



TITLE:

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1 **A new species of *Paramoera* (Crustacea: Amphipoda: Pontogeneiidae) from an estuary**

2 **habitat in Hokkaido, Japan**

3

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16

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20

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22

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24

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29

30 **Geolocation information**

31

32 KUZ Z2041–Z2043 (point): 43.332857°N, 140.410445°E

33

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35

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38

39 **ABSTRACT**

40 A new species of the pontogeneiid amphipod, *Paramoera shakotanensis*, from the mouth of
41 Horonai River, Hokkaido, Japan, is described. *Paramoera shakotanensis* sp. nov. can
42 clearly be distinguished from its congeners by a combination of the following features: large
43 eyes, deep antennal sinus without sharp incision, epimeral plate 3 with smooth posterior
44 margin, small number of setae on inner plate of the maxilla 1 (up to three) and on inner plate
45 with oblique inner row (up to two), pereopod 7 with coxal gill, and distally tapering telson
46 with almost straight lateral margins bearing submarginal setae.

47

48 <http://zoobank.org/urn:lsid:zoobank.org:pub:72E1F36D-87E5-406A-B92D-6DE686150F99>

49

50 **KEYWORDS**

51 Gammaridea; Pacific Ocean; estuary; brackish water

52

53 **Introduction**

54

55 *Paramoera* Miers, 1875 is the most species-rich genus within the family Pontogeneiidae and
56 contains more than 50 species, which inhabit mainly cold marine habitats but are occasionally
57 found in brackish or freshwater (Staude 1995; Sidorov 2010; Jung et al. 2016). The type

58 species, *Paramoera australis* Miers, 1875, was described from Kerguelen Island in the
59 southern Indian Ocean and is an epigeal amphipod. However, several other species in the
60 genus, described from the northern Pacific Rim region, are hypogean crustaceans (Staude
61 1995; Sidorov 2010; Nakano and Tomikawa 2018).

62 Before this study, none of hypogean *Paramoera* amphipods had been recorded from
63 coastal areas in the northwestern Pacific. Three *Paramoera* species, i.e. *P. erimoensis*
64 Kuribayashi and Kyono, 1995, *P. hanamurai* Hirayama, 1990, and *P. koysama* Kuribayashi
65 and Kyono, 1995, were described from epigeal waters of Hokkaido, Japan, and all of them
66 were classified within *Paramoera* sensu stricto (Hirayama 1990; Kuribayashi and Kyono
67 1995). *Paramoera relicta* Uéno, 1971 is a subterranean species inhabiting an underground
68 water habitats of an insular lava tube in Fukuejima island, Goto Islands, Japan (Uéno 1971;
69 Nakano and Tomikawa 2018). In 2012, several specimens of an unidentified *Paramoera*
70 species were collected from a river mouth in Hokkaido, Japan by Masaki Kyono of Sapporo
71 Technical College, and given to the last author. After careful examination, detailed below, we
72 concluded that these specimens belonged to a distinctive species, and thus describe and
73 illustrate them herein as a new species belonging to the genus *Paramoera*.

74

75 **Material and methods**

76 *Sample collection*

77 *Paramoera* amphipods were collected from under stones at a river mouth of Horonai River,
78 Shakotan Peninsula, Hokkaido, Japan using a fine-mesh hand-net. Specimens were fixed and
79 preserved in 99% ethanol.

80

81 ***Morphological examination***

82 All appendages of the specimens were dissected in 80% ethanol and mounted in gum-chloral
83 medium on glass slides using a stereomicroscope (Olympus SZX7; Olympus, Tokyo, Japan).
84 The specimens were examined using a light microscope (Nikon Eclipse Ni; Nikon, Tokyo,
85 Japan), and illustrated with the aid of a camera lucida. Body length (BL: to the nearest 0.1
86 mm) was measured from the rostrum tip to the telson base, along the dorsal curvature. The
87 specimens examined in this study have been deposited in the Zoological Collection of Kyoto
88 University (KUZ).

