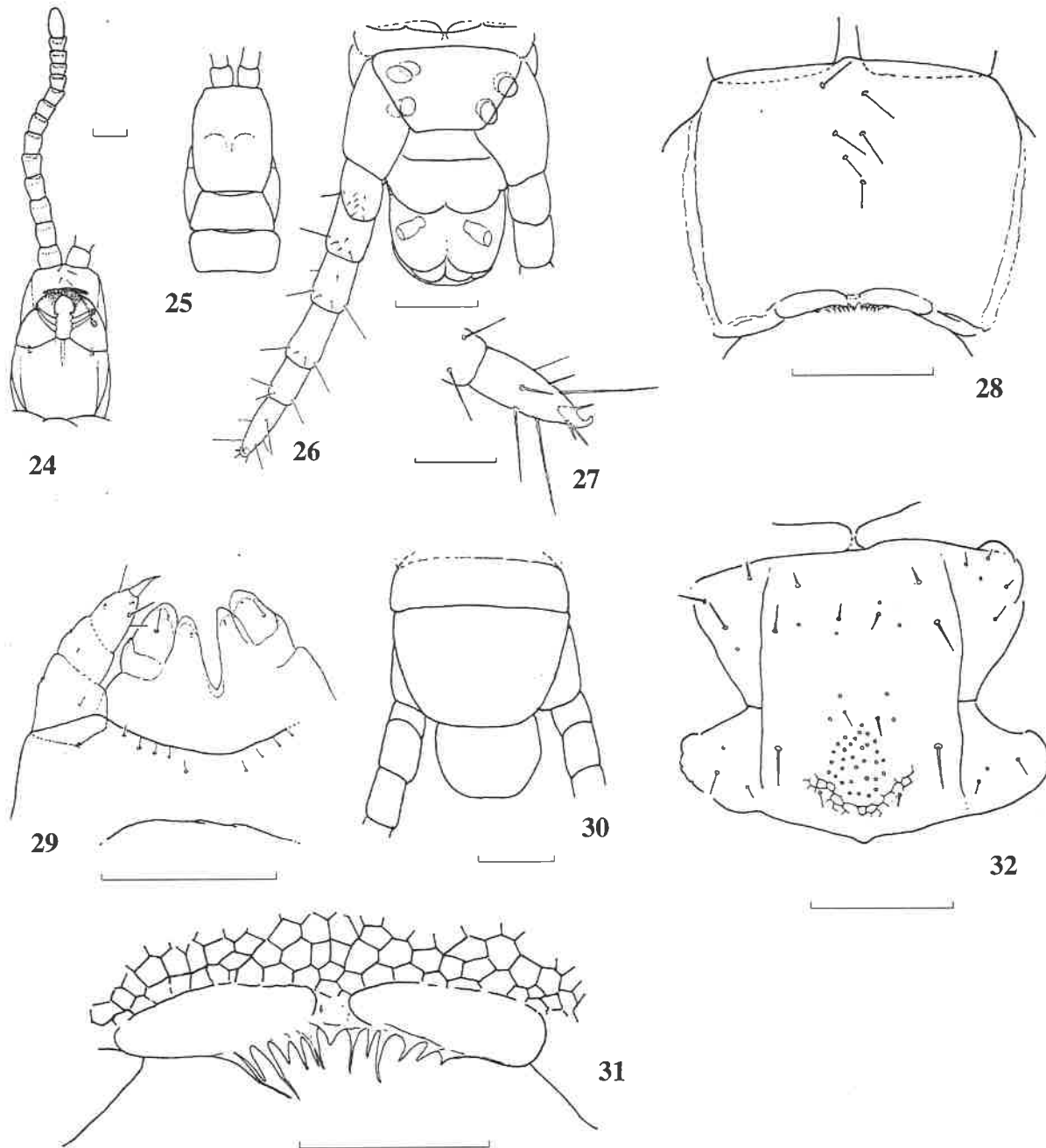
Metasternite (Fig. 22) similar but much smaller.

Last legs: Female slightly swollen, coxopleuron containing a large, single gland. Anal pores present and very large (Fig. 22), male unknown.



