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**ADDITIONAL DATA ON MORPHOLOGY AND DISTRIBUTION  
OF *MELITOIDES VALIDA* (SHOEMAKER, 1955) (AMPHIPODA, MELITIDAE)**

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The genus *Melitoides* Gurjanova, 1934 (Amphipoda, Melitidae) includes three species from the Arctic and northwestern Pacific: *Melitoides makarovi* Gurjanova, 1934, *M. valida* (Shoemaker, 1955), and *M. kawaii* Labay, 2014. *M. makarovi* and *M. kawaii* only were recorded until recently in the seas of the Russian Far East. Only two specimens of *M. valida* were found once near the Arctic coast of Alaska; therefore, the morphological description of the species was incomplete, which led to difficulties with its generic identification. For the first time, *M. valida* was found in the seas of the Russian Far East in September 2018 on the shelf of the Sea of Okhotsk, near the North-Eastern Sakhalin Island at the depth of 29 m on the sand bottom. Detailed re-description of the species was carried out using optical and electronic scanning microscopes by the Coleman protocol. The material collected is stored at the Crustacea collection of the Zoological Museum of Far Eastern Federal University (Vladivostok). The specimen from the Sea of Okhotsk is identical to the specimens of the type series from the Arctic coast of Alaska in the form of dorsal carination (with several teeth on posterior margin of pleon segments 2, 3 and urosomites 1, 2), in the structure of pereopods 1–7, especially in the form of propodus of pereopods 2 (palm with distinct posterior-distal tooth, as well as with three large and one small obtuse palmar teeth). *M. valida* description has been substantially supplemented, and information on its range has been expanded.

**Keywords:** Amphipoda, Melitidae, *Melitoides valida*, Sea of Okhotsk, North-Eastern Sakhalin

The genus *Melitoides* Gurjanova, 1934 was described by E. F. Gurjanova (1934) for the new species *Melitoides makarovi* Gurjanova, 1934 from the Kara Sea. This species was also subsequently noted in the Bering Sea (Gurjanova, 1951). Only two Amphipoda species of the genus *Melitoides*, *M. makarovi* and *M. kawaii* Labay, 2014, were recorded until recently in the seas of the Russian Far East (Labay, 2014). Another species of the genus, *Melitoides valida* (Shoemaker, 1955), was found only once in Arctic waters (Alaska coast on the Chukchi and Beaufort seas border) (Shoemaker, 1955): as *Melita valida* Shoemaker, 1955 (Jarrett & Bousfield, 1996). The latter species was described incompletely and only by two specimens (Shoemaker, 1955). This species was not noted in other Amphipoda collections from the Arctic and Far Eastern seas. Because of the incompleteness of description, Jarret & Bousfield (1996) have not established the exact generic affiliation of the species, and it was referred to the genus *Melitoides* “tentatively”: as *Melitoides* (?) *valida* (Shoemaker).

Labay (2014) finally approved this species in the genus *Melitoides*, based on morphological analysis, despite the presence of several features that combine it with the species of the genus *Quasimelita* Jarrett & Bousfield, 1996.

Another *M. valida* specimen was found in benthos samples, collected on the shelf of North-Eastern Sakhalin in September 2018. This finding allows not only to significantly expand the range of the species, but also to make its full description in accordance with the requirements of modern systematics.

## MATERIAL AND METHODS

The material was collected from the bottom sediments of the Sakhalin Island shelf (53°18'42.495"N, 143°17'31.469"E) in the bottom survey on the RV "Dmitry Peskov". The specimens were dissected under a stereoscopic microscope, and their appendages and mouth parts were mounted in glycerol gel slides. Illustrations were made under an optical microscope with a photo digital camera DCM-500 and digitally prepared by the Coleman protocol (2003). All the material collected is kept in 70 % ethanol and stored at the Crustacea collection of the Zoological Museum of Far Eastern Federal University (Vladivostok).

Setae definitions are based on Watling (1989). Scanning electron microscope images of surface sculpture were made by a NeoScope JCM-5000 SEM (JEOL) on pre-dissected alcohol-dried material, coated with gold.