89

90 **Taxonomy**

91

92 Family **Pontogeneiidae** Stebbing, 1906

93 Genus *Paramoera* Miers, 1875

94 *Paramoera shakotanensis* sp. nov.

95 (New Japanese name: *Shakotan-migiwa-yokoebi*)

96 (Figures 1–5)

97

98 *Paramoera* sp.: Tomikawa et al., 2014: fig 2; Tomikawa et al., 2017: fig. 2.

99 *Paramoera* sp. 1: Nakano and Tomikawa, 2018: fig. 4, table 1.

100

101 ***Type material***

102 ***Holotype.*** Female (BL 4.6 mm), KUZ Z2041, collected from Horonaifu River

103 (43.332857°N, 140.410445°E), Shakotan, Hokkaido, Japan, by Masaki Kyono, on 13 May

104 2012.

105

106 ***Paratypes.*** In total 3 females: female (BL 5.3 mm), KUZ Z1939, female (BL 5.6 mm), KUZ

107 Z2042 (Figure 1), female (BL 5.1 mm), KUZ Z2043, data same as for holotype.

108

109 ***Diagnosis***

110 Head with large eyes; peduncular article 2 gland cone of antenna 2 with 2 apical setae; lacinia

111 mobilis of left mandible 5-dentate; mandibular palp article 3 without B-setae; inner plate of

112 maxilla 1 with 3 plumose setae; gnathopod 2, carpus longer than propodus; coxa of pereopod

113 4 with shallow posterior concavity; coxal gills on gnathopod 2, and pereopods 3–7; peduncles

114 of pleopods 1–3 with facial setae; uropod 2 inner ramus longer than outer ramus; telson

115 longer than wide.

116

117 **Description**

118 **Female [holotype, KUZ Z2041].** Body smooth. Rostrum (Figure 2(a)) short, weakly
119 produced; lateral cephalic lobe mammilliform; inferior antennal sinus quadrate, corner of
120 sinus rounded, not incised; eyes sub-oval, large, 0.4 times as high as head. Epimeral plates 1–
121 3 (Figure 2(b–d)): lateral surface with many tiny setae; posterior margins without crenulation,
122 with seta; posterodistal corners slightly pointed, with seta; plate 1 with long seta on ventral
123 submargin; plate 3 with 1 or 2 short setae and short bifid seta on ventral submargin.

124 Antenna 1 (Figure 2(e), 2(f)): length 0.5 times as long as body length; peduncular articles
125 progressively shorter, length ratio of peduncular articles 1–3 1.0 : 0.7 : 0.5; peduncular article
126 1 with short setae on anterior margin, 2 single and 1 cluster of setae on posterior margin,
127 posterodistal corner with single seta and pair of setae; peduncular article 2 with short seta on
128 anterior margin, 2 clusters of setae on posterior margin, anterodistal and posterodistal corners
129 with cluster of setae; peduncular article 3 with cluster of setae on posterior margin,
130 anterodistal and posterodistal corners with cluster of setae; flagellum 17-articulate, about 1.9
131 times as long as peduncles, first article with 2 aesthetascs, articles 2, 4, 6, 8, 10, 12, 14, and 16
132 each with aesthetasc; accessory flagellum 1-articulate, scale-like, provided with 4 apical setae;
133 calceoli absent. Antenna 2 (Figure 2(g), 2(h)): length ratio of peduncular articles 3–5 1.0 :

134 1.9 : 1.9; gland cone length 0.8 times that of peduncular article 3, not prolonged, with 2 apical
135 setae; peduncular article 3 with pair of setae on anterior margin, 3 setae on medial face of
136 semi-circular elevation, single seta on lateral face, 3 setae on posterodistal corner; peduncular
137 article 4 with 3 pairs or clusters of setae on anterior margin, 3 pairs of setae on medial surface,
138 and a few short setae on posterior margin; peduncular article 5 with single seta and 2 pairs of
139 setae on anterior margin, short single seta on posterior margin, 2 pairs of setae on medial
140 surface, cluster of setae on anterodistal and posterodistal corners; flagellum with 10+ articles
141 (some distal articles broken); calceoli absent.

