

**New species of the genus *Macrostylis* G.O. Sars, 1864
(Crustacea: Isopoda: Macrostylidae)
from the abyssal and ultraabyssal zones of the Indian Ocean**

**НОВЫЕ ВИДЫ РОДА *Macrostylis* G.O.Sars, 1864 из абиссали
и ультраабиссали Индийского океана
(Crustacea: Isopoda: Macrostylidae)**

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КЛЮЧЕВЫЕ СЛОВА: Isopoda, *Macrostylis*, новые виды, абиссаль, ультраабиссаль, Индийский океан.

ABSTRACT. The descriptions of four new species from the genus *Macrostylis* G.O. Sars, 1864 (collections R/V “Vityaz” from the eastern part of the Indian Ocean) are given. *Macrostylis pectorosa* sp.n. (29°43’ S, 89°53’ E; 2807 m) differs from the closely related species by the following characters: the considerably smaller sizes, single pointless sternal spine in the pereonal anterior division, proportions of the antenna I and structure of the pereopod III — from *M. caribbicus* Menzies, 1962; the absence of pits on tergites, morphology of the antenna I, configuration of the pereopod III ischiopodite and structure of operculum — from *M. foveata* Mezhev, 2000; the macrosculptural peculiarities of tergite IV, morphology of the cutting margin of mandible, comparatively narrower epipodite and palp of maxillipede, relatively elongated pereopods — from *M. squalida* Mezhev, 2000. *M. pumicosa* sp.n. (4°59’ N, 90°47.5’ E; 2917 m) differs from the related *M. rectangulata* Mezhev, 1989 by the cavernousity of dorsal covers and absence of their setation, configuration of the pereonal anterior division and correlation of the tergites composing it, configuration of pleotelson, morphology of the pereopod III ischiopodite and meropodite and angularly tapered distal end of the second pleopod. *M. diatona* sp.n. differs from the related *M. hadalis* Wolff, 1956 by the shortened pleotelson with the larger mediobasal lobe, the narrower operculum with smaller (half?) number of bristles on the distal margin, the clavate distal parts of the pleopod I hyaline processes; from the related *M. longiuscula* Mezhev, 1981 new species differs by the configuration of pleotelson, morphological peculiarities of the pereopod III ischiopodite and meropodite, the visible less curved hyaline processes of pleopod I. *M. fragosa* sp.n. differs from the related *M. reticulata* Birstein, 1963 by the twin pits on tergites IV–VII, the

rounded lateral surfaces of pleotelson and relatively broadened operculum with the distinctly truncated narrow distal margin.

РЕЗЮМЕ. Приведены описания четырех новых для науки видов рода *Macrostylis* G.O.Sars, 1864 (сборы э/с «Витязь» из восточной части Индийского океана). *Macrostylis pectorosa* sp.n. (29°43’ ю.ш., 89°53’ в.д.; 2807 м) отличается от близких видов следующими признаками: значительно меньшими размерами, единственным притупленным стермальным шипом в переднем отделе переона, пропорциями антенны I и строением переопода III — от *M. caribbicus* Menzies, 1962; отсутствием ямок на тергитах, морфологией антенны I, формой исхиоподита переопода III и строением оперкулома — от *M. foveata* Mezhev, 2000; макроскульптурными особенностями тергита IV, морфологией режущего края мандибулы, сравнительно более узкими эпиподитом и щупиком ногочелюсти, относительно удлиненными переоподами — от *M. squalida* Mezhev, 2000. *M. pumicosa* sp.n. (4°59’ с.ш., 90°47,5’ в.д.; 2917 м) отличается от сходного с ним *M. rectangulata* Mezhev, 1989 нездреватостью дорсальных покровов и отсутствием их щетинкового покрытия, формой переднего отдела переона и соотношением составляющих его тергитов, формой плеотельсона, морфологией исхиоподита и мероподита переопода III и угловато оттянутым дистальным концом второго плеопода. *M. diatona* sp.n. отличается от близкого ему *M. hadalis* Wolff, 1956 укороченным плеотельсоном с более крупной медиодистальной лопастью, более узким оперкуломом с меньшим (примерно вдвое) количеством щетинок на дистальном крае, булавовидными дистальными частями гиалиновых отростков плеопода I; от *M. longiuscula* Mezhev, 1981 новый вид отличается формой плеотельсона, морфологичес-

кими особенностями исхиоподита и мероподита переопода III, заметно менее изогнутыми гиалинными отростками плеопода I. *M. fragosa* sp.n. отличается от близкого *M. reticulata* Birstein, 1963 парными ямками на тергитах IV–VII, округленными латеральными поверхностями плеотельсона и относительно расширенным оперкулюмом с заметно усеченным узким дистальным краем.