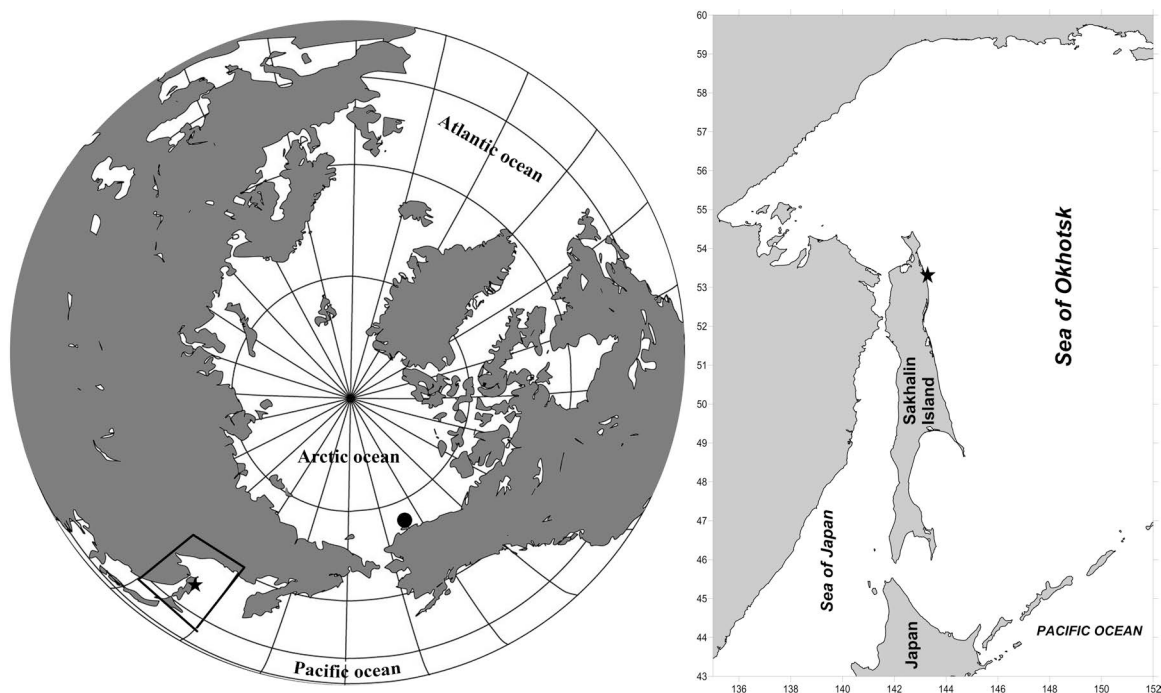
The following abbreviations are used on the plates: Pr denotes pereon; Pl – pleon; Ur – urosomite.

**Systematics.** *Melitoides valida* (Shoemaker, 1955) (Figs 1, 2, 3, 4, 5).

Syn.: *Melita valida* Shoemaker, 1955: 50 (Shoemaker, 1955). – Barnard, 1958: 62. – Barnard & Barnard, 1983: 666;

*Abludomelita valida* (Shoemaker) Karaman, 1981: 40;

*Melitoides valida* (Shoemaker, 1955) Jarrett & Bousfield, 1996: 34. – Labay, 2014: 269.



**Fig. 1.** Distribution of *Melitoides valida* (Shoemaker, 1955): ● is a type locality; ★ is a new location on the north-eastern shelf of the Sakhalin Island

**Material.** Male, 14 mm, X 53091/Cr-2310, north-eastern shelf of the Sakhalin Island, Sea of Okhotsk, Russian Far East (53°18'42.495"N, 143°17'31.469"E; 29 m), sand, M. G. Rogotnev, 11.09.2018.

**Type locality.** Beach at Point Barrow, Alaska (Shoemaker, 1955).

**Description.** *Male* (14 mm). Medium size species. Vital body color unknown. Pereon segments without teeth (Figs 2A, 5). Pleon segment 1 without teeth; pleon segment 2 with 4–5 small teeth, pleon segment 3 with 7 small teeth. Urosomite 1 with a medial group of 3 post-dorsal teeth; urosomite 2 with two pairs of small teeth and with single cuspidate seta among each lateral pair.