142 Upper lip (Figure 2(i)) ventral margin convex, rounded, with minute setae. Left and right
143 mandibular incisors (Figure 2(j), 2(k)) 6-dentate, with left lacinia mobilis 5-dentate and right
144 tridentate; left and right accessory setal rows with 6 and 5 blade setae, respectively; molar
145 process triturative with plumose seta; palp 3-articulate, length ratio of left and right palp
146 articles 1–3 1.0:2.7:2.4 and 1.0:2.5:2.2, article 1 bare, article 2 with 10 setae, article 3 with
147 pair of A-, 2 C-, 5 D- and 7-E setae, lateral surface with many fine setae. Lower lip (Figure
148 2(l)) outer lobes broad, setulose, mandibular lobes narrow; inner lobes indistinct. Maxilla 1
149 (Figure 2(m), 2(n)) inner plate narrow with 3 plumose setae; outer plate rectangular with 10
150 serrate robust setae; palp 2-articulate; article 1 bare; article 2 with 6 robust and 1 slender setae
151 on apical and subapical margins, respectively, outer margin without setae. Maxilla 2 (Figure
152 2(o)) inner plate with oblique inner row of 2 plumose setae; outer plate with about 19–20

153 slender setae on subapically. Maxilliped (Figure 3(a)) inner plate not exceeding palp article 1,
154 with 3 robust setae subapically, medial face with oblique row of plumose setae; outer plate
155 exceeding palp article 1, with 2 thick plumose setae and robust setae apically; palp 4-
156 articulate, article 2 oblong, with a row of setae, article 3 unlobate, article 4 shorter than article
157 3, nail present and not spinose along the inferior margin but with 3 sub-apical setae.

158 Gnathopod 1 (Figure 3(d), 3(e)) shorter than gnathopod 2; coxa subrectangular, left and
159 right coxae with 6 and 4 short setae on ventral margins, respectively; basis length about 3
160 times longer than wide, with long setae on anterior and posterior margins, and inner surface;
161 ischium with setae on posterodistal corner; merus with long ventral setae; carpus 0.8 times as
162 long as propodus, with finely serrate setae on posterodistal corner; propodus subrectangular,
163 length 1.9 times longer than wide; left propodus with single seta, pair and cluster of setae on
164 anterior margin, single seta and 2 clusters of setae on posterior margin, right propodus single
165 seta and pair and cluster of setae on anterior margin, 2 clusters of setae on posterior margin,
166 palm (Figure 3(e)) oblique, about 0.6 times as long as posterior margin, smoothly connected
167 with posterior margin by 2 medial and 2 lateral robust setae; dactylus with seta on anterior
168 margin and 2 short setae subapically, nail indistinct. Gnathopod 2 (Figure 3(f), 3(g)) coxa with
169 6 setae on ventral margin; basis sub-linear, length about 3 times longer than wide, with
170 anterior and posterior marginal setae; ischium with 3 setae on posterodistal corner; merus with
171 long setae distally; carpus 1.2 times as long as propodus; propodus subrectangular, length 2.3

172 times longer than wide, with 2 pairs and cluster of setae on posterior margin, palm (Figure
173 3(g)) oblique, about 0.5 times as long as posterior margin, smoothly connected with posterior
174 margin by 3 medial and 1 lateral robust setae in left gnathopod 2, by 4 medial and 1 lateral
175 robust setae in right one; dactyl similar to that of Gnathopod 1.