Four new species *Macrostylis*, three from the abyssal zone and one from the ultraabyssal zone, are defined from the collections of R/V "Vityaz" (voyages 31, 33, 35 and 36; east part of the Indian Ocean) as new for science. Their descriptions make a main content of this paper. The most important characteristics of the material collection places are shown in the Table 1. Type specimens of the new species are deposited in the Zoological Museum of the Moscow State University.

Macrostylis pectorosa sp.n.

Table 1, Fig. 1.

MATERIAL. Holotype ♀ with empty marsupium of length about 3.3 mm (posterior division of pereon and pleotelson are strongly damaged), No. Mc-1372, station 4575.

DESCRIPTION. Female about 3.3 mm long. Body length approximately 4 times more than maximal width; covers of body granulated, with distinct reticular design; macrosculpture expressed by one small mediofrontal convexity and two wide orbicular near-lateral excavations on tergite IV; setation consists of rather numerous short hairs located in the main on dorsolateral parts of head and other segments.

Head semicircular, maximal width almost 1.3 times more than length and 1.85 times more than width of frontal margin; lateral surfaces uniformly convex; frontal margin with insignificant excavation in medial third.

Anterior division of pereon keg-like, length 1.1 times less than maximal width; tergite I 1.1 times longer than tergite II and 1.3 times shorter than tergite III; anterolateral and posterolateral parts angular; sternal surface differentiated segmentally by shallow transversal grooves and forms large angular projection in the field of sternites I–II, with short roundly pointless spine frontally.

Tergite IV poorly broaden frontally, length approximately 2.9 times less than maximal width; lateral surfaces uniformly convex; sternite swelled.

Tergites V–VI presumably with tapered posterolateral parts; sternite VII with small spine directed inferocaudally.

Pleotelson presumably ovoid, with uniformly convex dorsal surface, angular posterolateral projections and round-

ed mediiodistal lobe; caudal organs not visible, slot-like apertures transversal.

Antenna I consists of 5 articles, their length ratios from basal to distal: 1 : 0.70 : 0.45 : 0.45 : 0.40; distal article with one aesthetasc of average length. Antenna II 5.2 times longer than antenna I and reaching to posterior third of tergite III being unbended backwards; flagellum consists of 7 articles; rudiment of exopodite one-articled. Cutting edge of mandible smoothed, with two roundly pointless teeth on margins; movable plate with 3 digitate denticles; in tooth row approximately 9 sawtooth bristles; tooth process hemispherical, with 10 long bristles on end of shortly and narrowly tapered distal part. Epipodite of maxillipe semileaf-like, length 3.3 times more than maximal width; extero-lateral margin with insignificantly excavate distal half.

Ischiopodite of pereopod III elongated-triangular, length 1.6 times more than maximal width; lobe low, widely angular, with pair rather long forked thickened bristles on top; combs of meropodite and carpopodite include 7 and 6 bristles accordingly.

Operculum tongue-like, maximal width 1.5 times less than length and 2.3 times more than distal width; distal margin roundly pointless, with 14 long pinnate bristles.

Uropods not saved.

TAXONOMIC REMARKS. The presence of a pair thickened forked bristles on an ischiopodite of pereopod III shows affinity of *M. pectorosa* sp.n. to *M. caribbicus* Menzies, 1962, *M. foveata* Mezhov, 2000 and *M. squalida* Mezhov, 2000. From the first the new species differs by considerably smaller sizes, single pointless sternal spine in the anterior division of pereon, proportions of the antenna I and structure of the pereopod III; from second — absence of pits on tergites, morphology of the antenna I, shape of the pereopod III ischiopodite and structure of the operculum; from third — by the macrosculptural peculiarities of the tergite IV, morphology of a mandible's cutting margin, by comparatively narrower epipodite and palp of maxillipe, relatively elongated pereopods.

ETYMOLOGY. From Latin *pectorosus* (with powerful breast); referring to rather wide anterior division of pereon with large angular sternal projection.

DISTRIBUTION. Eastern part of the Indian Ocean (29°43'S, 89°53'E).

ECOLOGY. Abyssal zone, depth 2807 m; very dense silt-covered foraminiferal sand, temperature 1.8°C; are marked density 10 ind./m² and biomass 0.01 g/m².

Macrostylis pumicosa sp.n.

Table 1, Fig. 2.

MATERIAL. Holotype ♂ 3.6 mm long, No. Mc-1373, station 4951.

DESCRIPTION. Male 3.6 mm long. Maximal width of body 5.35 times less than length and approximately 1.25 times more than maximal width of pleotelson; covers smooth, glossy and partially granulated (on intersegmental girdles and on separate sites of pleotelson; macrosculpture represented by numerous orbicular pits located (especially dorsolaterally) on tergites and pleotelson; no setation.

