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Deep-sea Mysidaceans (Crustacea: Lophogastrida and Mysida) from the Northwestern North Pacific off Japan, with Descriptions of Six New Species

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Abstract: Mysidaceans (Lophogastrida and Mysida) from deep waters off the northern Japan are reported. Four species of Lophogastrida and 33 species of Mysida were identified. A new genus, *Neoamblyops*, and six new species, *Ceratomysis japonica*, *C. orientalis*, *Holmesiella bisaetigera*, *Mysimenzies borealis*, *Neoamblyops latisquamatus*, and *Paramblyops hamatilis*, are described.

Key words: Crustacea, Lophogastrida, Mysida, deep water, northern Japan, new genus, new species.

Introduction

Mysidaceans (Lophogastrida and Mysida) from deep waters off the Pacific coast of the northern Honshu, Japan, have been reported by W. Tattersall (1951), Birstein and Tchindonova (1958), Taniguchi (1969), Murano (1975, 1976), Fukuoka *et al*. (2005), and Fukuoka and Murano (2006). To date, two species of Lophogastrida and 11 species of Mysida have been recorded (Table 1).

The present paper provides the taxonomic result of mysidacean specimens collected from deep waters off the northern Japan during a research project entitled “Research on Deep-sea Fauna and Pollutants off Pacific Coast of Northern Japan” as part of the “Study on Deep-Sea Fauna and Conservation of the Deep-Sea Ecosystem” conducted by the National Museum of Nature and Science, Tokyo. This paper reports four species of Lophogastrida and 33 species of Mysida including a new genus, *Neoamblyops*, and six new species, *Ceratomysis japonica*, *C. orientalis*, *Holmesiella bisaetigera*, *Mysimenzies borealis*, *Neoamblyops latisquamatus*, and *Paramblyops hamatilis*.

Body length was measured from the tip of the rostrum to the posterior end of the telson excluding spines. In Gnathophausiidae specimens, the total length was measured from the posterior margin of the orbit to the posterior end of the telson excluding spines. Specimens examined in this study were stored in the National Museum of Nature and Science, Tokyo (NSMT). Sampling data are shown in Tables 2−3.

Taxonomic accounts

Order Lophogastrida
Family Gnathophausiidae
Neognathophausia gigas (Willemoes-Suhm, 1875)

Gnathophausia gigas Willemoes-Suhm, 1875: 28−31, pl. 9, figs. 16−17, pl. 10, figs. 2−3; G. Sars, 1885: 33−35, pl. 3; Ortmann, 1906: 36−38, pl. 2, fig. 1; Fage, 1941: 24−27; Nouvel, 1943: 12−15, pl. 1, figs. 11−15; Banner, 1948a: 357−358, fig. 1; W. Tattersall, 1951: 26−28; W. Tattersall and O. Tattersall, 1951: 77−82, figs. 1−2; O. Tattersall, 1955: 36−38; Birstein and Tchindonova, 1958: 260−261; 1962: 57−58; Taniguchi, 1969: 44−45, fig. 2; Kathman *et al.*, 1986: 158, fig. a−h (p.

Table 1. List of species of Lophogastrida and Mysida recorded from deep waters off the Pacific coast of Tohoku District and Hokkaido, northern Japan.

Species	References
Order Lophogastrida	
Family Ganthophausiidae	
Neognathophausia gigas (Willemoes-Suhm, 1875)	Taniguchi (1969)
Family Eucopiidae	
Eucopia grimardii Nouvel, 1942	Taniguchi (1969)
Order Mysida	
Family Petalophthalmidae	
Ceratomysis spinosa Faxon, 1893	W. Tattersall (1951)
Family Mysidae	
Subfamily Boreomysinae	
Boreomysis californica Ortmann, 1894	Taniguchi (1969)
Boreomysis incisa Nouvel, 1942	Birstein and Tchindonova (1958)
Subfamily Mysinae	
Tribe Erythropini	
Caesaromysis hispida Ortmann, 1893	Murano (1977)
Hyperamblyops nana Birstein and Tchindonova, 1958	Murano (1975)
Katerythrops oceanae Holt and W. Tattersall, 1905	Taniguchi (1969)
Meterythrops microphthalmus W. Tattersall, 1951	Murano (1977), Fukuoka and Murano (2006)
Meterythrops robustus Smith, 1879	Fukuoka and Murano (2006)
Tribe Mysini	
Parastilomysis paradoxa Ii, 1936	Fukuoka *et al*. (2005)
Parastilomysis prominula Fukuoka, Bravo and Murano, 2005	Fukuoka *et al*. (2005)
Parastilomysis separata Fukuoka, Bravo and Murano, 2005	Fukuoka *et al*. (2005)

159); Ledoyer, 1995: 602–603; Liu and Wang, 2000: 68–70, fig. 5.
Gnathophausia drepanephora Holt and W. Tattersall, 1905: 113–116, pl. 18.
Neognathophausia gigas: Petryashov, 1992: 47, fig. 1 (1–5); 2005: 959, fig. 2.

Material examined. 1 juvenile (24.5 mm), WA06-E750, NSMT-Cr 19613. 1 female (70.2 mm), WA06-E1200, NSMT-Cr 19614. 1 juvenile (damaged), WA07-A650, NSMT-Cr 19615. 1 female (44.7 mm), WA07-A750, NSMT-Cr 19616. 1 juvenile (49.2 mm), WA07-A900, NSMT-Cr 19617. 1 female (68.0 mm) and 1 juvenile (61.2 mm), WA07-B450, NSMT-Cr 19618. 2 juveniles (37.9, 45.0 mm), WA07-B650, NSMT-Cr 19619. 3 juveniles (31.6–37.8 mm), WA07-B750, NSMT-Cr 19620. 4 juveniles (31.1–40.9 mm), WA07-B900, NSMT-Cr 19621. 7 males (55.3–86.3 mm) and 6 females (54.0–84.2 mm), WA07-B1200T, NSMT-Cr 29622. 1 juvenile (27.4 mm), WA07-B1500D, NSMT-Cr 19623. 1 juvenile (46.4 mm), WA07-D900, NSMT-Cr 19624. 1 male (95.0 mm), SO07-O3, NSMT-Cr 19625. 1 female (75.6 mm), KT-07-29-M3-2, NSMT-Cr 19626. 1 female (85.2 mm) and 1 juvenile (22.2 mm), KT-07-29-M3-3, NSMT-Cr 19627. 1 male (71.3 mm) and 2 juveniles (22.5, 47.2 mm), KT-07-29-K3, NSMT-Cr 19628.

Distribution. Cosmopolitan (see Müller, 1993).

Family Lophogastridae
Lophogaster japonicus W. Tattersall, 1951

Lophogaster typicus (Japanese specimens): Ortmann, 1906: 23–26.
Lophogaster japonicus W. Tattersall, 1951: 19–20, figs. 1a, 2a; Murano, 1970c: 1–4, fig. 1a–d.

Material examined. 1 female (24.8 mm), WA06-H210, NSMT-Cr 19629. 2 males (23.3, 23.4

Table 2. List of stations by R/V *Wakataka-maru*. BT, beam trawl with 2 m span opening; D, dredge; O, otter trawl.