Head (Fig. 2A): subequal to pereonites 1 and 2 together with an indistinct rostrum; eyes absent; inferior antennal sinus shallow; cusp indistinct.

Antenna 1 (Fig. 2B): 0.45 times of body length, slender; flagellum exceeding 1.5 times length of the peduncle, 23–25 articles, few very thin and short setae scattered along flagellum; peduncle article 1 double width and slightly longer than article 2, article 3 0.38 times length of article 2; accessory flagellum 4-articulate.

Antenna 2 (Fig. 2C): flagellum 0.47 times as long as peduncle, 9 articles, bundle of thin setae on each article; peduncle article 5 1.2 times shorter than article 4, articles 1 + 2 + 3 subequal to article 5, articles 2 with protruding lobe almost reaching the distal end of next article.

Mouthparts.

Labrum (Fig. 2D): short and rounded, frontal margin convex, densely covered by minute setae.

Mandible (Fig. 2E, F): incisor crenulate and stretching in a rounded tip, left and right lacinia are present; raker setae stout and plumose, numerous (9–10), as long as incisor; molar rectangular tritritative, chewing plate flattened; palp 3-articulate, palp segments 2 and 3 setose, article 1 with protruding lobe, the percentage of total length of the articles of the palp is 16 % (article 1), 44 % (article 2), and 40 % (article 3).

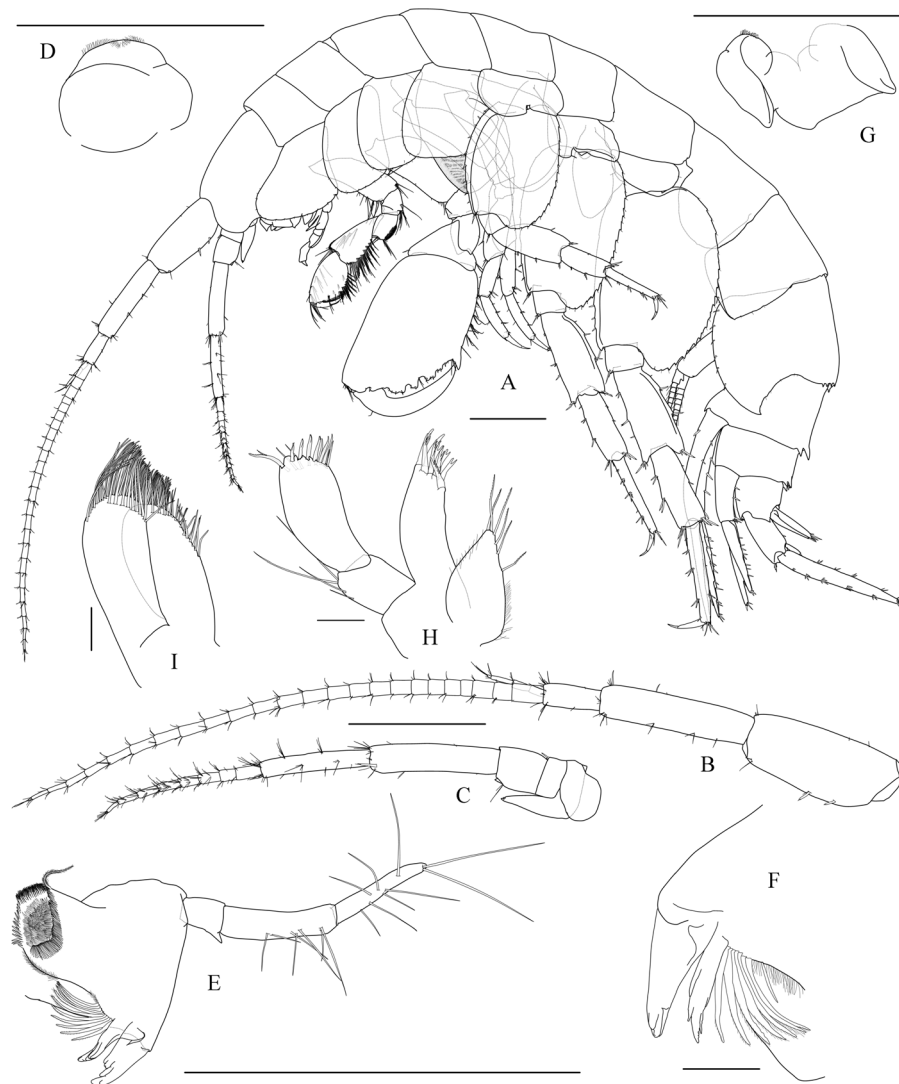
Labium (Fig. 2G): inner lobes large, well defined, rounded; outer lobes rounded at distal margin.