Head narrow-trapezoidal, length 1.1 times less than maximal width; posterolateral parts slightly tapered backwards and sideways; frontal margin poorly convex on all width.

Anterior division of pereon elongated-rectangular, length almost 1.1 times more than maximal width; tergite I 1.5 times longer than tergite II and 1.05 times shorter than tergite III;

Table 1. Collecting stations.
Таблица 1. Станции сбора материала.

No. of station	Gear	Coordinates		Depth, m
		Latitude	Longitude	
4575	BS	29°43'S	89°53'E	2807
4951	BS	4°59'N	90°47,5'E	2917
5168	ST	8°41,9'S	105°30,7'E	6433
5333	BS	32°24,8'S	108°03,3'E	5410

Gears: ST — Sigsby Trawl, BS — bottom sampler "Okean".

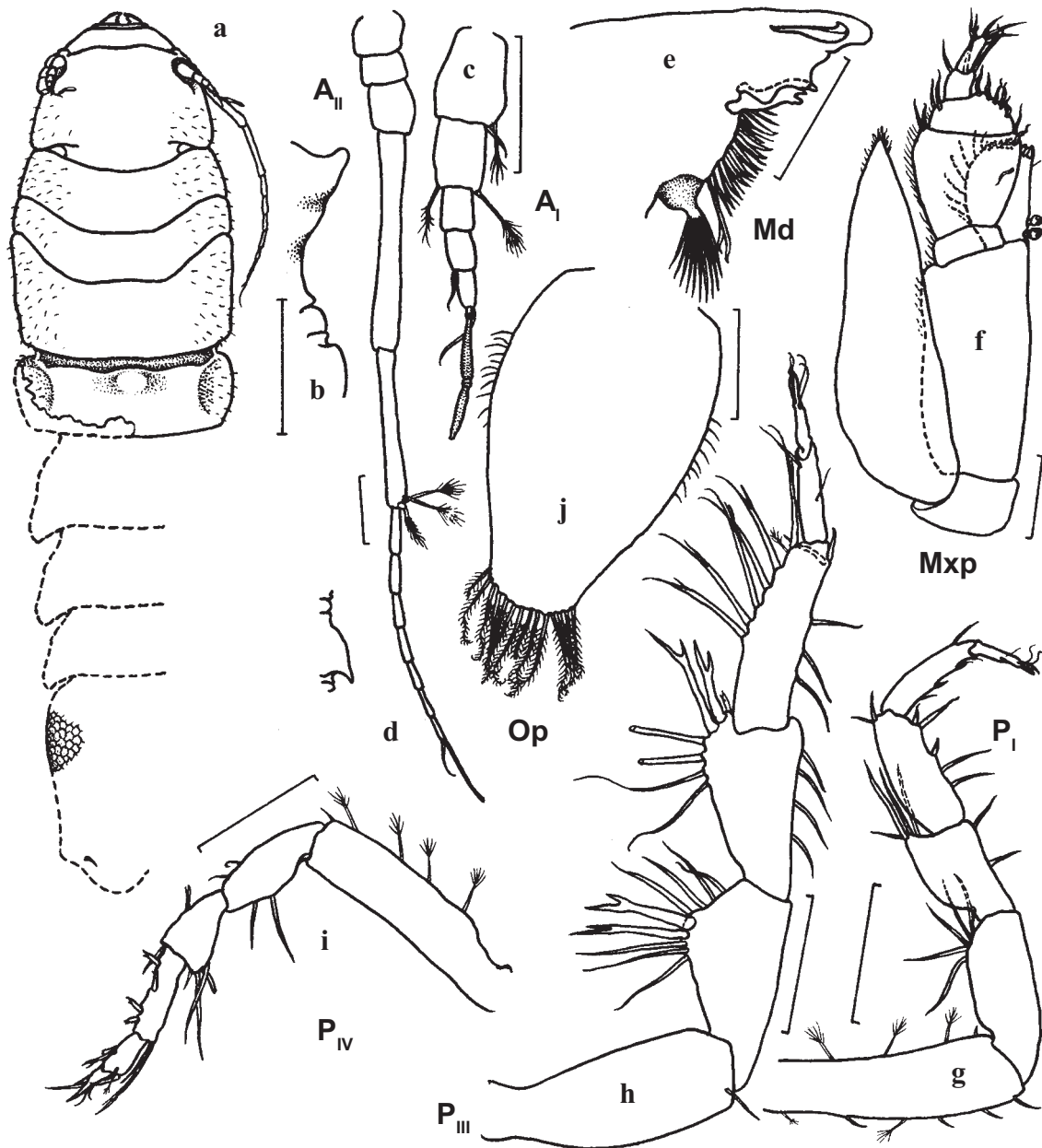


Fig. 1. *Macrostylis pectorosa* sp.n. Holotype female: total view from above (a), sternites from lateral side (b) and appendages (c-j). Scale bars: 0.5 mm (a, b), 0.05 mm (c-e) and 0.1 mm (f-j).