Stn. no.	Gear	Date	Position in	Position out	Depth (m)	Bottom Temp (°C)
WA91-03	BT	20 October 1992	40° 45.3′ N, 141° 57.5′ E	40° 44.8′ N, 141° 58.5′ E	200–210	7.8
WA05-F510	O	27 October 2005	37° 39.4′ N, 142° 01.2′ E	37° 38.2′ N, 142° 01.1′ E	508–506	4.3
WA05-G550	O	3 November 2005	36° 58.2′ N, 141° 37.9′ E	36° 59.1′ N, 141° 38.6′ E	560–557	3.8
WA05-H650	O	2 November 2005	36° 30.8′ N, 141° 11.5′ E	36° 31.6′ N, 141° 12.6′ E	661–647	3.7
WA06-E425	O	4 November 2006	38° 24.2′ N, 142° 03.0′ E	38° 24.9′ N, 142° 02.7′ E	423–423	3.4
WA06-E450	O	3 November 2006	38° 23.5′ N, 142° 04.0′ E	38° 25.2′ N, 142° 03.6′ E	448–451	3.6
WA06-E510	O	3 November 2006	38° 22.6′ N, 142° 06.3′ E	38° 23.9′ N, 142° 05.7′ E	514–506	3.4
WA06-E750	O	2 November 2006	38° 23.1′ N, 142° 14.5′ E	38° 22.4′ N, 142° 14.1′ E	758–756	3.2
WA06-E1200	O	2 November 2006	38° 23.4′ N, 142° 31.8′ E	38° 23.8′ N, 142° 31.9′ E	1202–1206	-
WA06-EF425D	D	21 November 2006	38° 03.3′ N, 142° 04.0′ E	38° 03.1′ N, 142° 04.1′ E	420–424	-
WA06-F480	O	31 October 2006	37° 41.7′ N, 141° 59.0′ E	37° 39.9′ N, 141° 59.0′ E	483–478	3.6
WA06-F510	O	31 October 2006	37° 38.6′ N, 142° 01.1′ E	37° 39.8′ N, 142° 01.4′ E	503–511	3.8
WA06-G380	O	27 October 2006	36° 53.4′ N, 141° 27.4′ E	36° 54.5′ N, 141° 28.9′ E	384–377	4.7
WA06-G425	O	27 October 2006	36° 53.2′ N, 141° 29.2′ E	36° 52.1′ N, 141° 27.6′ E	428–420	5.0
WA06-G480	O	28 October 2006	36° 51.2′ N, 141° 29.2′ E	36° 50.0′ N, 141° 27.7′ E	481–483	4.5
WA06-H210	O	13 November 2006	36° 30.0′ N, 140° 58.4′ E	36° 31.4′ N, 140° 59.0′ E	213–193	11.8
WA07-A410	O	9 October 2007	40° 57.9′ N, 141° 42.5′ E	40° 57.5′ N, 141° 43.3′ E	412–415	3.4
WA07-A650	O	10 October 2007	41° 04.9′ N, 141° 48.9′ E	41° 04.5′ N, 141° 49.2′ E	662–661	3.3
WA07-A750	O	10 October 2007	41° 07.6′ N, 141° 50.0′ E	41° 07.4′ N, 141° 50.1′ E	748–747	3.1
WA07-A900	O	10 October 2007	41° 09.3′ N, 141° 53.8′ E	41° 09.0′ N, 141° 53.8′ E	882–881	2.9
WA07-A1500D	D	11 October 2007	40° 50.5′ N, 142° 31.5′ E	40° 50.2′ N, 142° 31.1′ E	1402–1377	-
WA07-B350	O	13 October 2007	40° 06.4′ N, 142° 15.1′ E	40° 08.2′ N, 142° 14.6′ E	350–352	3.4
WA07-B410	O	13 October 2007	40° 15.4′ N, 142° 14.1′ E	40° 13.7′ N, 142° 14.6′ E	420–412	3.4
WA07-B410D	D	13 October 2007	40° 16.9′ N, 142° 13.5′ E	40° 17.1′ N, 142° 13.5′ E	416–416	-
WA07-B450	O	12 October 2007	40° 13.2′ N, 142° 15.7′ E	40° 14.7′ N, 142° 15.4′ E	454–459	3.5
WA07-B650	O	11 October 2007	40° 19.8′ N, 142° 18.0′ E	40° 20.6′ N, 142° 17.7′ E	644–640	3.3
WA07-B750	O	11 October 2007	40° 19.7′ N, 142° 21.3′ E	40° 20.1′ N, 142° 20.9′ E	759–749	3.3
WA07-B900	O	11 October 2007	40° 21.8′ N, 142° 24.3′ E	40° 21.5′ N, 142° 24.4′ E	898–900	3.1
WA07-B1200T	O	12 October 2007	40° 21.6′ N, 142° 33.9′ E	40° 21.8′ N, 142° 33.8′ E	1208–1200	-
WA07-B1500D	D	12 October 2007	40° 23.9′ N, 142° 48.5′ E	40° 23.9′ N, 142° 48.2′ E	1511–1514	-
WA07-C350	O	15 October 2007	39° 45.7′ N, 142° 16.9′ E	39° 47.4′ N, 142° 17.0′ E	358–358	3.9
WA07-C410	O	14 October 2007	39° 50.3′ N, 142° 17.9′ E	39° 48.5′ N, 142° 17.9′ E	409–415	3.7
WA07-C450	O	17 October 2007	39° 42.3′ N, 142° 18.0′ E	39° 40.6′ N, 142° 17.7′ E	467–458	3.7
WA07-C510	O	14 October 2007	39° 52.5′ N, 142° 19.8′ E	39° 51.2′ N, 142° 20.0′ E	511–521	3.5
WA07-C550	O	16 October 2007	39° 35.5′ N, 142° 18.6′ E	39° 34.2′ N, 142° 18.5′ E	552–559	3.6
WA07-C650	O	16 October 2007	39° 34.3′ N, 142° 20.3′ E	39° 35.5′ N, 142° 20.3′ E	659–644	3.4
WA07-C750	O	16 October 2007	39° 34.1′ N, 142° 22.5′ E	39° 33.5′ N, 142° 22.3′ E	748–749	3.4
WA07-C900	O	16 October 2007	39° 36.1′ N, 142° 32.7′ E	39° 35.9′ N, 142° 32.5′ E	900–893	3.1
WA07-D210	O	18 October 2007	38° 57.8′ N, 141° 59.9′ E	38° 59.2′ N, 142° 00.6′ E	212–214	8.8
WA07-D210D	D	18 October 2007	38° 57.4′ N, 141° 59.7′ E	38° 57.7′ N, 141° 59.9′ E	213–213	-
WA07-D250	O	18 October 2007	38° 56.8′ N, 142° 01.6′ E	38° 55.1′ N, 142° 01.0′ E	253–254	6.7
WA07-D310	O	18 October 2007	38° 53.5′ N, 142° 02.8′ E	38° 55.0′ N, 142° 03.3′ E	303–307	4.6
WA07-D510	O	17 October 2007	39° 04.2′ N, 142° 11.8′ E	39° 05.3′ N, 142° 12.0′ E	505–513	3.6
WA07-D900	O	5 October 2007	39° 05.3′ N, 142° 20.0′ E	39° 06.0′ N, 142° 20.1′ E	898–905	3.2
WA07-D1500D	D	17 October 2007	39° 20.2′ N, 142° 40.1′ E	39° 20.5′ N, 142° 40.3′ E	1505–1489	-

mm), WA07-D210, NSMT-Cr 19630. 33 males (19.4–28.2 mm) and 32 females (18.9–28.0 mm), WA07-D210D, NSMT-Cr 19631. 1 male (23.0 mm) and 1 female (25.0 mm), WA07-D250, NSMT-Cr 19632. 2 females (23.5, 26.5 mm), WA07-D310, NSMT-Cr 19633.

Distribution. Japan (Ortmann, 1906; W. Tattersall, 1951; Murano, 1970c).

Family Eucopiidae

Eucopia australis Dana, 1852

Eucopia australis Dana, 1852: 609–611; G. Sars, 1885: 55–62, pls. 9–10 (part); Faxon, 1895: 218–219; Hansen, 1905: 5, fig.

Table 3. List of stations by R/Vs *Soyo-maru*, *Tansei-maru* and *Yayoi*. BN, benthos-net; BT, beam trawl with 3 m span opening; D, dredge; TR, cage trap.

Stn. no.	Gear	Date	Position in	Position out	Depth (m)	Locality
R/V *Soyo-maru*						
SO-SE Erimo	BN	25 June 1992	41°22.1′N, 144°29.1′E	41°19.7′N, 144°24.6′E	4820–4480	SE Erimo
SO06-M4-B	BN	17 July 2006	39°35.2′N, 144°02.4′E	-	4951	off Miyako
SO07-C2-B	BN	21 July 2007	39°54.6′N, 136°07.8′E	39°56.9′N, 136°07.0′E	1360–1341	Yamato-tai
SO07-C3	TR	20 July 2007	40°03.2′N, 137°06.1′E	40°04.3′N, 137°05.8′E	1800–1820	Yamato Trench
SO07-C4-B1	BN	25 July 2007	43°00.4′N, 139°57.2′E	43°00.7′N, 140°00.4′E	1607–1369	off Iwanai
SO07-C6	TR	1 August 2007	42°06.6′N, 146°09.7′E	42°08.2′N, 146°15.2′E	5655–5680	off Kushiro
SO07-K1	BN	6 August 2007	38°35.4′N, 143°04.5′E	38°34.0′N, 143°06.9′E	2137–2081	off Kinkazan
SO07-K2	BN	6 August 2007	38°34.7′N, 143°32.9′E	38°30.6′N, 143°35.6′E	3045–3308	off Kinkazan
SO07-O1	BN	8 August 2007	36°46.0′N, 141°51.4′E	36°43.8′N, 141°48.1′E	2068–2020	off Onahama
SO07-O3	BN	7 August 2007	36°57.1′N, 142°39.9′E	36°52.4′N, 142°35.7′E	4123–4075	off Onahama
SO07-O4	BN	7 August 2007	37°00.6′N, 142°57.4′E	36°56.3′N, 142°58.9′E	5000–5268	off Onahama
R/V *Tansei-maru*						
KT-07-29-M1	BT	5 November 2007	39° 17.9′N, 142° 28.4′E	39°16.8′N, 142°27.4′E	1039–1041	off Miyako
KT-07-29-M2	BT	5 November 2007	39°16.2′N, 142°41.1′E	39°18.6′N, 142°43.7′E	1528–1603	off Miyako
KT-07-29-M3-2	BT	6 November 2007	39°20.2′N, 142°51.4′E	39°19.2′N, 142°49.2′E	1737–1709	off Miyako
KT-07-29-K1	BT	7 November 2007	42°35.0′N, 144°48.0′E	42°34.7′N, 144°49.9′E	1028–1075	off Kushiro
KT-07-29-K2	BT	7 November 2007	42°30.3′N, 144°50.5′E	42°30.6′N, 144°52.2′E	1535–1543	off Kushiro
KT-07-29-K3	BT	7 November 2007	42°27.6′N, 144°57.4′E	42°27.6′N, 144°59.4′E	2037–2025	off Kushiro
KT-07-29-E3	BT	7 November 2007	41°39.1′N, 144°07.5′E	41°37.2′N, 144°07.6′E	1997–2043	off Erimo
KT-07-29-H2	BT	8 November 2007	40°00.0′N, 143°31.4′E	41°00.8′N, 143°30.2′E	2055–2032	off Hachinohe
KT-07-29-M3-3	BT	8 November 2007	39°20.1′N, 142°51.2′E	39°19.2′N, 142°49.1′E	1733–1695	off Miyako
R/V *Yayoi*						
YA-06-4	D	23 May 2005	39°21.85′N, 141°59.40′E	39°21.91′N, 141°59.54′E	81.5–82.7	off Ohtsuchi

1; Ortmann, 1906: 53; Fage, 1942: 41–47, figs. 28a, 29, 30A, 31A–B, 32A, 33; Nouvel, 1943: 26–27, pl. 1, figs. 17–19; W. Tattersall, 1951: 33; O. Tattersall, 1955: 48–49, fig. 4C–D; Birstein and Tchindonova, 1958: 268; 1962: 60–61; Kathman *et al*., 1986: 140, fig. a–f (p. 141); Liu and Wang, 2000: 75–76, fig. 8.

Eucopia major Hansen, 1910: 21, pl. 1, fig. 4; Nouvel, 1943: 28–29, pl. 1, figs. 20–25; W. Tattersall, 1951: 33.

Material examined. 1 adult female (53.0 mm), SO07-C6, NSMT-Cr 19634.
Distribution. Cosmopolitan (see Müller, 1993).

Eucopia grimaldii Nouvel, 1942

Eucopia grimaldii Nouvel, 1942a: 5–6, figs. 5–8; Fage, 1942: 47–56, figs. 31C, 32B; Nouvel, 1943: 40–43, pl. 2, figs. 36–40; W. Tattersall and O. Tattersall, 1951: 106–108, fig. 11; O. Tattersall, 1955: 54–56, fig. 5; Birstein and Tchindonova, 1958: 266–267; 1962: 61; Murano, 1971: 46; Kathman *et al.*, 1986: 144–145, fig. c, e, g, i (p. 147); Petryashov, 2005: 962.