Maxilla 1 (Fig. 2H): inner plate subtriangular, lined with a row of 6 plumose setae; outer plate elongated, 1.3 times as long as inner plate, apically with 2 rows of 9 toothed strong setae (anterior row of 5 bifurcate setae and posterior row of 4 comb setae); palp 2-articulate, article 2 2 times as long as article 1, article 2 apically with two rows of 9 cuspidate setae each.

Maxilla 2 (Fig. 2I): inner plate slightly shorter than outer plate, facial row of setae of inner plate reduced, tip covered with numerous plain setae; outer plate with same numerous plain setae.

Maxilliped (Fig. 3A): compact; inner plates medium, fully cleft, distal margin with a row of 4 teeth, inner and distal margins with long setae; outer plates reaching 0.9 of palp article 2, inner margin lined with a row of short stout paddle-like setae longer toward the apex, apical row with long thin specific setae, which plumose in the middle part; palp 4-articulate, the percentage of total length of the articles of the palp is 15 % (article 1), 44 % (article 2), 21 % (article 3), and 20 % (article 4); article 2 with numerous setae along inner margin; article 3 bilobed, tip of article 3 felted, with a row of plain setae along apical indentation; article 4 straight, with nail, inner surface with a dense row of tiny setae.

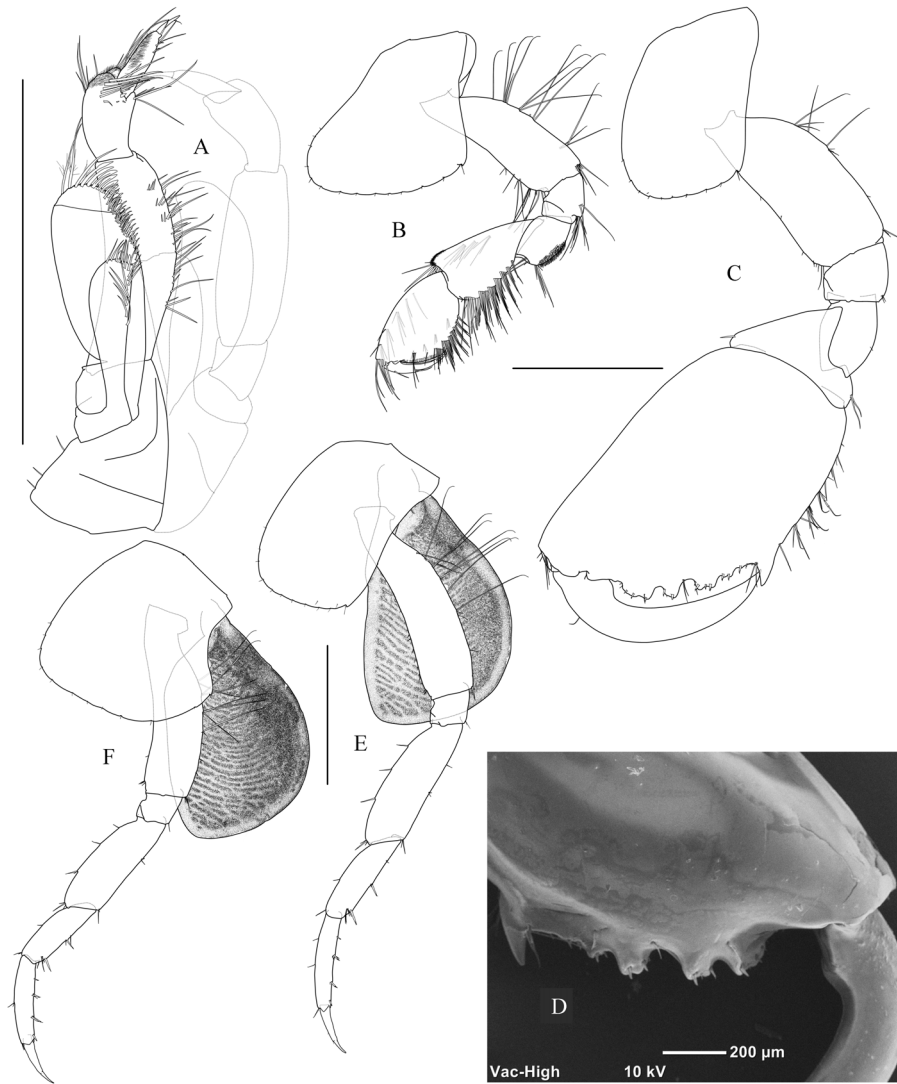
Pereopod 1 (Fig. 3B): coxa medium long, extended and rounded anterior-distally; basis straight with a rare row of long simple setae along distal part of anterior margin and with long setae along posterior margin; ischium subrectangular with two bunches of long simple setae at posterior-distal corner; merus subrectangular, with dense group of short setae along distal part of posterior margin, distal margin with a row of long setae; carpus long and broad, 1.1 times as long as propodus, 6 oblique rows of long plumose