Рис. 1. *Macrostylis pectorosa* Mezhov, sp.n. Голотип самка: общий вид сверху (а), стерниты сбоку (b) и придатки (c-ж). Масштаб 0,5 мм (a,b), 0,05 мм (c-е) и 0,1 мм (f-ж).

lateral surfaces insignificantly convex, anterolateral and posterolateral parts rounded; sternal surface differentiated segmentally by shallow transversal grooves, with two spines.

Tergite IV with insignificantly convex lateral surfaces; length 2.2 times less than maximal width; sternite uniformly swelled, with angularly prominent posterior margin.

Tergite V 1.2 times shorter than tergite VI and approximately 1.25 times longer than tergite VII; posterolateral parts of tergites V-VII tapered backwards, with distal bristles; sternites V-VII with spines of average length, directed inferocaudally.

Pleotelson elongated-rectangular, slightly broaden distally, its length 3.9 times less than total body length; maximal width 1.65 times less than length; dorsal surface straightened, with abrupt fracture under direct angle in distal part; lateral surfaces direct; mediolateral lobe hardly visible as rounded little angle behind widely rounded distal margin; caudal organs latent under round sites of granulated covers, slot-like apertures transversal.

Antenna I consists of 5 articles with length ratios: 1 : 0.50 : 0.30 : 0.15 : 0.20; on third, fourth and fifth articles 7 long aesthetascs. Antenna II 3.5 times longer than antenna I and