Eucopia unguiculata: Banner, 1948a: 359–360, fig. 2; Taniguchi, 1969: 45–46, fig. 3. [not *E. unguiculata* (Willemoes-Suhm, 1875)]

Material examined. 1 adult female (33.3 mm) and 1 juvenile (17.6 mm), WA07-A1500D, NSMT-Cr 19635. 1 adult male (36.6 mm), WA07-B750, NSMT-Cr 19636. 2 juveniles (17.2 mm, damaged), WA07-B1500D, NSMT-Cr 19637. 4 adult males (25.0–27.5 mm), WA07-D1500D, NSMT-Cr 19638. 7 adult males (22.2–31.3 mm) and 3 adult females (27.5–43.0 mm), SO07-C6, NSMT-Cr 19639. 1 adult male (22.0 mm), SO07-K1, NSMT-Cr 19640. 1 adult male (22.0 mm) and 1 adult female (27.1 mm), SO07-K2, NSMT-Cr 19641. 1 immature female (28.2 mm), KT-07-29-E3, NSMT-Cr 19642. 1 adult male (22.3 mm), KT-07-29-K1, NSMT-Cr 19643. 2 adult males (20.8, 27.4 mm) and 3 adult females (21.0–34.5 mm), KT-07-29-K2, NSMT-Cr 19644. 1 adult male (26.2 mm), KT-07-29-M1, NSMT-Cr 19645. 2 adult females (broken), KT-07-29-M2,

NSMT-Cr 19646. 2 adult males (30.8 mm, broken) and 2 adult females (22.5, 35.5 mm), KT-07-29-M3-2, NSMT-Cr 19647. 1 adult female (30.7 mm), KT-07-29-M3-3, NSMT-Cr 19648. 1 juvenile (19.5 mm), KT-07-29-H2, NSMT-Cr 19649.

Distribution. Cosmopolitan (see Müller, 1993).

Order Mysida
Family Petalophthalmidae
Ceratomysis japonica sp. nov.
(Figs. 1–2)

Material examined. Holotype: adult female (28.0mm), WA06-G425, NSMT-Cr 19650. Paratypes: 1 adult female (damaged, ca 22.6 mm), WA05-G550, NSMT-Cr 19651; 1 adult female (20.8 mm), WA05-H650, NSMT-Cr 19653; 1 adult female (30.0 mm), WA06-G425, NSMT-Cr 19652.

Description. Body spinous (Fig. 1A–B). Seventh and eighth thoracic somites with dorsal median spine with rounded apex. First abdominal somite with anterior simple spine and posterior bifid spine along dorsal median line, those apices rounded; second to sixth somites with simple, dorsal, pointed spine on posterior part.

Carapace (Fig. 1A–B) spinous; anterior margin almost straight; anterolateral angles produced into long spiniform process; posterior margin not emarginate, uncovering last 2 thoracic somites; dorsal surface with 3 spines anterior to cervical sulcus, 2 pairs of spines posterior to cervical sulcus, and 1 spine near posterior end, those apices rounded.

Antennular peduncle (Fig. 1A, C): second segment 1/2 of first segment in length; third segment slightly shorter than first.

Antennal scale (Fig. 1C–D) elongate, extending beyond distal margin of antennular peduncle by 2/3 of its length, 8 times as long as broad, armed with setae on entire margin except for basal 1/5 of lateral margin, and with 9 spines among setae on lateral margin. Antennal peduncle (Fig. 1D) slender, extending to distal 1/4 of scale; second segment 4.2 times as long as broad; third segment 1.2 times longer than second. Antennal sympod (Fig. 1D) with anterolateral angle produced into long, spiniform process.

Eye (Fig. 1A, C) reduced to single plate without visual elements, each corner produced into spiniform process with pointed apex extending slightly beyond distal margin of proximal segment of antennular peduncle.

Labrum without acute process on anterior margin. Mandibular palp (Fig. 1E) with second segment armed with robust setae on lateral and mesial margins; third segment 1/2 length of third segment. Maxillule (Fig. 1F) with lateral lobe armed with 10 spines on distal margin and with 3 setae arranged irregularly on posterior surface. Maxilla (Fig. 1G): exopod large, extending to 1/2 of distal segment of endopod; second segment of endopod 1.5 times as long as broad.

Endopod of first thoracopod (Fig. 2A) short, robust; ischium with mesial lobe; merus expanded mesially. Endopod of second thoracopod (Fig. 2B) robust; ischium with large mesial lobe. Endopods of third to fifth thoracopods (Fig. 2C–D) long, slender, increasing in length from third to fifth thoracopods; carpopropodus as long as merus, undivided into subsegments; dactylus very small. Endopods of sixth to eighth thoracopods (Fig. 2E–G) long, robust; carpopropodus slightly shorter than merus, divided into 3 subsegments, proximal 2 subsegments short, distal subsegment 3.6–4.0 times longer than combined length of proximal 2 subsegments; dactylus 1/3 of carpopropodus in length, with terminal claw. First thoracopod without exopod; second to eighth thoracopods with flagilliform exopod.

Marsupium of female composed of 7 pairs of oostegites.

All pleopods of female uniramous (Fig. 2H–L); first to fourth pleopods unsegmented; fifth

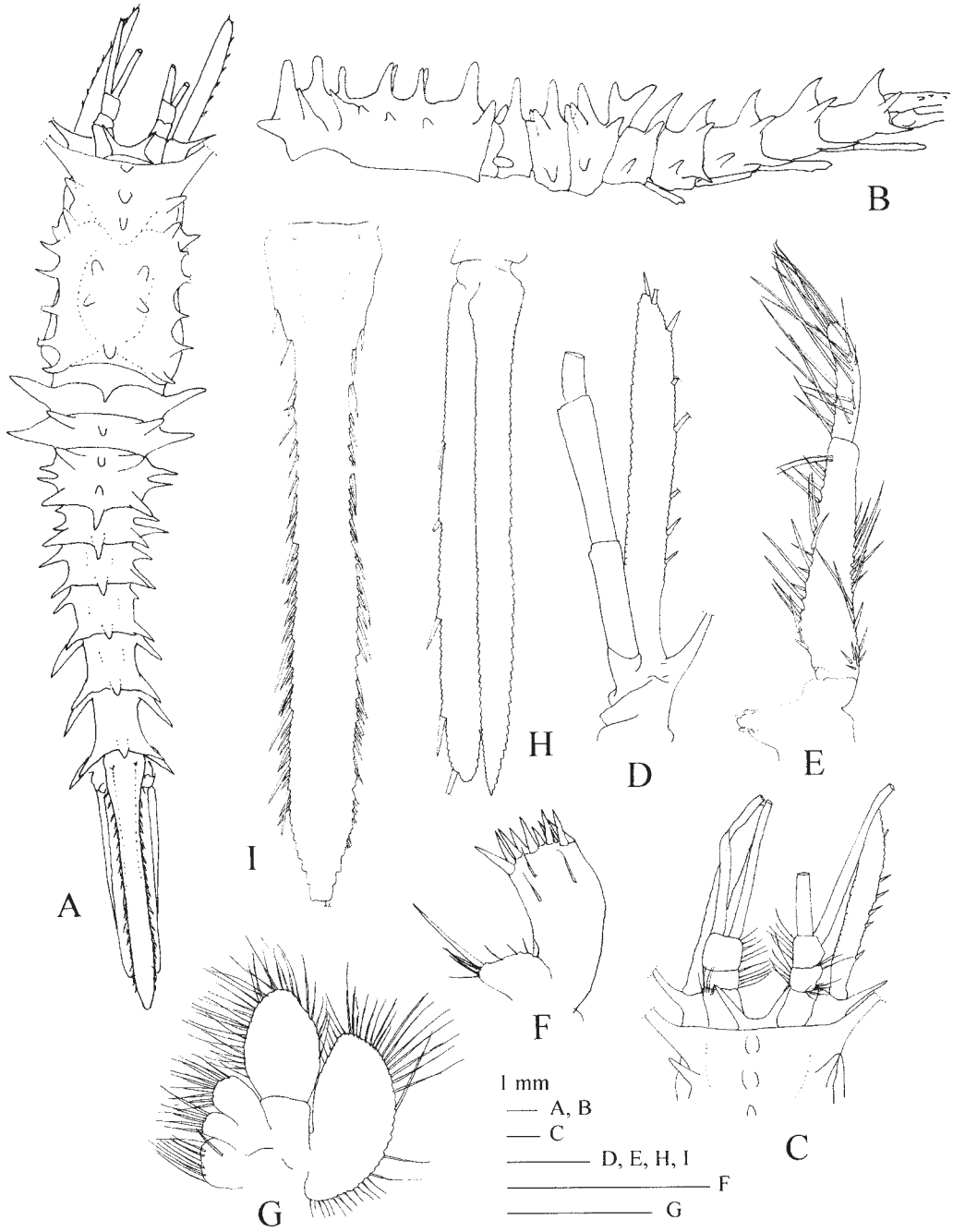

Fig. 1. *Ceratomysis japonica* sp. nov. Adult female (28.0 mm), holotype, NSMT-Cr 19650. A, body (dorsal); B, body (lateral); C, anterior part of body (dorsal); D, antenna (left, ventral); E, mandible (left, ventral); F, maxillule (left, posterior); G, maxilla (left, posterior); H, uropod (left, ventral); I, telson (dorsal).

pleopod 2-segmented, extending to proximal 1/7 of uropodal exopod, 1.4 times longer than fourth.

Uropodal endopod (Fig. 1A, H) long, slender, extending to distal 1/8 of telson, 16 times as long as broad, without spines on mesial margin. Uropodal exopod (Fig. 1A, H) slightly shorter