**Fig. 2.** *Melitoides valida* (Shoemaker, 1955), male: A – lateral view; B – antenna 1; C – antenna 2; D – upper lip; E – left mandible; F – incisor of right mandible; G – lower lips; H – maxilla 1; I – maxilla 2. Scale bars: A, B, C, D, E, and G – 1 mm; F, H, and I – 0.1 mm

setae along outer posterior margin, 3 transverse rows of long plumose setae along anterior margin, with a row of long plumose setae along anterior and posterior parts of distal margin; propodus slightly extended distally, with 7 oblique rows of long plumose setae along posterior margin, with 5 tufts of long setae along anterior margin, and with a dense bunch of long simple setae at anterior-distal corner, palmar margin slightly oblique, with a row of short thin simple setae along palmar; dactylus as long as palm, curved.

Pereopod 2 (Fig. 3C, D): coxa relatively short, subrectangular, anterior angle rounded; basis substraight, wide, subequal to coxa in length, with rare long plain setae along posterior margin and with few rare short setae along anterior margin; merus subrectangular with short triangular protrusion at posterior-distal corner, carpus cup-shaped, with developed posterior lobe, almost 3.8 times shorter than propodus; propodus with subparallel anterior and posterior margins, palm oblique, with distinct posterior-distal tooth and with 3 large and 1 small obtuse palmar teeth, posterior margin with 8 tufts of short setae, palm with rare small cuspidate setae; dactylus inflated, as long as palm, curved to the inside of propodus, outer margin rarely setose.



**Fig. 3.** *Melitoides valida* (Shoemaker, 1955), male: A – maxilliped; B – pereopod 1; C – pereopod 2; D – palmar margin of propodus of pereopod 2; E – pereopod 3; F – pereopod 4. Scale bars: A, B, C, E, and F – 1 mm; D – 0.2 mm