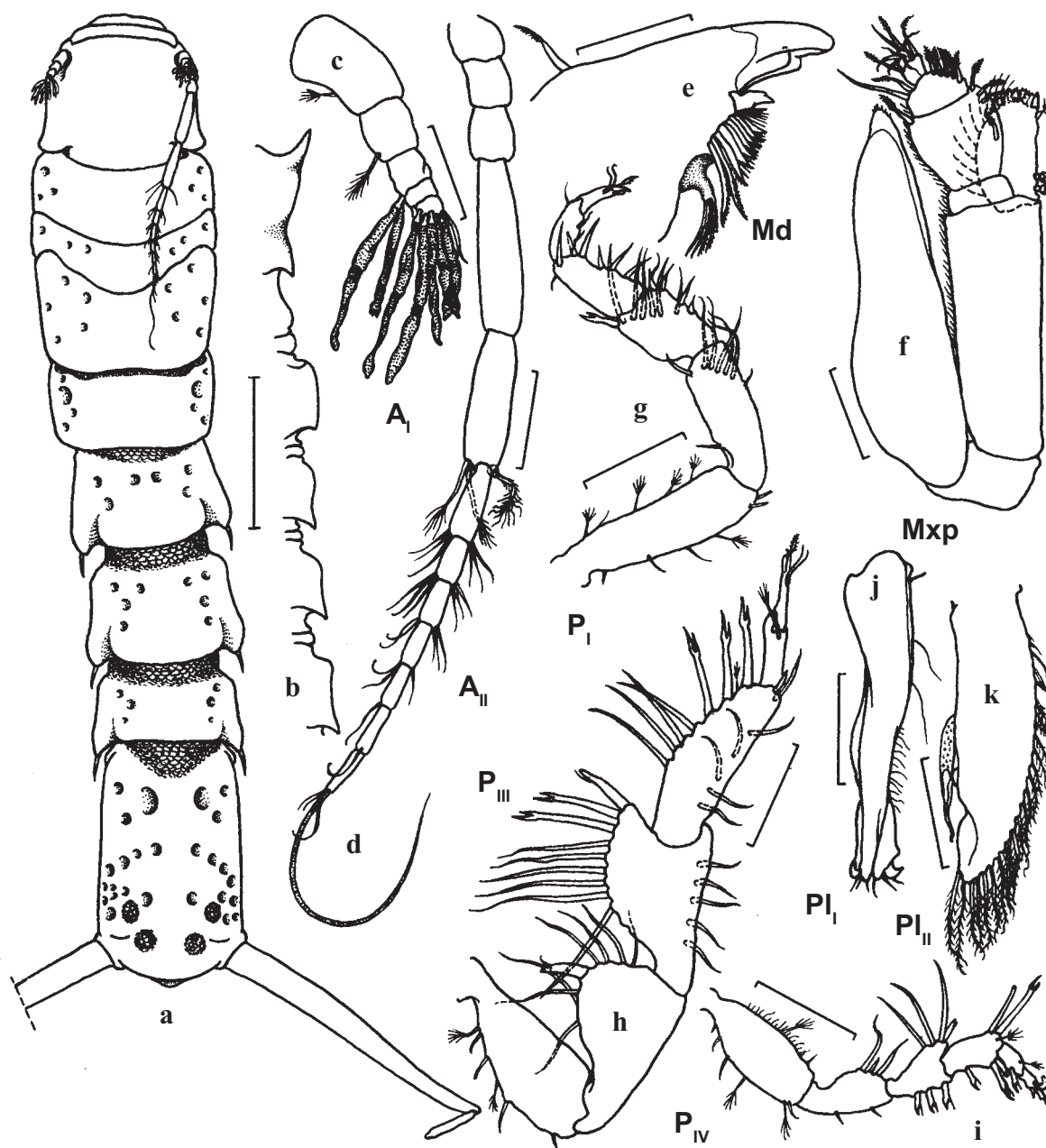


Fig. 2. *Macrostylis pumicosa* sp.n. Holotype male: total view from above (a), sternites from lateral side (b) and appendages (c-k). Scale bars: 0.5 mm (a, b), and 0.1 mm (c-k).

Рис. 2. *Macrostylis pumicosa* Mezhov, sp.n. Голотип самец: общий вид сверху (a), стерниты сбоку (b) и придатки (c-k). Масштаб 0,5 мм (a,b), и 0,1 мм (c-k).

reaching tergite III being unbended backwards; flagellum consists of 7 articles; rudiment of exopodite one-articled.

Cutting edge of mandible with 3 (blunt?) teeth; movable plate with vague serration; in tooth row approximately 9 sawtooth bristles; tooth process wide in basis, with 6 long bristles on end of narrow tapered elongated distal part; on place of palp there is bristle. Epipodite of maxillipede visibly tapered on distal end, length 3.6 times more than maximal width; exterolateral margin with shallow wide excavation.

Ischiopodite of pereopod III rounded-triangular, length 3.6 times more than maximal width; lobe large, widely round-

ed, with slightly curved short spine-like bristle on top; in combs of meropodite and carpopodite 9 and 7 long bristles accordingly.

Pleopod I with 3 bristles on beveled distal margin; prominent parts of hyaline processes hook-likely curved. Protopodite of pleopod II ovate-lanceolate, with deep rounded-angular excavation on distal third of interolateral margin, length 2.7 times more than maximal width; distal third of endopodite visible part thinly tapered and not reaching to distal margin of protopodite; distal and exterolateral margins of protopodite with approximately 24 pinnate bristles.