176 Pereopod 3 (Figure 4(a)) coxa ovate, with 6 short setae on ventral margin and robust seta
177 on posterodistal corner; length ratio of from basis to propodus 1.0:0.2:0.6:0.5:0.6; basis sub-
178 liner, with long setae on anterior and posterior margins; ischium with 2 setae on posterodistal
179 corner; merus with 2 setae on anterior margin, single seta and cluster of setae on posterior
180 margin; carpus with seta on anterior and posterior margins; propodus with 2 setae on anterior
181 margin, 2 robust and 1 slender setae on posterior margin; dactyls 0.4 times as long as
182 propodus, bearing seta on anterior margin and 2 minute setae subapically. Pereopod 4 (Figure
183 4(b)) coxa with shallow posterior concavity, right ventral margins of left and right coxae with
184 10 and 8 short setae, respectively; length ratio from basis to propodus 1.0:0.3:0.6:0.6:0.6;
185 anterior and posterior margins of basis with long setae; ischium with 1 or 2 setae on
186 posterodistal corner; merus with 1 or 2 setae on anterior margin, 2 setae on posterior margin;
187 anterior and posterior margins of carpus with 1 and 2 setae, respectively; propodus with 2
188 setae on anterior margin, single and pair robust setae on posterior margin; dactyl 0.3 times as
189 long as propodus, bearing seta on anterior margin and 2 minute setae subapically. Pereopod 5
190 (Figure 4(c)) coxa bilobed, anterior lobe with small seta, posterior lobe with 2 robust and 1

191 small setae; length ratio from basis to dactylus 1.0:0.3:0.7:0.7:0.8:0.3; basis ovate,
192 posteroventrally lobate; ischium with pair of setae on anterodistal corner; merus with single
193 and pair of setae on anterior margin, robust seta on posterior margin; carpus with single and
194 pair of robust setae on anterior margin, posterior margin with seta; propodus with 2 pairs of
195 robust setae on anterior margin, single and pair of setae on posterior margin; dactylus with
196 seta on posterior margin and 2 small subapical setae. Pereopod 6 (Figure 4(d)) coxa bilobate,
197 posterior lobe with 1 robust and 1 slender setae; length ratio from basis to dactylus
198 1.0:0.3:0.8:0.7:0.8:0.3; basis ovate, posteroventrally lobate; ischium with 2 setae on
199 anterodistal corner; merus with single and pair of setae on anterior margin, robust seta on
200 posterior margin; carpus with single and pair of robust setae on anterior margin, posterior
201 margin with 2 robust setae; propodus with 2 single and 1 pair of robust setae on anterior
202 margin, single and pair of robust setae on posterior margin; dactylus with seta on posterior
203 margin and 2 small subapical setae. Pereopod 7 (Figure 4(e)) coxa semicircular with 3 setae
204 on posteroventral margin; length ratio from basis to dactylus 1.0:0.2:0.6:0.6:0.7:0.2; basis
205 ovate, posteroventrally lobate; ischium with 2 setae on anterodistal corner; anterior and
206 posterior margins of merus and carpus with 2 robust setae; propodus with single and 2 pairs of
207 robust setae on anterior margin, 2 robust and 1 small setae on posterior margin; dactylus with
208 seta on posterior margin and small subapical seta.

209 Coxal gills (Figures 3(f), 4(a–c), 4(e)) ovate, on gnathopod 2 to pereopod 7. Sternal gill

210 and hump absent. Brood plates (Figure 3(h), 3(i)) on gnathopod 2, pereopods 3 and 4 large,
211 brood plate on pereopod 5 small, narrow, strap-like.

212 Pleopods 1–3 (Figure 5(a–c)) peduncles with paired retinacula on inner distal margin, and
213 with facial setae; pleopods 1–3 inner ramus 7-, 8- and 7-articulate, respectively, with bifid
214 plumose setae (clothes-pin setae) on inner basal margins, terminal setae on rami length 0.7–
215 0.9 times that of rami; outer rami 10-, 10- and 9-articulate, respectively.

216 Uropod 1 (Figure 5(d)) not extending beyond peduncle of uropod 3; peduncle with 2 and
217 4–5 robust setae along medial and lateral ridges, respectively, basofacial seta absent; inner
218 ramus length 0.7 times that of peduncle, with 1–2 robust setae on inner margin; outer ramus
219 length 0.9 times that of inner ramus, with outer marginal robust seta. Uropod 2 (Figure 5(e))
220 length 0.7 times that of uropod 1; peduncle with 1 medial and 2 lateral robust setae dorsally;
221 inner ramus almost as long as peduncle, with 2 robust setae on inner margin; outer ramus
222 length 0.7 times that of inner ramus, with outer marginal robust seta. Uropod 3 (Figure 5(f))
223 length 0.6 times that of uropod 1; both rami equal in length, length 1.2 times that of peduncle,
224 uniaarticulate, each ramus with 2 subterminal setae; inner ramus with 5 and 2 robust setae on
225 inner and outer margins, respectively; outer ramus with 2 and 3 robust setae on inner and
226 outer margins, respectively. Telson (Figure 5(g)) tapering distally, length 1.3 times longer than
227 wide, cleft for 58%, lateral margin not concave, with several sub-lateral and facial setae, each
228 lobe bearing 1 long and 1 short setae sub-apically, apex rounded.