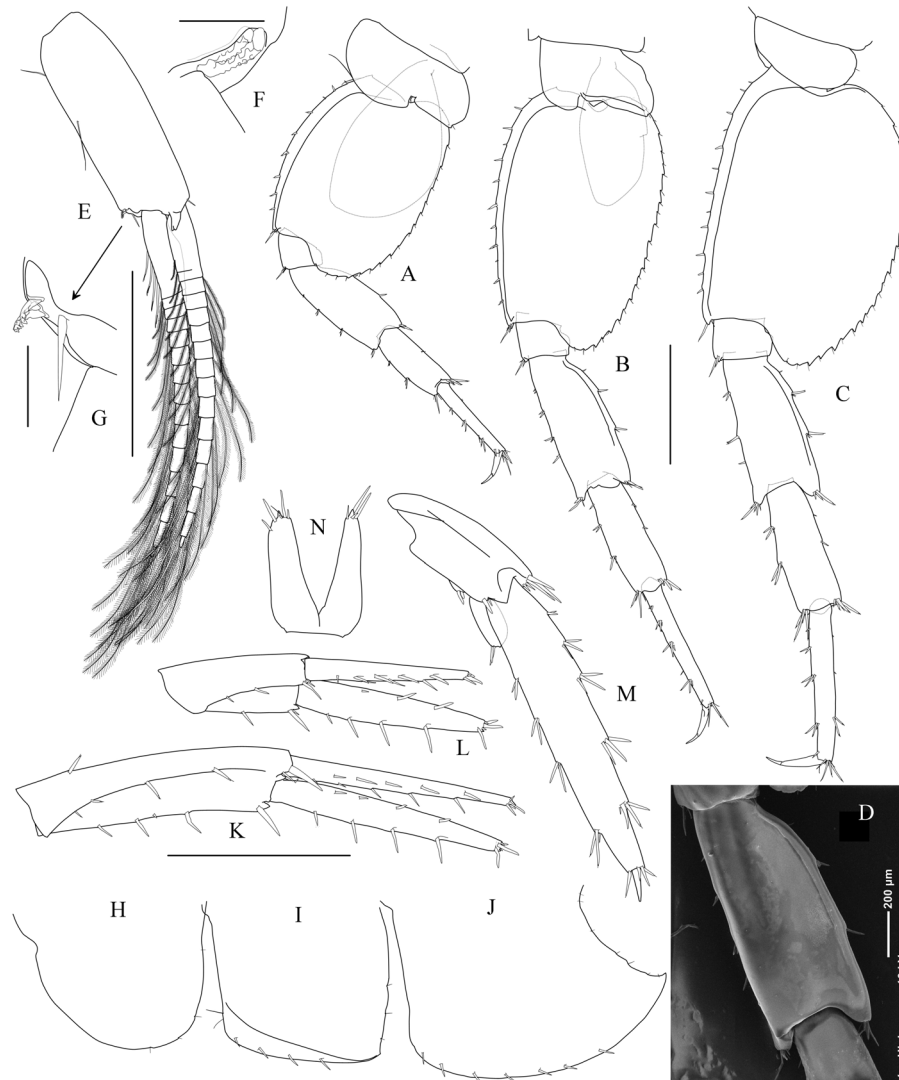
Pereopod 3 (Fig. 3E): coxa subequal to coxa 2, subrectangular, with rounded anterior and posterior corners; basis long, anterior margin concave, posterior margin convex, with long plain setae along posterior margin; merus long; carpus 0.63 times as long as merus, with 3 cuspidate setae along posterior margin; propodus linear, more narrow and slightly longer than carpus, with 3 small stout setae along posterior margin; dactylus medium (0.5 of propodus length), with nail.

Pereopod 4 (Fig. 3F): coxa as long as coxa 3, wide, excavated posteriorly, leg is similar to that of pereopod 3.

Pereopods 5–7 elongated from pereopod 5 to pereopod 6; pereopod 6 subequal to pereopod 7.

Pereopod 5 (Fig. 4A): coxa rounded anteriorly, hind margin with angled posterior lobe; basis short and broad, with rounded posterior wing, rounded posterior-distally, width 0.75 times length, hind margin crenulated, anterior margin with short cuspidate setae; merus slightly broad medially, with 2 cuspidate setae along posterior margin and with 3 small stout setae along anterior margin, and with a cluster of 2–3 cuspidate setae at posterior-distal and anterior-distal corners each; carpus 0.69 times as long

as merus, with 2 groups of 2 cuspidate setae at anterior margin and with single clusters of cuspidate setae at anterior and posterior-distal corners each; propodus linear, more narrow than carpus and 1.12 times as long as carpus; dactylus medium (0.44 of propodus length), with nail.