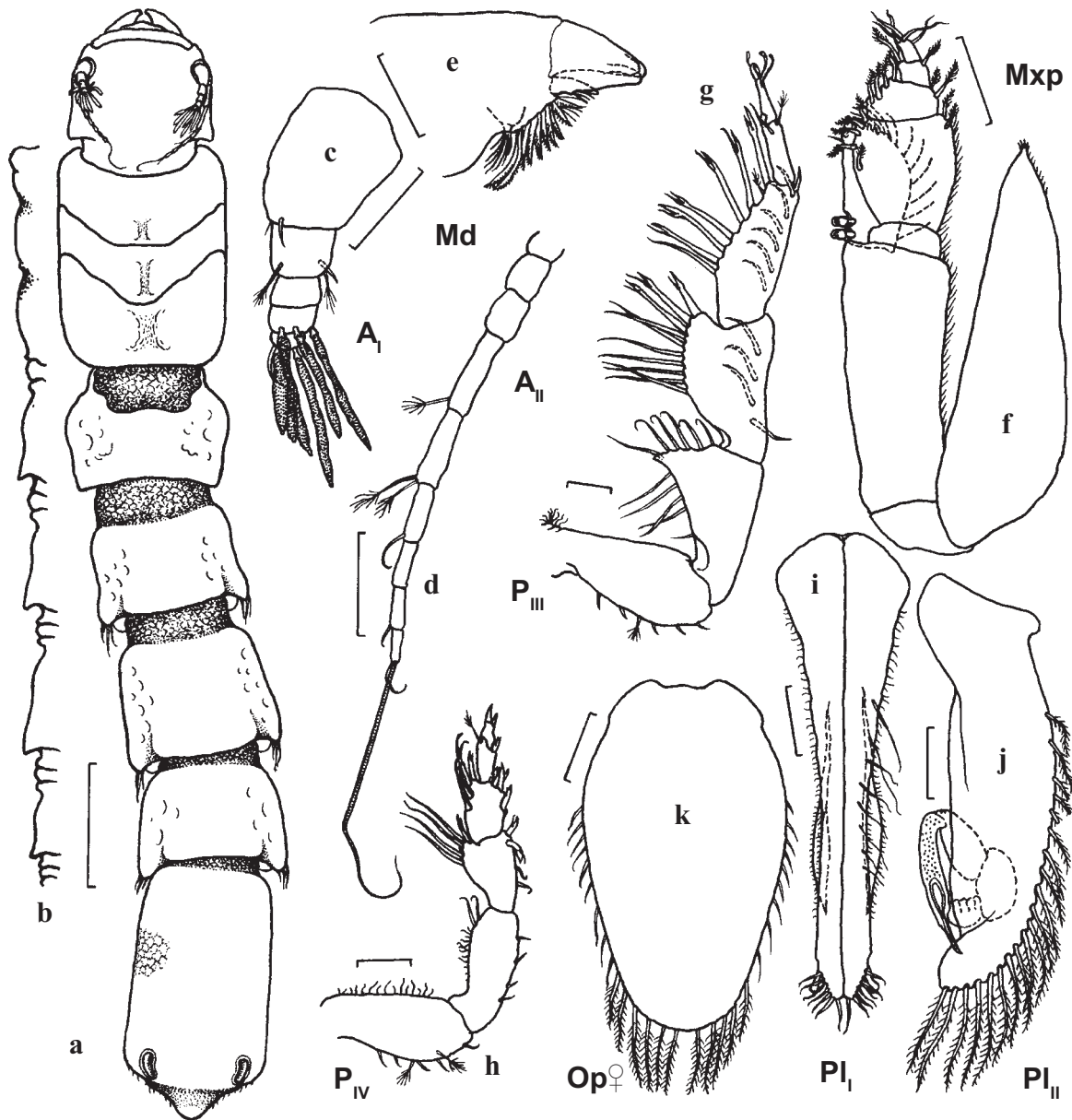


Fig. 3. *Macrostyliis diatona* sp.n. Holotype male: total view from above (a), sternites from lateral side (b) and appendages (c–j). Paratype female: operculum (k). Scale bars: 0.5 mm (a, b) and 0.1 mm (c–k).

Рис. 3. *Macrostyliis diatona* Mezhov, sp.n. Голотип самец: общий вид сверху (а), стерниты сбоку (b) и придатки (с–j). Паратип самка: оперкулюм (k). Масштаб 0,5 мм (а,b), и 0,1 мм (с–k).

Uropods 1.35 times longer than pleotelson; endopodite 5.5 times shorter than protopodite; protopodites with short exterodistal processes.

TAXONOMIC REMARKS. The new species demonstrate definite morphological similarity with *M. rectangularata* Mezhov, 1989. The distinctive peculiarities of new species are expressed by the cavernous dorsum and the absence of any setation, the anterior division of the pereon and the shape of tergites, and of the pleotelson, the morphology of the pereopod III ischiopodite and meropodite and the angularly tapered distal end of the second pleopod.

ETYMOLOGY. From Latin *pumicosus* (cavernous); referring to the foveate covers.

DISTRIBUTION. Eastern part of the Indian Ocean (4°59'N, 90°47.5'E).

ECOLOGY. Abyssal zone, depth 2917 m; foraminiferal silt at bottom temperature 2.3°C; density 5 ind./m² and biomass 0.005 g/m² are marked.

Macrostyliis diatona sp.n.

Table 1, Fig. 3.

MATERIAL. Holotype ♂ 4.4 mm long, No. Mc-1374, station 5168. Paratype — incomplete ♀ (from pereonite VI till pleotelson, length of 2.0 mm; presumable length of full specimen not less than 5.5 mm), No. Mc-1375, station 5168.

DESCRIPTION. Male 4.4 mm long. Body very elongated, maximal width 6.5 times less than length and 1.2 times more than maximal width pleotelson; covers smooth, glossy, with subsurface granulosity (intersegmental girdles granulat-

ed outwardly); dorsolateral parts of tergites IV–VII poorly tuberculate; no setation

Head narrow-trapezoidal, maximal width 1.35 times more than length and 1.4 times more than width of frontal margin; lateral surfaces weakly concave; frontal margin uniformly convex.

Anterior division of pereon rounded-rectangular, length 1.15 times more than maximal width; lateral surfaces direct, anterolateral and posterolateral parts rounded; tergite I 1.25 times longer than tergite II and 1.1 times longer than tergite III; sternal surface only with an angular, distally rounded tubercle instead of a frontal spine.

Tergite IV broadening frontally, maximal width 2.3 times more than length; lateral surfaces slightly concave; anterolateral parts widely rounded, posterolateral parts angular; sternite with short spine.

Tergite V 1.2 times shorter than tergite VI and 1.1 times longer than tergite VII; posterolateral parts of tergites V–VII tapered distally, with 3–4 bristles on distal end everyone; sternites V–VII with short spines.