229

230 ***Variation***

231 Antenna 1 of one paratype (KUZ Z2042) length 0.4 and 1.4 times that of body and antenna 2,
232 respectively.

233

234 ***Distribution***

235 Known only from the type locality.

236

237 ***DNA sequences***

238 In total, 3 sequences of the present paratype (KUZ Z1939) were determined by previous
239 studies (Tomikawa et al. 2014; Tomikawa et al. 2017; Nakano and Tomikawa 2018): nuclear
240 28S ribosomal RNA (AB778502; 787 bp), histone H3 (LC334142; 328 bp), mitochondrial
241 16S ribosomal RNA (LC334116; 418 bp), and cytochrome c oxidase subunit I (LC146870;
242 658 bp).

243

244 ***Etymology***

245 The specific name is an adjective derived from the name of the type locality of this new
246 species.

247

248 **Remarks**

249 *Paramoera shakotanensis* sp. nov. is characterized by the antennal sinus without sharp
250 incision and the small number of setae on maxillae 1 and 2 (up to three on the inner plate of
251 the maxilla 1 and up to two on oblique inner row of the inner plate of the maxilla 2). The
252 present species shares these features with *P. austrina* (Bate, 1862), *P. (H.) crassicauda* Staude,
253 1995, *P. hermitensis* Barnard, 1932, and *P. tristanensis* Barnard, 1932. *Paramoera*
254 *shakotanensis* sp. nov. can be distinguished from those five species by the following features
255 (Bate 1862; Barnard 1932; Staude 1995): from *P. austrina* [features of *P. austrina* in
256 parentheses], antennal sinus deep (shallow), epimeral plate 3 moderately (broadly) expanded
257 posteriorly, and ventral margin of coxa of pereopod 4 rounded (almost straight); from *P.*
258 *crassicauda* [features of *P. crassicauda* in parentheses], eyes large (small, reduced) and
259 pereopod 7 with coxal gill (lacking); from *P. hermitensis* [features of *P. hermitensis* in
260 parentheses], posterior margin of epimeral plate 3 smooth (posterior margin weakly serrate),
261 telson length 1.3 (1.8) times longer than wide with almost straight (concave) lateral margins,
262 and telson with sub-lateral and distal setae (distal setae only); and from *P. tristanensis*
263 [features of *P. tristanensis* in parentheses], posterior margin of epimeral plate 3 smooth
264 (posterior margin slightly crenulate) and lateral margins of telson almost straight (convex)
265 with (without) setae.

266 The original descriptions of *P. fasciculata* (Thomson, 1880), *P. fissicauda* (Dana, 1852),

267 and *P. litoralis* (Oldevig, 1959) lack information of antennal sinus and setal numbers of
268 maxillae 1 and 2 (Dana 1852; Thomson 1880; Oldevig 1959). However, *P. shakotanensis* sp.
269 nov. is distinguished from *P. fasciculata* and *P. litoralis* by the following features: palm of
270 propodus of gnathopods 1 and 2 with 4 and 5 robust setae, respectively on posteroproximal
271 corners (2–3 and 3 robust setae, respectively in *P. litoralis*), telson tapering distally (lateral
272 margins parallel in *P. fasciculata*) with sub-lateral setae (lacking lateral setae in *P. litoralis*).