**Fig. 4.** *Melitoides valida* (Shoemaker, 1955), male: A – pereopod 5; B – pereopod 6; C – pereopod 7; D – merus of pereopod 7; E – pleopod 3; F – coupling spines of pleopod 2; G – coupling spines of pleopod 3; H – epimer 1; I – epimer 2; J – epimer 3; K – uropod 1; L – uropod 2; M – uropod 3; N – telson. Scale bars: A, B, C, E, H, I, J, K, L, M, and N – 1 mm; D – 0.2 mm; F and G – 0.1 mm

Pereopod 6 (Fig. 4B): coxa with angled hind margin and with short and narrow anterior lobe lowered down; basis broad, with rounded posterior wing, slightly narrowed distally, width 0.64 times as length, posterior-distal corner rounded, hind margin crenulated, anterior margin with small cuspidate setae; merus long, with a rigid rib along posterior margin on the outer surface (Fig. 3D), with 3–4 groups of short cuspidate setae along anterior and posterior margins each, and with single clusters of 3–4 cuspidate setae at anterior and posterior-distal corners each; carpus 0.8 times as long as merus, with 2–3 rare cuspidate setae at anterior and posterior margins each and with a single cluster of cuspidate setae at anterior and posterior-distal corners each; propodus linear, more narrow and slightly longer than carpus; dactylus small (0.32 times length of propodus), with nail.

Pereopod 7 (Fig. 4C, D): coxa small, without anterior lobe, with rounded posterior margin; basis short and broad, with rounded posterior wing, rounded posterior-distally, width 0.67 times length, hind margin crenulated, with small cuspidate setae along anterior margin; merus long, slightly broadened medially, with a rigid rib along posterior margin on the outer surface, with 3 clusters of small cuspidate setae along anterior and posterior margins each, and with single clusters of 3–5 cuspidate setae at anterior and posterior-distal corners each; carpus short, 0.88 times as long as merus, with two groups of cuspidate setae along anterior and posterior margins each and with single clusters of 4–5 cuspidate setae at anterior and posterior-distal corners each; propodus linear, more narrow than carpus and 1.12 times as long as carpus, with 3–4 groups of short cuspidate setae along anterior margin; dactylus small (0.39 times length of propodus), with nail.

Coxal gills 2–6. Coxal gills 6 distinctly smaller than gills 2–5.

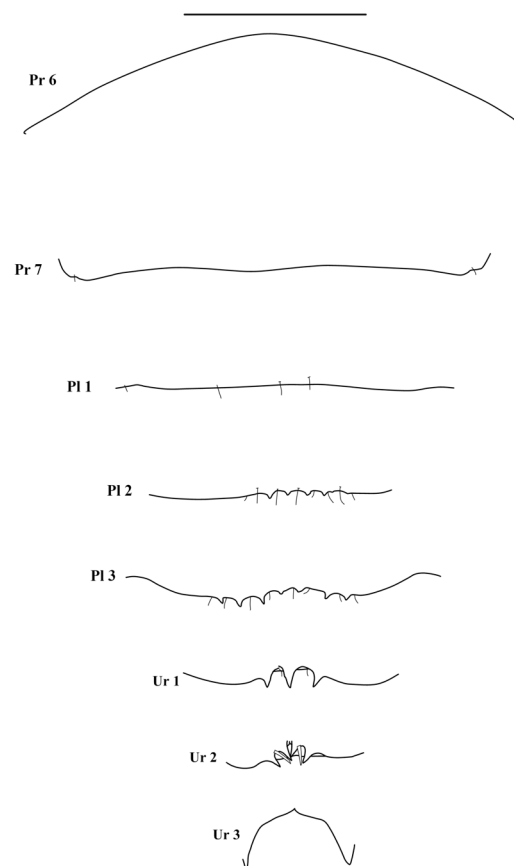
Epimeral plates (Fig. 4H, I, J): plate 1, hind corner not acuminate, rounded posterior-distally; plate 2 with oblique crest, with quadrate posterior-distal corner, lower margin not serrated, with 4 cuspidate setae; plate 3 hind corner produced, acute, posterior margin concave, ventral margin convex, with a row of 7 strong cuspidate setae.

Pleopods (Fig. 4E, F, G): normal; peduncle of pleopods 1 and 2 with 2 specific toothed coupling strong setae on the inner corner, which hidden in a specific recess (Fig. 4F), peduncle of pleopod 3 with 2 specific toothed coupling strong setae and with 1 simple stout seta on the inner corner, distal margin of peduncle posteriorly with specific stopper process; coupling basis of inner ramus with 4–5 specific stout two-pointed plumose setae along inner margin: pleopod 1 (5), pleopod 2 (5), and pleopod 3 (4).