Pleotelson subrectangular (weakly broadened distally), its length 4.2–4.3 times less than total body length; maximal width of pleotelson falls to distal part and 1.8 times less than length; dorsal surface moderately convex, with abrupt distal inflection; lateral surfaces direct, anterolateral and posterolateral parts rounded; mediiodistal lobe rather large, angular, with suberected rounded distal end; caudal organs not visible, slot-like apertures longitudinal.

Antenna I consists of 5 thickened articles, length ratios from basal to distal: 1 : 0.35 : 0.20 : 0.20 : 0.15; preapical and apical articles with 6 aesthetascs of average length. Antenna II 1.7 times longer than antenna I and reaching tergite I being unbended backwards; flagellum consists of 4 articles; rudiment of exopodite not present.

Cutting margin of mandible with vague serration; movable plate bend-conic; in tooth row 10 sawtooth bristles; tooth process small, hemispherical, with 7 bristles terminally of shortly and thinly tapered distal part. Epipodite of maxilliped hemileaf-like, with subacute and shortly tapered on end distal part; length 3.3 times more than maximal width.

Ischiopodite of pereopod III elongated-triangular, length 1.3 times more than maximal width; lobe distinctly moved forwards, large, angular, with pointed top and without thickened bristle; in combs of meropodite and carpopodite 10 and 7 long bristles accordingly.

Ischiopodite of pereopod IV without lobe; in combs of meropodite and carpopodite 4 and 3 bristles accordingly.

Pleopod I with 7 bristles on exterolaterally beveled distal margin; prominent part of hyaline process directed backwards and sideways by clavate end. Protopodite of pleopod II irregular ovate-lanceolate, length 3.6 times more than maximal width; distal-lateral setular bordering includes not less than 20 pinnate bristles; prominent out part of endopodite process shortly tapered on end and not reaching distal margin of protopodite.

Uropods not saved.

Fragment of female body (from pereonite VI till a pleotelson, length 2.0 mm). Length of pleotelson 1.6 times more than maximal width; lateral surfaces a little bit convex. Operculum elongated, tongue-like, maximal width 1.75 times less than length and twice more than distal width; distal margin uniformly rounded, with 12 pinnate bristles.

TAXONOMIC REMARKS. The following peculiarities distinguish this species from the closely related *M. hadalis* Wolff, 1956: relatively shortened anterior division of pereon, elongated pereonites VI and VII, a little bit shortened and

extending distally pleotelson with the larger mediiodistal lobe, 6 aesthetascs on the antenna I, detail of the pereopod III structure, narrower operculum with smaller (approximately half the number of bristles on a distal margin, clavate distal part of the pleopod I hyaline processes, a somewhat narrowed protopodite of pleopod II with 20 bordering bristles. The new species are also related to abyssal *M. longiuscula* Mezhov, 1981, from which *M. diatona* sp.n. differs by the configuration of pleotelson, morphological peculiarities of the pereopod III ischiopodite and meropodite, distinctly less curved hyaline processes of pleopod I.

ETYMOLOGY. From Latin *diatonus* (lengthy); referring to the very elongated body.

DISTRIBUTION. Eastern part of the Indian Ocean (8°41.9'S, 105°30.7'E).

ECOLOGY. Ultraabyssal zone, depth 6433 m; semifluid clayey carbonateless silt, bottom temperature 0.75°C.

Macrostylis fragosa sp.n.

Table 1, Fig. 4.

MATERIAL. Holotype — incomplete specimen of juvenile ♀ (from pereonite IV till pleotelson); underdeveloped pereonite VII and corresponding pereopods, length 1.6 mm; presumable length of full specimen 2.3–2.5 mm), No. Mc-1376, station 5333.

DESCRIPTION. Incomplete specimen of juvenile female. Covers of body smooth, glossy, structurally granulated (specific reticularity distinctly transparent under surface of covers); dorsal surfaces of tergites with dotted grooves on lateral thirds; no setation.

Length of tergite IV twice less than maximal width; lateral surfaces uniformly convex, posterolateral parts angular; sternite uniformly convex, without spine.

Tergite V equal in length to tergite VI; sternites V–VII without spines.

Pleotelson oblong-oval, maximal width twice less than length and 1.25 times more than distal width; dorsal and lateral surfaces uniformly convex; mediiodistal lobe wide, angularly subacute; caudal organs not visible, slot-like apertures longitudinal.

Operculum broadened-tongue-like, maximal width 1.2 times less than length and 2.55 times more than distal width; distal margin roundly truncated, with 7 long pinnate bristles.

Uropods approximately 1.75 times shorter than pleotelson; endopodites 1.4 times shorter than protopodites, with pair of very long bristles everyone.

TAXONOMIC REMARKS. The saved structures will indicate definite affinity *M. fragosa* sp.n. and *M. reticulata* Birstein, 1963. The distinctive characters of new species consist at the presence of pair pits on tergites IV–VII, rounded lateral surfaces of pleotelson and relatively broadened operculum with the distinctly truncated narrow distal margin.