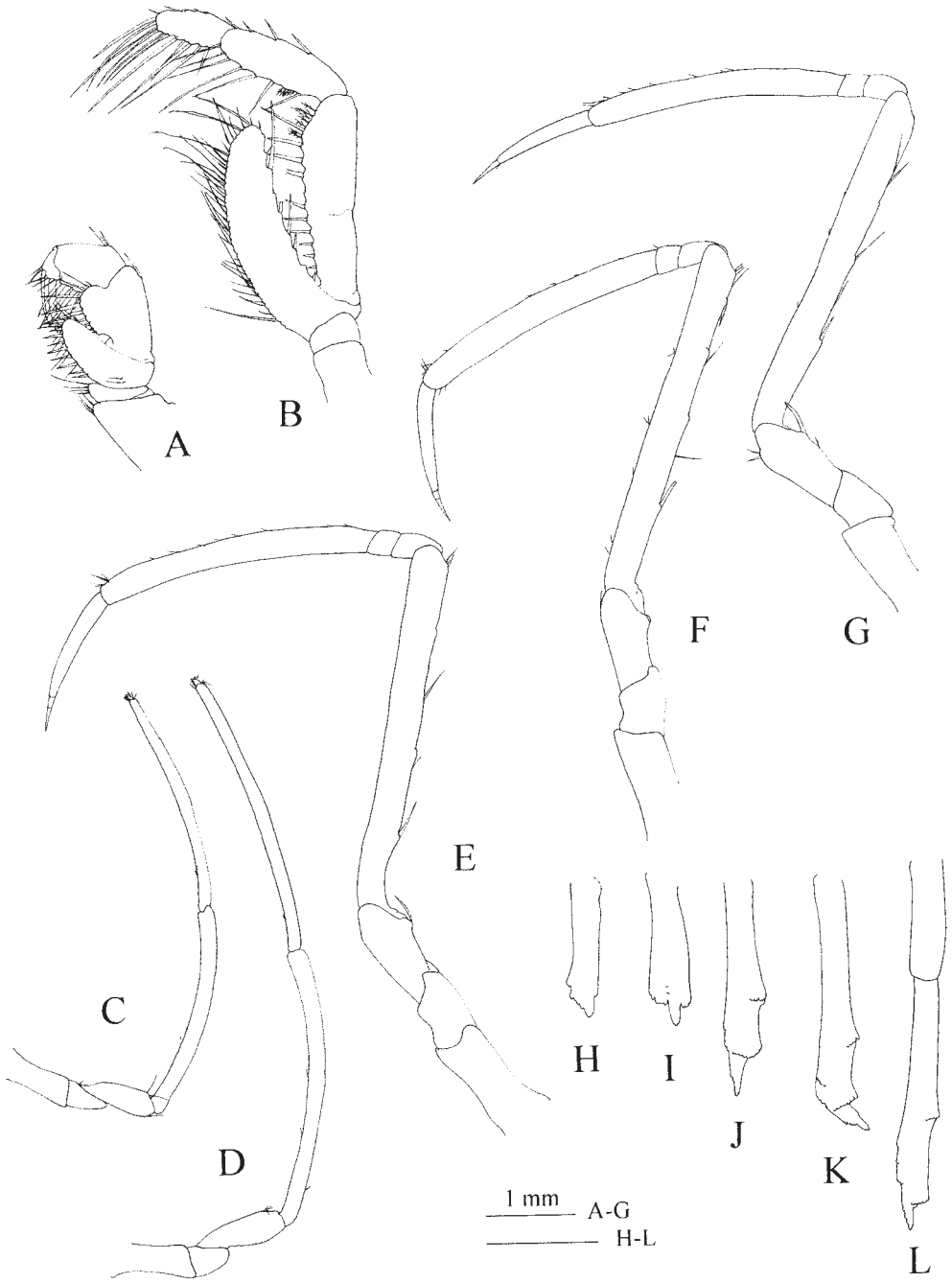

Fig. 2. *Ceratomysis japonica* sp. nov. Adult female (28.0 mm), holotype, NSMT-Cr 19650. A, endopod of first thoracopod (left, posterior); B, endopod of second thoracopod (left, posterior); C, endopod of third thoracopod (left, posterior); D, endopod of fourth thoracopod (left, posterior); E, endopod of sixth thoracopod (left, posterior); F, endopod of seventh thoracopod (left, posterior); G, endopod of eighth thoracopod (left, posterior); H–L, first to fifth pleopods (left, anterior).

Table 4. Comparison of characters in the five species in *Ceratomysis*.

	C. spinosa Faxon, 1893	*C. egregia* Hansen, 1910	*C. ericula* Ledoyer, 1977	*C. japonica* sp. nov.	*C. orientalis* sp. nov.
Body length	36 mm	27 mm	24 mm	28 mm	33.5 mm
Apex of dorsal spines on carapace and 7th and 8th thoracic somites	pointed	pointed	rounded	rounded	pointed
Dorsal spines on abdomen					
Posterior spine on 1st somite	bifid, both pointed apically	bifid, both pointed apically	not bifid, rounded apically	bifid, both rounded apically	bifid, both pointed apically
Spine on 2nd somite	not bifid	bifid	bifid	not bifid	not bifid
Spine on 3rd-5th somites	not bifid	bifid	not bifid	not bifid	not bifid
Uropodal exopod	without suture	with suture	with suture	without suture	with suture
Telson					
Dorsal spines near base	present	absent	present	absent	absent
Posterior part	narrowing posteriorly toward narrow truncate end	parallel-sided with truncate end	narrowing posteriorly toward narrow truncate end	narrowing posteriorly toward narrow truncate end	narrowing posteriorly toward narrow truncate end

than endopod, armed with 5 spines among setae on lateral margin, without suture near apex.

Telson (Fig. 1A, I) elongate, 4 times longer than sixth abdominal somite, 6 times as long as basal broadest part, with narrow truncate apex; lateral margin armed with spines on distal 6/7, spines on distal 2/3 arranged alternately 1 long spine and several short ones; apical spines unknown for missing; dorsal surface without spines.

Etymology. The specific name is derived from the type locality, Japan.

Remarks. *Ceratomysis* comprises three species, *C. egregia* Hansen, 1910 recorded from Indonesia (Hansen, 1910), *C. ericula* Ledoyer, 1977 from the Kerguelen Islands in the southern Indian Ocean (Ledoyer, 1977, 1995), and *C. spinosa* Faxon, 1893 from the Gulf of Panama (Faxon, 1893), British Columbia and Japan (W. Tattersall, 1951).

Ceratomysis japonica is allied to *C. spinosa* with respect to the second to fifth abdominal somites with a simple dorsal spine, the uropodal exopod with no suture, and the telson with a narrow truncate apex. However, it is distinguished from *C. spinosa* by the absence of the dorsal spines of the telson and the apical shape of the dorsal spines on the carapace, last two thoracic somites and abdomen (Table 4).

Ceratomysis japonica is readily distinguishable from *C. egregia* and *C. ericula* by the different characters of the dorsal spines on the abdomen, the uropodal exopod and the telson (Table 4).

Ceratomysis orientalis sp. nov.
(Figs. 3–4)

Material examined. Holotype: adult female (33.5 mm), KT-07-29-K2, NSMT-Cr 19654. Paratype: 1 immature male (22.7 mm), KT-07-29-K2, NSMT-Cr 19655.

Other material. 3 juveniles (13.3 mm, damaged), KT-07-29-K2, NSMT-Cr 19656.

Description. Body spinous (Fig. 3A–B). Seventh and eighth thoracic somites with dorsal median spine with pointed apex. First abdominal somite with anterior simple and posterior bifid spines on dorsal median line, those spines with pointed apex; second to sixth somites with simple dorsal spine with pointed apex.

Carapace (Fig. 3A–B) spinous; anterior margin straight; anterolateral angles produced into long spiniform process; posterior margin not emarginate, uncovering last 2 thoracic somites; dorsal surface with 3 spines anterior to cervical sulcus, 2 pairs of spines posterior to cervical sulcus, and 1 spine near posterior end, those spines with pointed apex.

Antennular peduncle (Fig. 3C) robust. Lateral antennular flagellum thick and slightly shorter than mesial one in male (Fig. 3C), slightly thicker than mesial one in female.

Antennal scale (Fig. 3C–D) long, 2.2 times as long as antennular peduncle, 8 times as long as broad, armed with setae on entire margin except for proximal 2/5 of lateral margin naked, 7 spines present among setae on lateral margin. Antennal peduncle (Fig. 3D) long, extending to distal 1/5 of scale; second segment 4 times as long as broad; third segment 1.3 times longer than second. Antennal sympod (Fig. 3D) with anterolateral angle protruded into immovable long spine.

Eye (Fig. 3C) reduced to single plate without visual elements, both angles produced into spiniform process.

Labrum without acute projection on anterior margin. Mandibular palp (Fig. 3E) with second segment armed with spine-like setae on mesial and lateral margins; third segment 2/3 of second segment in length. Lateral lobe of maxillule (Fig. 3F) armed with 12 spines on distal margin and 2 setae on posterior surface. Maxilla (Fig. 3G): exopod large, oval, extending to 1/2 of second segment of endopod; second segment of endopod 1.6 times as long as broad.

Endopod of first thoracopod (Fig. 3H) short, robust; ischium with mesial lobe; merus expanded mesially. Endopod of second thoracopod (Fig. 3I) robust; ischium with mesial lobe extending to distal margin of merus; merus expanded mesially. Endopods of third to fifth thoracopods (Fig. 4A–C) long, slender, increasing in length from third to fifth thoracopods; carpopropodus undivided. Endopods of sixth to eighth thoracopods (Fig. 4D–E) long; carpopropodus almost as long as merus, divided into 3 subsegments, proximal 2 subsegments short; dactylus 1/3 of carpopropodus in length, with terminal claw. First thoracopod without exopod; second to eighth thoracopods with flagelliform exopod.

Marsupium of female composed of 7 pairs of oostegites.

All pleopods of female uniramous; first to fourth pleopods (Fig. 4F) unsegmented, increasing in length from first to fourth pleopod; fifth pleopod (Fig. 4G) long, extending to proximal 1/5 of uropodal exopod, 2.1 times longer than fourth pleopod, 2-segmented, proximal segment with long lobe at distolateral angle.

Uropodal endopod (Fig. 4H) 1.1 times as long as exopod, without spines on mesial margin. Uropodal exopod (Fig. 4H) lanceolate, with suture in distal 1/8; proximal segment armed with 8 spines among setae on lateral margin.

Telson (Fig. 4I) long, 4.3 times as long as sixth abdominal somite, 1.3 times longer than uropodal exopod, 6.3 times as long as maximum breadth at base, slightly broadened from proximal 1/3 to distal 1/7, then narrowing toward narrow truncate apex, without dorsal spines.

Etymology. The specific name is derived from Latin "*oriens*" referring to type locality.