Uropod 1 (Fig. 4K): peduncle without interrampal spur, armed with 5 stout cuspidate setae along inner and outer margins; rami subequal in length, shorter than peduncle length; rami with tiny spine-form setae along inner and outer edges each, both rami with few tiny simple stout setae at the tip.

Uropod 2 (Fig. 4L): peduncle shorter than outer ramus (0.77 ramus length); inner ramus shorter than outer, both with numerous simple stout setae along inner and outer edges each; uropod 2 1.47 times shorter than uropod 1.

Uropod 3 (Fig. 4M): peduncle subequal to peduncle of uropod 2, with a group of 2 small stout cuspidate setae at the inner margin, with a row of 5 stout cuspidate setae at posterior-distal margin; elongated 2-articulate outer ramus (6 times as long as inner ramus), with 5 tufts of small cuspidate setae along lateral margin, with 4 tufts of cuspidate setae along medial margin of article 1, article 2 minutely, 1.5–2 times longer than crowning setae, 10.5 times shorter than article 1; inner ramus short and sub-oval with 2 cuspidate setae subapically.



**Fig. 5.** *Melitoides valida* (Shoemaker, 1955), male: dorsal carination. Scale bar is 1 mm

Telson (Fig. 4N): fully cleft; lobes diverging distally, with acute tips; lateral and medial notches in almost identical position; each lobe with 2 stout setae in the lateral and medial notches each.

*Female unknown.*

**Ecology.** *Melitoides valida* was found on the shelf of North-Eastern Sakhalin at a depth of 29 m on the sand bottom. Specimens of the type series were found on pebble beach at Point Barrow (Alaska) (Shoemaker, 1955).

**Distribution.** Recorded from eastern Arctic (Alaska coast on the Chukchi and Beaufort seas border; the Arctic Ocean) and from northern Pacific (the Sea of Okhotsk, near the North-Eastern Sakhalin Island) (Fig. 1).

**Remarks.** The specimen from the Sea of Okhotsk is identical to the specimens of the type series from Point Barrow (Alaska) in the form of dorsal carination, in the structure of pereopods 1–7, especially in the form of propodus of pereopod 2, and in the structure of telson and maxilliped.

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## ДОПОЛНИТЕЛЬНЫЕ СВЕДЕНИЯ О МОРФОЛОГИИ И РАСПРОСТРАНЕНИИ *MELITOIDES VALIDA* (SHOEMAKER, 1955) (AMPHIPODA, MELITIDAE)

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Род *Melitoides* Gurjanova, 1934 (Amphipoda, Melitidae) объединяет три вида амфипод из Арктики и северо-западной части Тихого океана: *Melitoides makarovi* Gurjanova, 1934, *M. valida* (Shoemaker, 1955) и *M. kawaii* Labay, 2014. Только виды *M. makarovi* и *M. kawaii* были отмечены ранее в дальневосточных морях России. *M. valida* обнаружен единожды у арктического побережья Аляски в количестве двух экземпляров; в связи с этим его морфологическое описание было неполным, что привело к трудностям с родовой идентификацией. По данным сборов в сентябре 2018 г. на шельфе Охотского моря у Северо-Восточного Сахалина на глубине 29 м на песках, впервые в дальневосточных морях России обнаружен редкий вид бокоплава *M. valida*. С использованием оптического и электронного сканирующего микроскопов по протоколу Коулмана проведено подробное переписание вида. Собранный материал передан на хранение в коллекцию ракообразных Зоологического музея Дальневосточного федерального университета (г. Владивосток). Экземпляр из Охотского моря идентичен образцам типовой серии с арктического побережья Аляски по форме дорсальной каринации (несёт несколько зубчиков на заднем крае плеосомальных сегментов 2, 3 и уросомальных сегментов 1, 2), по структуре переоподов 1–7, особенно по форме проподуса переоподов 2 (пальмарный край с отчётливым заднедистальным зубцом и с тремя крупными и одним мелким тупыми пальмарными зубцами). Существенно дополнено видовое описание *M. valida* и расширены сведения о его ареале.

**Ключевые слова:** амфипода, Melitidae, *Melitoides valida*, Охотское море, Северо-Восточный Сахалин