273 The insufficient description of *P. fissicauda* makes difficult to compare with the present
274 new species. Bellan-Santini and Ledoyer (1974) described *P. fissicauda* based on materials
275 from the Kerguelen and Crozet. *Paramoera fissicauda* described by them has the sharply
276 incised antennal sinus and the maxillae 1 and 2 with many setae, and thus obviously differs
277 from *P. shakotanensis* sp. nov. However, Bellan-Santini and Ledoyer's *P. fissicauda* has been
278 considered to be an undescribed species (De Broyer and Jazdzewski 1993). Accordingly, the
279 taxonomic relationship between *P. shakotanensis* sp. nov. and *P. fissicauda* remains subject to
280 a future study.

281 *Paramoera shakotanensis* sp. nov. is also similar to *P. anivae* Labay, 2012 and *P.*
282 *erimoensis* Kuribayashi and Kyono, 1995 in having an inferior antennal sinus lacking an
283 incision, pereopod 7 with coxal gill, and rami of uropod 3 without plumose setae. However, *P.*
284 *shakotanensis* can be distinguished from these two species by the following features
285 (Kuribayashi and Kyono 1995; Labay 2012) [features of *P. anivae* and *P. erimoensis* in

286 parentheses]: from *P. anivae*, peduncular article 2 gland cone of antenna 2 with 2 setae (with
287 6 setae), inner plate of maxilla 1 with 3 plumose setae (5 plumose setae), outer margin of palp
288 article 2 of maxilla 1 without seta (with seta), inner plate of maxilla 2 with oblique inner row
289 of 2 plumose setae (3 plumose setae); and from *P. erimoensis*, inner plate of maxilla 1 with 3
290 plumose setae (5 plumose setae), inner plate of maxilla 2 with oblique inner row of 2 plumose
291 setae (3 plumose setae), and carpus of female gnathopod 2 longer than propodus (shorter than
292 propodus).

293 *Paramoera shakotanensis* sp. nov. possesses large eyes despite this species inhabits
294 interstitial habitats. Unlike the epigeal species, the previously known hypogean *Paramoera*
295 amphipods can be characterised by their eyes, which are vestigial or completely lacking,
296 among other characteristics, and thus, four subgenera have been erected for those species
297 (Staude 1995; Sidorov 2010). Of the four described subgenera, three subgenera, *Moanamoera*
298 Staude, 1995, *Humilomoera* Staude, 1995 and *Rhithromoera* Staude, 1995, were erected by
299 Staude (1995) for the subterranean and/or interstitial species distributed in the North Pacific.
300 The subgenus *Moanamoera* was established for the *Paramoera* amphipod inhabiting brackish
301 lava ponds in the Hawaiian Islands (Barnard 1977; Staude 1995), and the remaining two
302 subgenera, i.e. *Humilomoera* and *Rhithromoera*, were erected from the interstitial subtidal
303 and/or brackish pool species inhabiting the eastern coast of the North Pacific (Staude 1995).
304 Recently, an additional subgenus, *Ganigamoera* Sidorov, 2010, was described for the

305 stygobitic *Paramoera* species inhabiting inland freshwater habitats in the Russian Far East
306 (Sidorov 2010). The remaining species which were not included in those four subgenera have
307 been assigned to the subgenus *Paramoera* (Staude 1995).

308 As described above, the new species bears morphological characteristics mostly consistent
309 with the diagnosis of *Humilomoera* as defined by Staude (1995). However, the new species
310 possesses large eyes and a coxal gill on pereopod 7, two characteristics that are at odds with
311 Staude's (1995) definition of this subgenus. Eye reduction is a character that can differ even
312 among two populations of the same species of amphipod if, for example, one population lives
313 underground and the other inhabits surface waters (Culver *et al.* 1995). Therefore, the absence
314 of eyes in the previously known *Humilomoera* species is deemed to be a highly derived
315 character that is related to their interstitial habitats. Moreover, another subgenus,
316 *Rhithromoera*, also contains species with and without a coxal gill on pereopod 7 (Staude
317 1995).