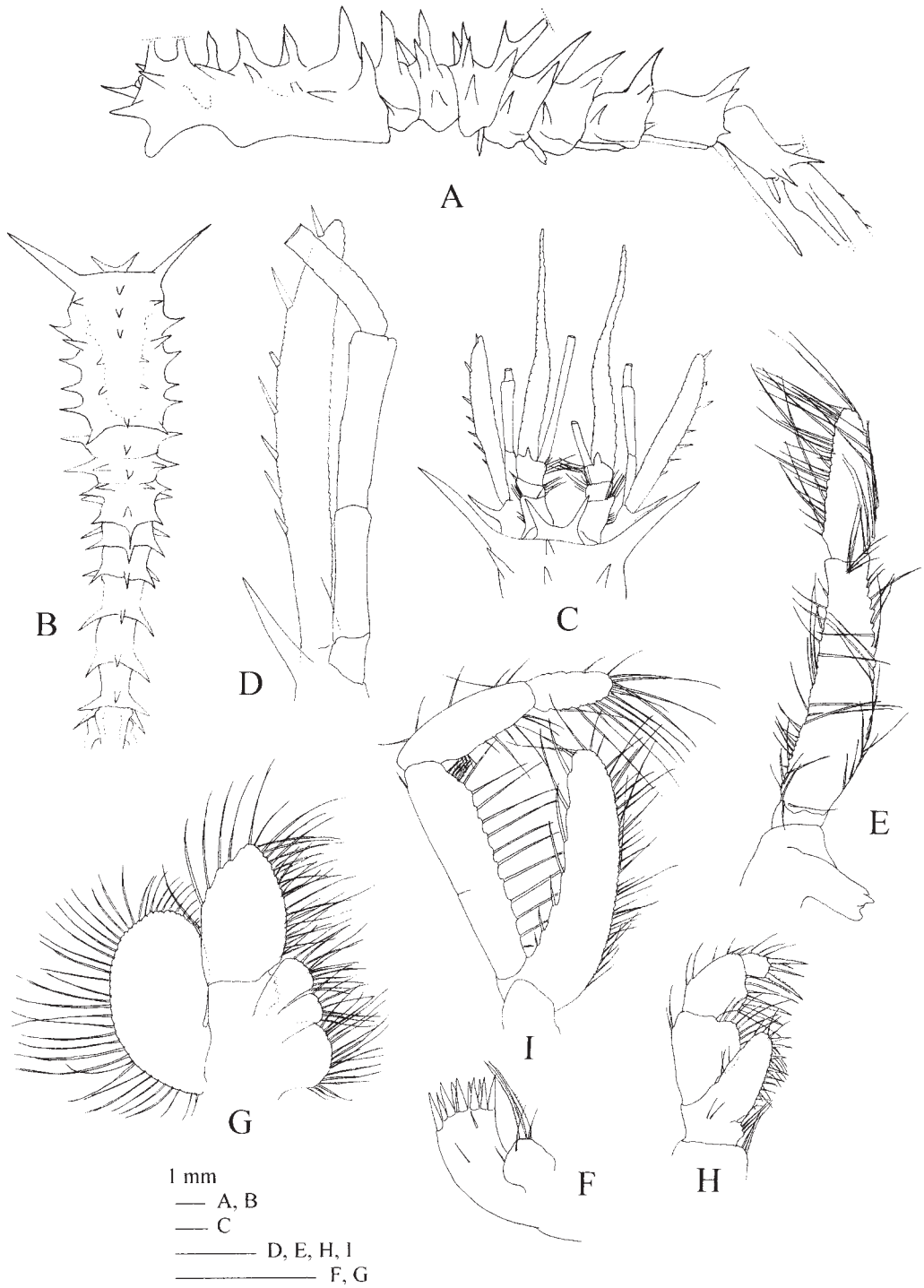

Fig. 3. *Ceratomysis orientalis* sp. nov. A, C–I, adult female (33.5 mm), holotype, NSMT-Cr 19654; B, immature male (22.7 mm), paratype, NSMT-Cr 19655. A, body (lateral); B, body (dorsal); C, anterior part of body (dorsal); D, antenna (right, ventral); E, mandible (right, posterior); F, maxillule (right, posterior); G, maxilla (right, posterior); H, endopod of first thoracopod (right, posterior); I, endopod of second thoracopod (right, posterior).

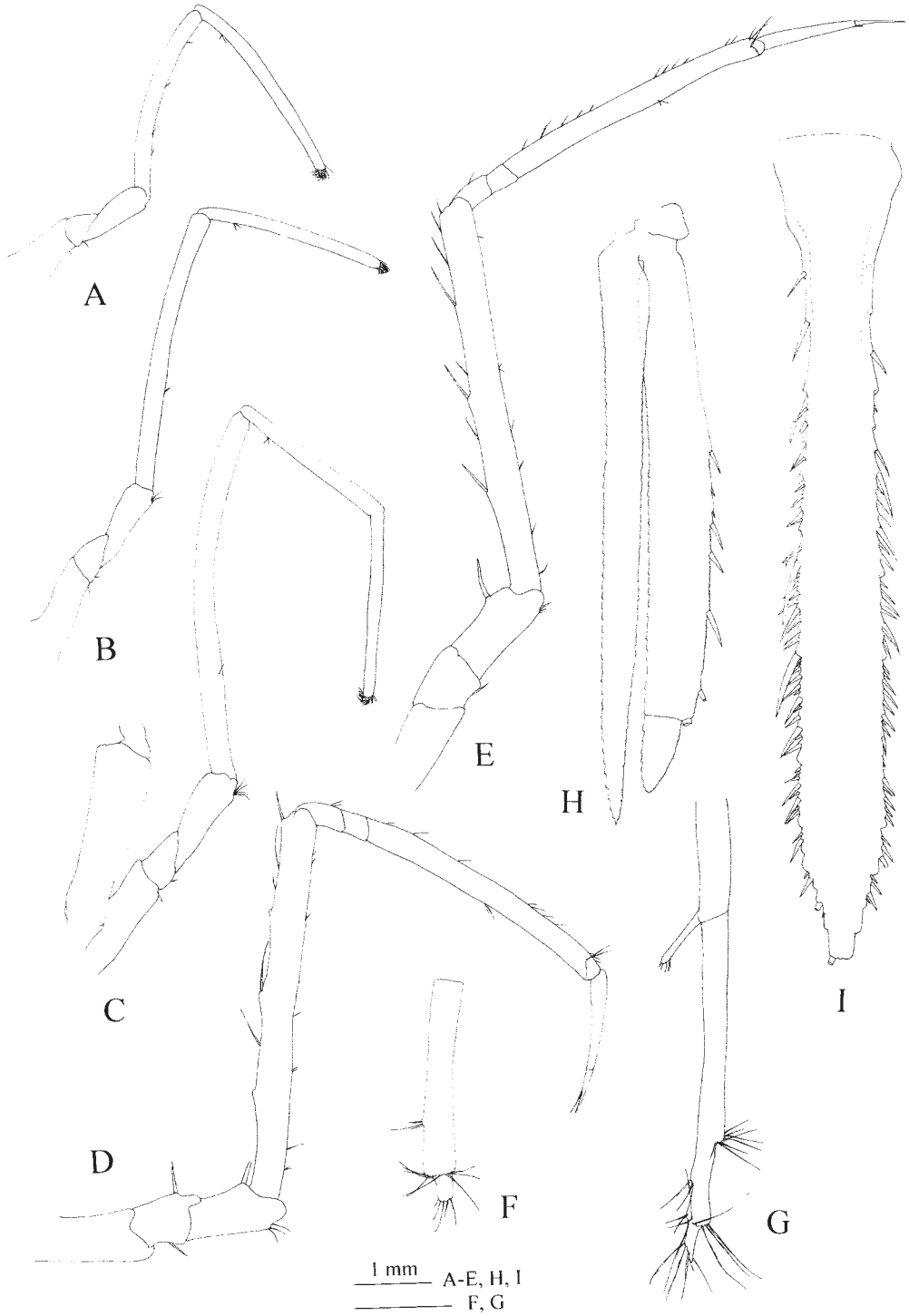

Fig. 4. *Ceratomysis orientalis* sp. nov. Adult female (33.5 mm), holotype, NSMT-Cr 19654. A, endopod of third thoracopod (right, posterior); B, endopod of fourth thoracopod (right, posterior); C, endopod and basal plate of exopod of fifth thoracopod (right, posterior); D, endopod of seventh thoracopod (right, posterior); E, endopod of eighth thoracopod (right, posterior); F, fourth pleopod (right, anterior); G, fifth pleopod (right, anterior); H, uropod (right, dorsal); I, telson (dorsal).

Remarks. *Ceratomysis orientalis* closely resembles *C. spinosa* in that the carapace, last two thoracic somites and abdomen have dorsal spines with a pointed tip, the bifid spine is present only on the first abdominal somite, and the telson has a narrow truncate apex. However, *C. orientalis* differs from *C. spinosa* in its uropodal exopod with a suture near the apex and telson without dorsal spines (Table 4).

Hansenomysis armata Birstein and Tchindonova, 1958
(Fig. 5)

Hansenomysis armata Birstein and Tchindonova, 1958: 271–273, figs. 4–5.

Material examined. 2 adult females (20.0 mm, damaged) and 2 juveniles (7.7, 9.3 mm), SO07-K2, NSMT-Cr 19657.

Distirbution. Previously known from the Kurile-Kamchatka Trench (Birstein and Tchindonova, 1958).

Remarks. In *Hansenomysis*, two species, *H. armata* and *H. menziesi* Bacescu, 1971, are characterized by a carapace with mid-dorsal spines and a posterior projection, and an antennal scale with spines among the setae on the lateral margin. The present specimens differ from *H. menziesi* in that the carapace shows a dorsal spine on the anterior margin in *H. menziesi*, whereas there are four more spines between the anterior end and the posterior projection in the present specimens; all abdominal somites have paired robust spines posterolaterally in *H. menziesi*, whereas the present specimens are lacking such spines; and the proximal segment of the uropodal exopod is armed with spines and fine setae on the distal two-thirds of the lateral margin in *H. menziesi*, but is armed with spines only on the distal two-fifths of the lateral margin in the present specimens.

The present specimens were thus identified as *H. armata*. However, there is a certain amount of variation observed in the number of dorsal spines in the present specimens. The type specimen

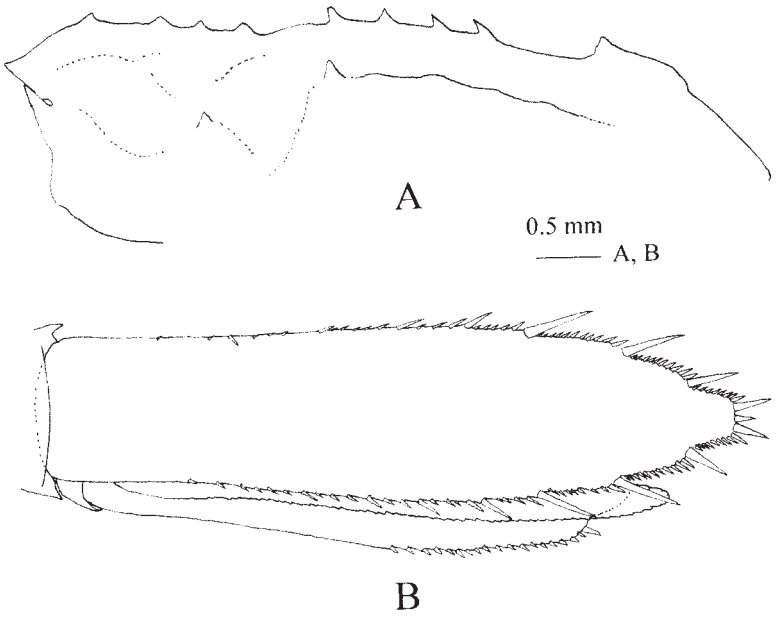

Fig. 5. *Hansenomysis armata* Birstein and Tchindonova, 1958. Adult female (20.0 mm), NSMT-Cr 19657. A, carapace (lateral); B, uropod and telson (dorsal).

of *H. armata* has dorsal spines on the mid-dorsal line with one spine immediately front of the cervical sulcus and two spines on the posterior part of the cervical sulcus (Birstein and Tchindonova, 1958). In the present specimens, one female (damaged, ca. 15.0 mm) is consistent with the type specimen in this feature. However, another female (20.0 mm) is furnished with seven spines, three on the anterior part of the cervical sulcus and four on the posterior part (Fig. 5A). In all other respects, these specimens were consistent with each other.