ETYMOLOGY. From latin *fragosus* (brittle); pointed out fragile cuticle.

DISTRIBUTION. Eastern part of the Indian Ocean (32°24.8'S, 108°03.3'E).

ECOLOGY. Abyssal zone, depth 5410 m; liquid clayey silt, bottom temperature 1.6°C; density 5 ind./m² and biomass 0.005 g/m² are marked.

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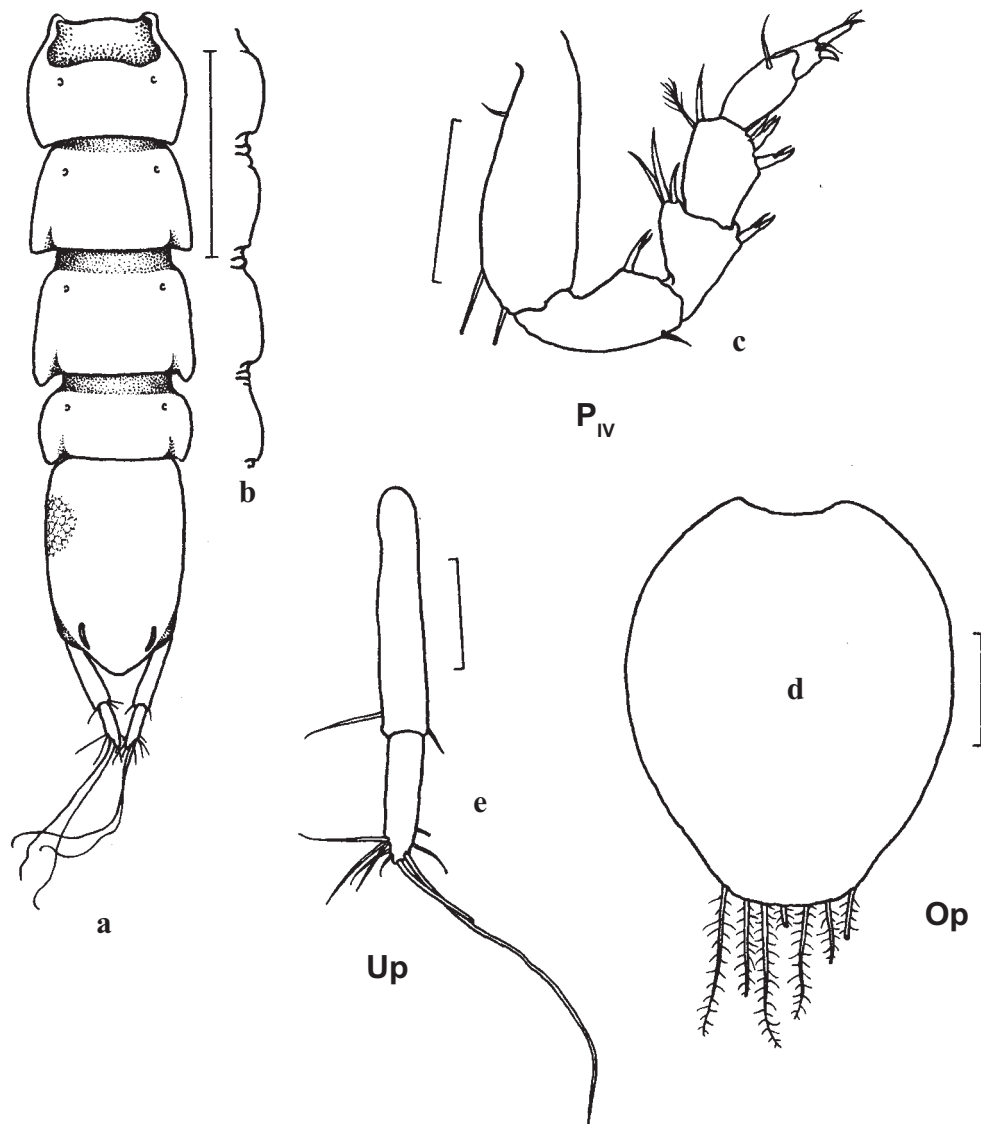


Fig. 4. *Macrostylis fragosa* sp.n. Holotype female (incomplete exemplar): total view from above (a), sternites from lateral side (b) and appendages (c-e). Scale bars: 0.5 mm (a, b) and 0.1 mm (c-e).

Рис. 4. *Macrostylis fragosa* Mezhov, sp.n. Голотип самка (неполный экземпляр): общий вид сверху (a), стерниты сбоку (b) и придатки (c-e). Масштаб 0,5 мм (a,b) и 0,1 мм (c-e).

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