318 It was stated that the subgenus-level classification of *Paramoera* remained unresolved,
319 when the two subgenera *Humulomoera* and *Rhithromoera* were erected (Staude 1995).
320 Moreover, it was implied that the other subgenus *Ganigamoera* might not be a monophyletic
321 taxon (Sidorov 2010). The subterranean *P. relictata* was once classified within the genus
322 *Relictomoera* Barnard and Karaman, 1982, of which the type species is *P. relictata*. According
323 to a systematic revision of *P. relictata* (Nakano and Tomikawa 2018), however, *P. relictata* was

324 genetically close to the epigean *P. koysama* synonymizing *Relictomoera* with *Paramoera*.
325 Since the precise phylogenetic relationships among *P. relictata* and the other hypogean species
326 classified within the three subgenera remained unresolved, *Relictomoera* was not treated as a
327 valid subgenus in Nakano and Tomikawa (2018). Therefore, the new species from Hokkaido
328 is not assigned to the subgenus *Humilomoera* as well as other subgenera, so as to avoid
329 additional taxonomic confusion. To clarify the subgeneric assignment of *P. shakotanensis* sp.
330 nov., as well as to test the validity of subgenus-level classification of *Paramoera*, a molecular
331 phylogenetic study should be necessary along with evaluating morphological characteristics
332 of all *Paramoera* species.

333 A few *Paramoera* species show sexual dimorphism in their pleopods (Kuribayashi and
334 Kyono 1995; Sidorov 2010). The outer ramus of pleopod 2 in their males is modified as more
335 or less shortened and broadened with thickened short setae distally, whereas that of the
336 females shows usual form common in *Paramoera* (Kuribayashi and Kyono 1995; Sidorov
337 2010). However, it remains unclear whether *P. shakotanensis* sp. nov. exhibits sexual
338 dimorphism in its pleopods, since any males of the new species have not been collected. The
339 morphological characteristics of the males of *P. shakotanensis* sp. nov. should be documented
340 by a future taxonomic study; the DNA sequences provided from the paratype of the new
341 species will greatly help identify male individuals of the new species.

342

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- 396

397 Figure captions

398

399 **Figure 1.** *Paramoera shakotanensis* sp. nov., paratype, female, KUZ Z2042, lateral view.

400 Scale bar, 1.0 mm.

401

402 **Figure 2.** *Paramoera shakotanensis* sp. nov., holotype, female, KUZ Z2041. (a) Head, lateral

403 view. (b–d) Epimeral plates 1–3, lateral views. (e) Antenna 1, medial view. (f) Accessory

404 flagellum of antenna 1, medial view. (g) Antenna 2, medial view. (h) Gland cone of

405 peduncular article 2 of antenna 2, medial view. (i) Upper lip, anterior view. (j), (k) Left and

406 right mandible, medial views. (l) Lower lip, ventral view. (m) Right maxilla 1, anterior view.

407 (n) Palp of left maxilla 1, anterior view. (o) Maxilla 2, anterior view. Scale bars, 0.1 mm.

408

409 **Figure 3.** *Paramoera shakotanensis* sp. nov., holotype, female, KUZ Z2041. (a) Maxilliped,

410 anterior view. (b), (c) Inner and outer plates of maxilliped, anterior views. (d) Gnathopod 1,

411 medial view. (e) Palmar margin of propodus and dactylus of gnathopod 1, medial view. (f)

412 Gnathopod 2, medial view. (g) Palmar margin of propodus and dactylus of gnathopod 2,

413 medial view. (h), (i) Brood plates of gnathopod 2 and pereopod 5, medial views. Scale bars,

414 0.1 mm.

415

416 **Figure 4.** *Paramoera shakotanensis* sp. nov., holotype, female, KUZ Z2041. (a–e) Pereopods

417 3–7, lateral (a), (c) and medial (b), (d), (e) views. Scale bars, 0.1 mm.

418

419 **Figure 5.** *Paramoera shakotanensis* sp. nov., holotype, female, KUZ Z2041. (a–c) Pleopods

420 1–3, lateral (a), (c) and medial (b) views. (d–f) Uropods 1–3, ventral views. (g) Telson, ventral

421 view. Scale bars, 0.1 mm.

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