Hansenomysis armata was previously recorded as a single damaged female specimen by Birstein and Tchindonova (1958). An illustration of the telson is first provided in Fig. 5B.

?***Hansenomysis fyllae*** (Hansen, 1887)
(Fig. 6)

Arctomysis fyllae Hansen, 1887: 210–213, pl. 7, fig. 5.

Hansenomysis fyllae: Stebbing, 1893: 268; Hansen, 1908: 96–98, pl. 4, fig. 4a–k; Zimmer, 1909: 41–43, figs. 68–70; W. Tattersall, 1911: 25–26; 1951: 43; W. Tattersall and O. Tattersall, 1951: 114–119, figs. 14–16.

Material examined. 1 immature male (14.5 mm), KT-07-29-M3-2, NSMT-Cr 19658.

Distirbution. Previously known from the northeastern North Atlantic (Hansen, 1887, 1908; W. Tattersall, 1911; W. Tattersall and O. Tattersall, 1951).

Remarks. *Hansenomysis fyllae* is characterized by its carapace without dorsal spines, the antennal scale having approximately six spines among the setae on the lateral margin, and the proximal segment of the uropodal exopod having approximately six spines among the setae on the lateral margin.

The present specimen is consistent with *H. fyllae* in the characteristics of its

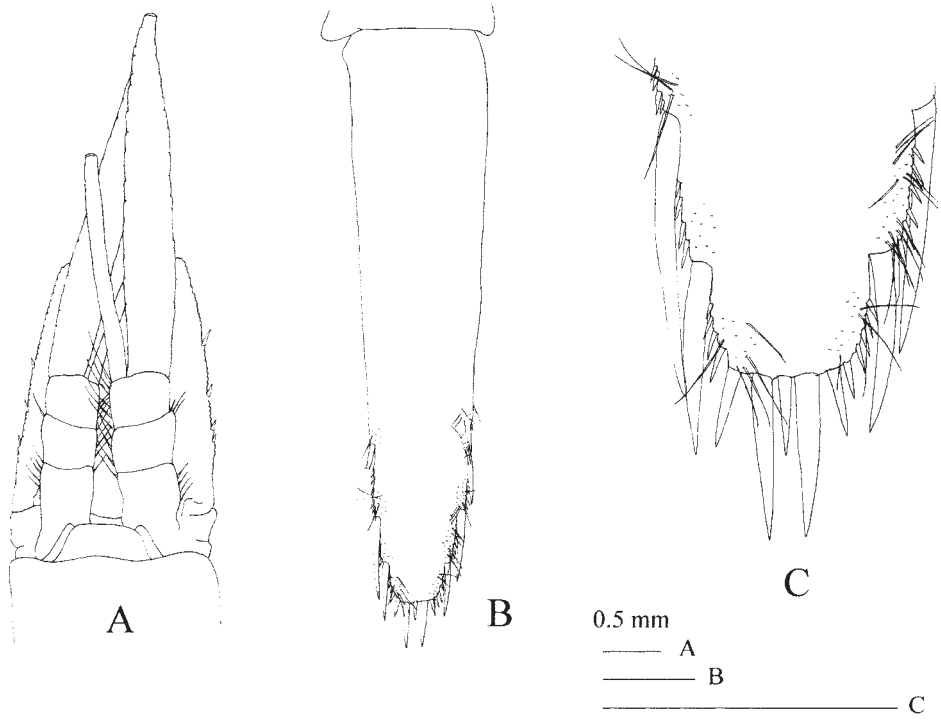

Fig. 6. ?*Hansenomysis fyllae* (Hansen, 1887). Immature male (14.5 mm), NSMT-Cr 19658. A, anterior part of body (dorsal); B, telson (dorsal); C, distal part of telson (dorsal).

carapace, antennal scale and uropod. The armature of the telson is also consistent with the previous descriptions. However, this specimen differs from the previous descriptions in that its telson shows setae on the dorsal surface (Fig. 6B–C). This feature has not been previously reported in this species. This paper therefore recorded this specimen tentatively as *H. fyllae*.

Hansenomysis japonica Bravo and Murano, 1997

Hansenomysis japonica Bravo and Murano, 1997: 228–232, figs. 1–2, 3A–D.

Material examined. 1 adult female (15.0 mm), WA05-F510, NSMT-Cr 19659.

Distirbution. Previously known from Sagami Bay, Japan (Bravo and Murano, 1997).

Hansenomysis rostrata Birstein and Tchindonova, 1970

Hansenomysis rostrata Birstein and Tchindonova, 1970: 280–284, figs. 1–3.

Material examined. 1 adult male (38.5 mm), SO-SE Erimo, NSMT-Cr 19660. 1 adult female (44.8 mm), SO06-M4-B, NSMT-Cr 19661.

Distribution. Previously known from south-east off Etorofu Island, Kurile Islands (Birstein and Tchindonova, 1970).

Family Mysidae
Subfamily Boreomysinae
Birsteiniamysis inermis (Willemoes-Suhm, 1874)

Petalophthalmus inermis Willemoes-Suhm, 1874: 15.
Petalophthalmus armiger Willemoes-Suhm, 1875: 41 (only female).
Boreomysis scyphops G. Sars, 1879b: 429–430; Hansen, 1908: 99–100, fig. 1.
Boreomysis suhmi Faxon, 1893: 218.
Boreomysis distinguenda Hansen, 1908: 100, fig. 2; W. Tattersall, 1913: 869.
Boreomysis inermis: W. Tattersall, 1951: 46–47; O. Tattersall, 1955: 75–76; Birstein and Tchindonova, 1958: 282–283, fig. 9; 1962: 62; Kathman *et al*., 1986: 108, figs. a–e (p. 109); Ledoyer, 1995: 603.
Birsteiniamysis scyphops: Tchindonova, 1981: 28–29.
Birsteiniamysis inermis: Tchindonova, 1981: 28–29; Petryashov, 2005: 963–964, fig. 4 (6–11).
not *Boreomysis inermis*: Hansen, 1910: 26–27, pl. 2, fig. 4 (=*Boreomysis hanseni* Holmquist, 1956).

Material examined. 1 adult male (39.5 mm), 2 immature males (25.0, 28.0 mm), 1 adult female (45.0 mm), 1 immature female (28.2 mm) and 2 juveniles (damaged), KT-07-29-K2, NSMT-Cr 19662.

Distribution. Known from the northern North Pacific (W. Tattersall, 1951; Birstein and Tchindonova, 1958), the northern North Atlantic (W. Tattersall, 1951), and Antarctic (O. Tattersall, 1955; Birstein and Tchindonova, 1962; Ledoyer, 1995; Petryashov, 2005).

Boreomysis arctica (Krøyer, 1861)

Mysis arctica Krøyer, 1861: 34, 42, fig. 5.
Boreomysis arctica: G. Sars, 1869: 330–332; Zimmer, 1909: 53–54, figs. 71–74; W. Tattersall, 1951: 49–51, fig. 8; W. Tattersall and O. Tattersall, 1951: 132–135, figs. 19B, 21B, 22; Birstein and Tchindonova, 1958: 284, fig. 10; Lagardère and Nouvel, 1980: 385–386; Wittmann *et al*., 2003: 1263.
Arctomysis arctica: Czerniavsky, 1887: 7–8.

Material examined. 1 adult male (27.9 mm), KT-07-29-K2, NSMT-Cr 19663.

Distribution. Known from the North Atlantic (W. Tattersall and O. Tattersall, 1951; Lagardère and Nouvel, 1980; Wittmann *et al*., 2003) and the northern North Pacific (W. Tattersall, 1951).

Boreomysis californica Ortmann, 1894

Boreomysis californica Ortmann, 1894: 106, figs. 4–14; Banner, 1948a: 367–369, pl. 4, fig. 5a–i; W. Tattersall, 1951: 52–55, figs. 9–10; Birstein and Tchindonova, 1958: 294; 1962: 64, fig. 5; Taniguchi, 1969: 46–47, fig. 4; Petryashov, 2005: 965.
Boreomysis media Hansen, 1912: 190, pl. 1, fig. 2a–b; Illig, 1930: 419.
Boreomysis kincaidi Banner, 1948a: 361–365, pl. 2, fig. 3a–j.

Material examined. 1 adult female (16.3 mm), WA07-D1500D, NSMT-Cr 19664. 1 immature male (6.8 mm), SO07-O1, NSMT-Cr 19665. 1 immature male (16.2 mm) and 1 juvenile (damaged), KT-07-29-K2, NSMT-Cr 19666. 1 immature male (15.5 mm) and 1 juvenile (13.0 mm), KT-07-29-M1, NSMT-Cr 19667.

Distribution. Widely distributed in the Pacific (W. Tattersall and O. Tattersall, 1951; Birstein and Tchindonova, 1958; Taniguchi, 1969), Indian (Hansen, 1912), and Antarctic Oceans (Birstein and Tchindonova, 1962; Petryashov, 2005).

Boreomysis incisa Nouvel, 1942

Boreomysis incisa Nouvel, 1942b: 4–5, figs. 9–11; 1943: 57–58, pl. 3, figs. 77, 84; Birstein and Tchindonova, 1958: 290–291, fig. 16.

Material examined. 1 immature male (21.3 mm) and 2 immature females (22.3, 24.2 mm), SO07-C6, NSMT-Cr 19668.

Distribution. Known from the East Atlantic (Nouvel, 1942b, 1943) and the western North Pacific (Birstein and Tchindonova, 1958).

Boreomysis sp.
(Fig. 7)

Material examined. 1 immature male (13.8 mm), KT-07-29-M1, NSMT-Cr 19669.