Figs 12-23. *Geophilus readae* sp.n.: 12 — head from above; 13 — head & forcipules from below; 14 — labrum; 15 — central labrum of second specimen; 16 — clypeus; 17 — head capsule and left antennae from below; 18 — 1st & 2nd maxillae; 19 — 1st maxilla; 20 — mandible; 21 — sternite of 10th segment; 22-23 — last segment: 22 — from below, ♀; 23 — from above. Scale bar = 0.1 mm (14-21), 0.5 mm (12,13,22,23).

Рис. 12-23. *Geophilus readae* sp.n.: голова сверху; 13 — голова и ногоочелюсти снизу; 14 — лабрум; 15 — центральный лабрум 2-го экземпляра; 16 — клипеус; 17 — головная капсула и левая антенна снизу; 18 — 1-я и 2-я максиллы; 19 — 1-я максилла; 20 — мандибула; 21 — стернит 10-го сегмента; 22-23 — последний сегмент: 22 — снизу, ♀; 23 — сверху. Масштаб 0,1 мм (14-21), 0,5 мм (12,13,22,23).



Figs 24–32. *Geophilus rouncei* sp.n.: 24 — head, forcipules & antenna from below; 25 — head & forcipular segment from above; 26 — last segment from below, ♀; 27 — claw of the right, last leg; 28 — clypeus; 29 — 1st & 2nd maxillae; 30 — last segment from above; 31 — labrum; 32 — sternite of 10th segment. Scale bars = 0.05 mm (27, 31), 0.1 mm (24–26, 28–30, 32).

Рис. 24–32. *Geophilus rouncei* sp.n.: 24 — голова, ногочелюсти и антенна снизу; 25 — голова и сегмент ногочелюстей сверху; 26 — последний сегмент снизу, ♀; 27 — коготок правой последней ноги; 28 — клипеус; 29 — 1-я и 2-я максиллы; 30 — последний сегмент сверху; 31 — лабрум; 32 — стернит 10-го сегмента. Масштаб 0,05 мм (27, 31), 0,1 мм (24–26, 28–30, 32).

Geophilus rouncei sp.n.

Figs 24–32.

Holotype ♀ (ZMUM 6963), Kirghizia, Tien-Shang Mts, Chatkalsky Mt. Ridge, Sary-Chelek Nature Reserve, 71°57'E 41°51'N, Karagaily Valley, 1,500 m a.s.l., *Picea* stand, in *Picea* litter, 29.05.1993, leg. H. Read.

NAME: Dedicated to Mr. Rounce, the estate agent who does my photocopying.

DIAGNOSIS: 39 pairs of legs, basal node of poison claw present, very small lappet on telopodite of first maxilla, mandible pectinate, pores in roughly circular grouping until segment 14, coxopleural glands of last legs 2 + 2, anal glands present.

DESCRIPTION: Length up to 12 mm. Number of segments 39.

Antennae 3X length of head capsule, antennomeres about 1.5:1 length to breadth (2nd antennomere) to 1:1 in penultimate, last antennomere equalling previous two (Fig. 24), setae sparse.

Head capsule equalling roughly 3:4 breadth to length, with concave sides, rear being almost straight (Fig. 25).

Forcipular tergite just over 2:1, roughly trapezoid with front edge curved to show basal plate (Fig. 25).

Forcipules with abridged chitin lines and basal nodes on poison claws, reaching to under one quarter of head capsule approximately when closed (Fig. 24).

Clypeus with 1+1 postantennal setae and 2+2 medial setae (Fig. 28).

Labrum tripartite with 7+6 fimbriae on inner half of side-pieces and a large tooth on mid-piece (Fig. 31).

First maxillae with a small lappet on telopodite plus one seta and one microseta on each telopodite, and one microseta on coxal processes (Fig. 29).

Second maxillae with a few setae on telopodite and a sharp claw (Fig. 29).

Mandible of *Geophilus* type.

Trunk pores in a roughly circular grouping at rear of each sternite until transition (about segment 14) (Fig. 32). Also a few scattered pores across front end of sternite as well as a poorly visible pore or two on precoxae and metacoxae.

Metatergite (Fig. 30) broader than long (about 3:2) with rounded corners.

Metasternite (Fig. 26) trapezoid with a straight end. Coxopleuron containing 2+2 glands.

Last legs: Female not much fatter than walking legs (Figs 26 & 27), male unknown.

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