Remarks. The present specimen is characterized by its flattened eyes (Fig. 7B), which, in *Boreomysis*, is known only in *B. latipes* Birstein and Tchindonova, 1958. However, it differs from *B. latipes* in its antennal scale and second thoracopodal endopod. The apical lobe of the antennal scale of this specimen is three times longer than the lateral spiniform process (Fig. 7D), whereas that of *B. latipes* is almost the same in length with the lateral spiniform process (Birstein and Tchindonova, 1958). The carpopropodus of the second thoracopodal endopod is normal in this specimen (Fig. 7E), whereas it is projected mesially in *B. latipes* (Birstein and Tchindonova, 1958).

The present specimen may be an undescribed species, but is recorded here as *Boreomysis* sp. for an immature.

Subfamily Mysinae
Tribe Erythropini
Amblyops abbreviata (M. Sars, 1869)

Pseudomma abbreviatum M. Sars, 1869: 262.
Amblyopsis abbreviat: G. Sars, 1869: 328–330.

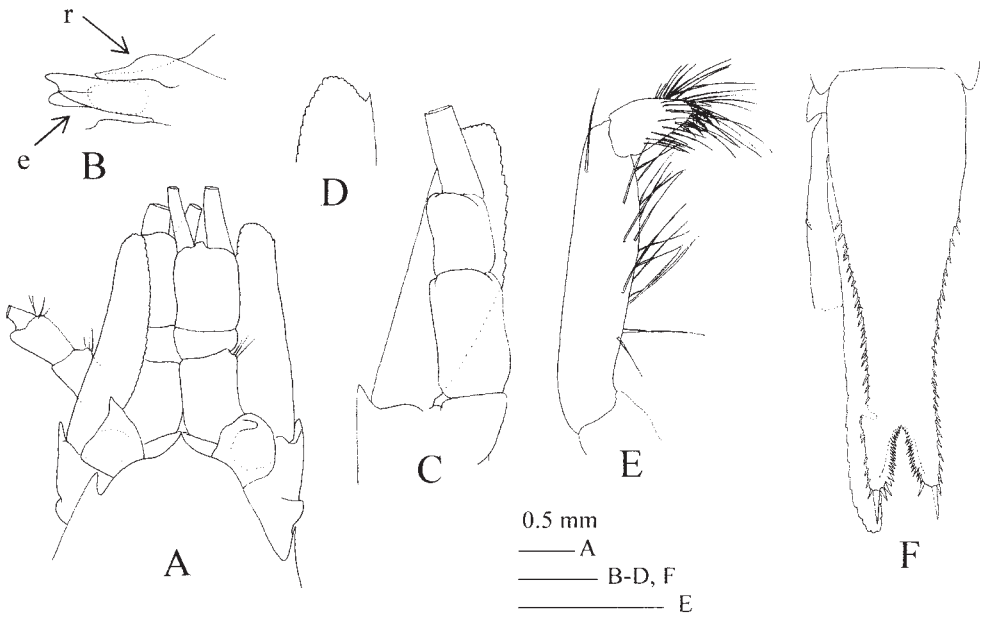

Fig. 7. *Boreomysis* sp. Immature male (13.8 mm), NSMT-Cr 19669. A, anterior part of body (dorsal); B, eye (left, lateral), e=eye, r=rostral plate; C, antenna (right, ventral); D, apical part of antennal scale (right, dorsal); E, distal part of endopod of second thoracopod (right, posterior); F, uropod and telson (dorsal).

Amblyops abbreviata: G. Sars, 1872: 5–12, pl. 6; Zimmer, 1904: 39, figs. 108–111; 1909: 112–113, figs. 223–228; Banner, 1948a: 382–383; W. Tattersall, 1951: 128–130, fig. 44; W. Tattersall and O. Tattersall, 1951: 247–251, figs. 56–57; Banner, 1954: 581; Birstein and Tchindonova, 1958: 319; Kathman *et al.*, 1986: 96, figs. a–m (p. 97).

Material examined. 2 adult males (9.9 mm, damaged), KT-07-29-K2, NSMT-Cr 19670. 1 adult male (damaged), 1 immature male (9.7 mm) and 1 immature female (damaged), KT-07-29-M1, NSMT-Cr 19671.

Distirbution. Known from boreal waters of both the Atlantic and Pacific Oceans (W. Tattersall, 1951; W. Tattersall and O. Tattersall, 1951).

Remarks. Banner (1948a) and W. Tattersall (1951) observed a difference in the shape of the process on the anteromedian margin of the eye between Atlantic and Pacific specimens of *A. abbreviata*; that of the Pacific specimens is longer and more acute in the lateral view (W. Tattersall, 1951). The present specimens are similar to the Pacific specimens in this feature.

Amblyops ewingi Bacescu, 1967
(Fig. 8)

Amblyops ewingi Bacescu, 1967: 153–157, figs. 3–4.

Material examined. 1 adult female (damaged), KT-07-29-E3, NSMT-Cr 19672.

Distribution. Previously known only from the Peru Trench (Bacescu, 1967).

Remarks. *Amblyops ewingi* was established on the basis of a single female specimen collected from the Peru Trench (Bacescu, 1967). The present occurrence is the second record and far from the type locality.

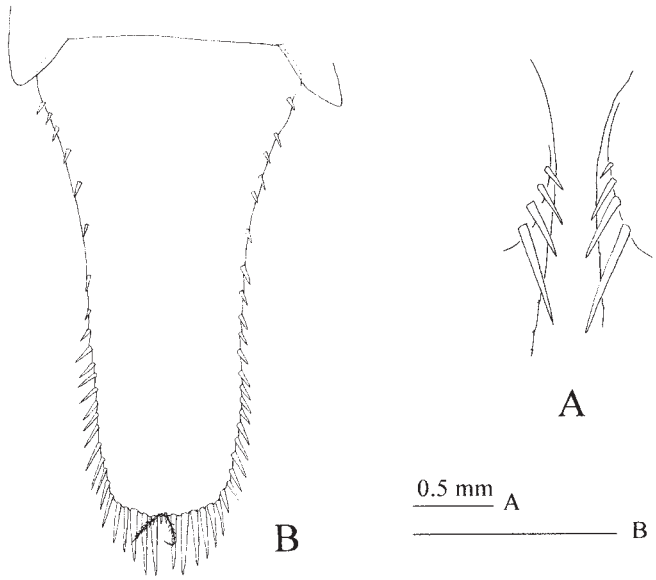

Fig. 8. *Amblyops ewingi* Bacescu, 1967. Adult female (damaged), NSMT-Cr 19672. A, proximal part of uropodal endopod (ventral); B, telson (dorsal).

Amblyops magna Birstein and Tchindonova, 1958
(Fig. 9)

Amblyops magna Birstein and Tchindonova, 1958: 319–320, fig. 36.

Material examined. 1 adult female (27.6 mm), SO07-O4, NSMT-Cr 19673. 1 immature female (20.6 mm), SO-SE Erimo, NSMT-Cr 19674.

Distribution. Previously known from the Kurile-Kamchatka Trench (Birstein and Tchindonova, 1958).

Amblyopsoides ohlinii (W. Tattersall, 1951)

Amblyops crozetii: Ohlin, 1901: 371; Zimmer, 1904: 39–40, figs. 114–116.
Amblyops crozeti: Zimmer, 1909: 114, figs. 229–231.
Amblyops n. sp. Hansen, 1908: 108.
Amblyops ohlinii W. Tattersall, 1951: 130–132, fig. 45.
Amblyopsoides ohlinii: O. Tattersall, 1955: 108.
Amblyops ohlini: Birstein and Tchindonova, 1970: 285–287, fig. 5.

Material examined. 1 adult female (25.5 mm), KT-07-29-H2, NSMT-Cr 19675. 1 immature female (15.9 mm), KT-07-29-K3, NSMT-Cr 19676. 1 adult female (32.3 mm), KT-07-29-M3-2, NSMT-Cr 19677.

Distribution. Known from the northern North Atlantic (Ohlin, 1901; W. Tattersall, 1951) and the northern North Pacific (Birstein and Tchindonova, 1970).

Holmesiella affinis Ii, 1937

Holmesiella affinis Ii, 1937: 200–205, figs. 31–45; 1964: 348–351, fig. 88; Murano, 1970a: 260; 1970b: 141, figs. 6–9; 1976: 25–26, fig. 4; Liu and Wang, 2000: 154–156, fig. 45.

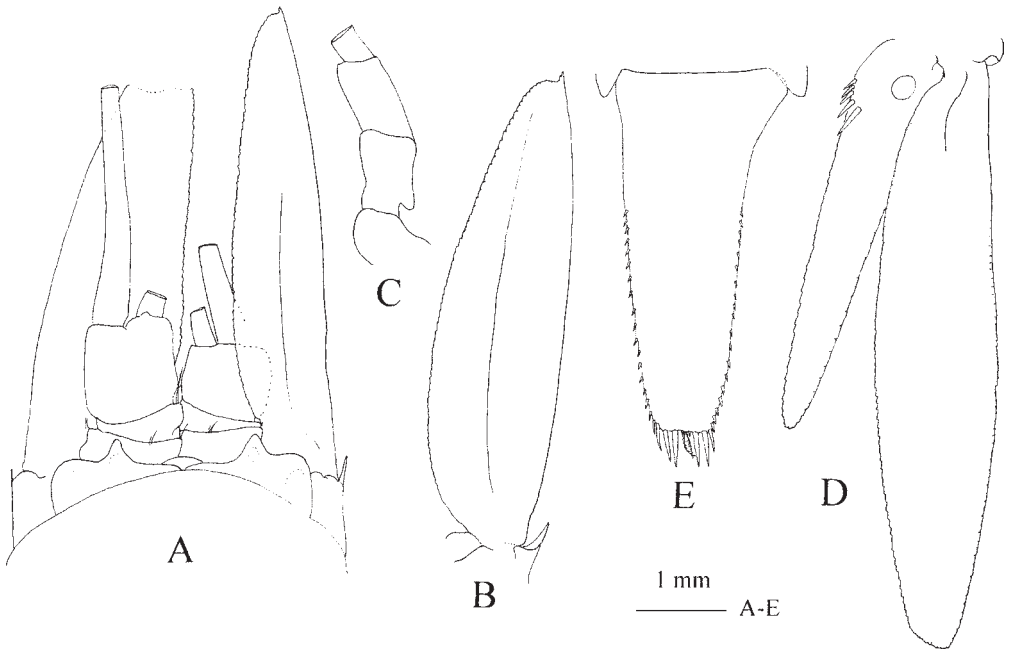

Fig. 9. *Amblyops magna* Birstein and Tchindonova, 1958. Adult female (27.6 mm), NSMT-Cr 19673. A, anterior part of body (dorsal); B, antennal scale (right, dorsal); C, antennal peduncle (right, dorsal); D, uropod (left, ventral); E, telson (dorsal).

Material examined. 1 adult female (25.3 mm), WA05-G550, NSMT-Cr 19678. 1 adult female (21.5 mm), WA06-E510, NSMT-Cr 19679. 2 adult males (22.3, 24.0 mm), WA06-F480, NSMT-Cr 19680. 1 adult male (28.0 mm), WA06-F510, NSMT-Cr 19681. 1 adult male (24.0 mm), WA06-G380, NSMT-Cr 19682. 2 adult males (20.0, 22.8 mm) and 2 adult females (18.0, 20.5 mm), WA06-G425, NSMT-Cr 19683. 2 adult males (23.5, 24.5 mm), WA06-G480, NSMT-Cr 19684.

Distribution. The East China Sea (Ii, 1937, 1964), the South China Sea (Liu and Wang, 2000), and Pacific waters off central Japan (Murano, 1970a, b, 1976).

Remarks. Murano (1970b) recognized two races in this species; the large- and small-sized races, which differ in the size of the body and eyes, the shape of the rostrum, antennal scale and telson, and the number of segments of both rami of the fourth male pleopod.

The present specimens correspond to the large-sized race in their body length, however, they have fewer segments of the fourth male pleopod than those described by Murano (1970b): eight-segmented endopod and seven-segmented exopod in the present specimens, and 14-segmented endopod and 11-segmented exopod in Murano's specimens (1970b); the number of spines on the lateral margin of the telson is also different from Murano's illustration of the large-sized race: 15 to 26 spines in the present specimens, and 12 spines in Murano's specimens (1970b).

This species has a wide range of body size from 15.0 to 28.0 mm (Ii, 1937; Murano, 1970b; present study), and has been observed to show intraspecific variation in morphology in several of its features.

Holmesiella anomala Ortmann, 1908

Holmesiella anomala Ortmann, 1908: 6–8, pl. 1, figs. 1–13; W. Tattersall, 1933: 5–6; Banner, 1948a: 395–399; W. Tattersall, 1951: 106–109, figs. 32–33; Birstein and Tchindonova, 1958: 304–305; Murano, 1976: 23–24, fig. 3; Murano and Krygier, 1985: 705, figs. 11–13; Kathman *et al*., 1986: 168, fig. a–j (p. 169).

Material examined. 1 adult male (31.5 mm) and 1 adult female (31.8 mm), WA07-A410, NSMT-Cr 19685. 1 adult female (39.0 mm), WA07-A750, NSMT-Cr 19686. 1 adult male (36.0 mm), WA07-A900, NSMT-Cr 19687. 1 immature male (19.3 mm) and 2 immature females (18.4, 20.3 mm), WA07-B410, NSMT-Cr 19688. 1 immature male (19.3 mm), WA07-B410D, NSMT-Cr 19689. 1 adult male (30.5 mm), WA07-B450, NSMT-Cr 19690. 1 adult male (damaged) and 2 adult females (32.8, 33.0 mm), WA07-B650, NSMT-Cr 19691. 4 adult males (28.2-31.7 mm) and 2 adult females (35.8, 37.4 mm), WA07-B750, NSMT-Cr 19692. 1 adult male (25.8 mm) and 4 adult females (29.2–35.0 mm), WA07-B900, NSMT-Cr 19693. 1 adult male (28.3 mm) and 7 adult females (31.0–35.5 mm), WA07-B1200T, NSMT-Cr 19694. 4 adult males (26.0–32.5 mm) and 2 adult females (27.2, 34.0 mm), WA07-C450, NSMT-Cr 19695. 5 adult males (31.7–33.2 mm), WA07-C510, NSMT-Cr 19696. 1 adult male (25.5 mm), WA07-C550, NSMT-Cr 19697. 2 adult females (40.5, 45.7 mm), WA07-C650, NSMT-Cr 19698. 1 adult female (broken), WA07-C750, NSMT-Cr 19699. 2 adult females (32.5, 35.2 mm), WA07-C900, NSMT-Cr 19700. 2 adult males (30.0, 32.3 mm) and 3 adult females (28.0–34.2 mm), WA07-D510, NSMT-Cr 19701. 2 immature males (20.4, 27.0 mm), 1 immature female (30.7 mm) and 8 juveniles (9.5–11.8 mm), KT-07-29-K2, NSMT-Cr 19702.

Distribution. Known from the northern North Pacific (Ortmann, 1908; W. Tattersall, 1933, 1951; Banner, 1948a; Birstein and Tchindonova, 1958; Murano, 1976; Murano and Krygier, 1985).

Holmesiella bisaetigera sp. nov.
(Figs. 10–11)

Material examined. Holotype: adult male (36.2 mm), WA06-E510, NSMT-Cr 19703.

Description. Integument smooth. First to fifth abdominal somites subequal in length; sixth somite 1.9 times longer than fifth.

Carapace produced anteriorly into trapezoidal rostral plate (Fig. 10A); anterolateral corner rounded; posterior margin emarginate, exposing last thoracic somite dorsally.

Antennular peduncle (Fig. 10A) robust; third segment slightly longer than first segment, with developed appendix masculina.

Antennal scale (Fig. 10A–B) lanceolate, extending beyond anterior end of antennular peduncle by 1/6 of its length, 4.8 times as long as broad, with suture near apex; lateral margin naked, terminating into spiniform process; apical lobe slightly longer than lateral process. Antennal peduncle (Fig. 10B–C) extending to proximal 2/5 of scale, with third segment as long as second segment. Antennal sympod (Fig. 10B) without spiniform processes at distolateral angle.

Eye (Fig. 10A) developed, globular, 1.1 times as long as broad in dorsal view; cornea occupying 3/5 of eye.

Labrum without frontal processes. Mandibular palp (Fig. 10D) with second segment armed densely with setae on lateral margin; third segment almost 1/2 of second segment in length. Maxillule (Fig. 10E) with lateral lobe armed with 13 spines on distal margin and 5 plumose setae on posterior surface; mesial lobe with long setae on mesial margin. Maxilla (Fig. 10F) with exopod extending beyond distal margin of proximal segment of endopod and tapering toward apex; endopod with second segment 1.5 times as long as broad.

Endopod of first thoracopod (Fig. 10G) short, robust; ischium and merus expanded mesially. Endopod of second thoracopod (Fig. 10H) long. Endopod of third thoracopod missing. Endopods of fourth to eighth thoracopods (Figs. 10I–J, 11A–B) long, robust; merus relatively broad; carpopropodus divided into 3 subsegments, proximal subsegment 1/2–3/5 of merus in length, 1.5–1.6

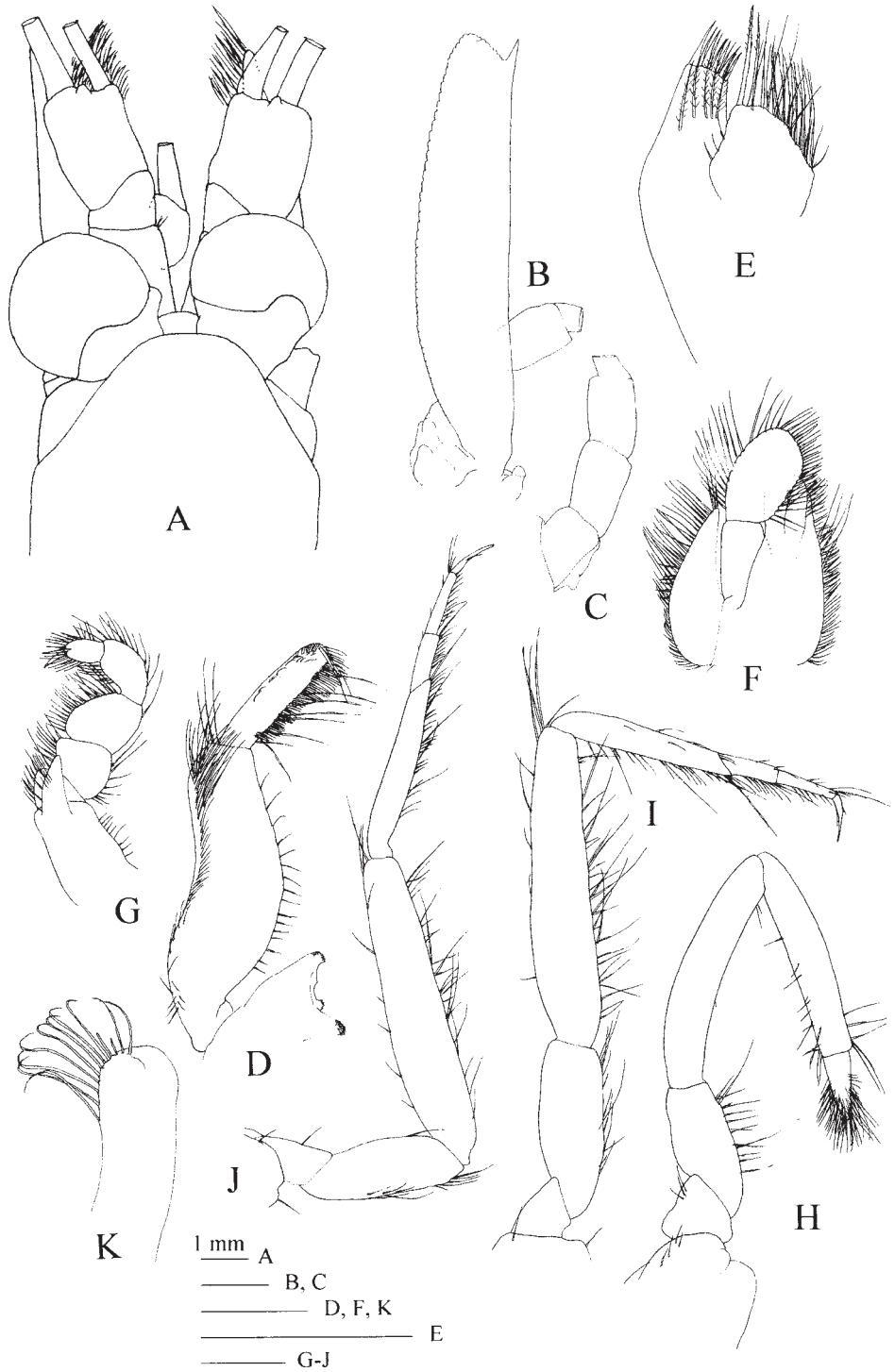

Fig. 10. *Holmesiella bisaetigera* sp. nov. Adult male (36.2 mm), holotype, NSMT-Cr 19703. A, anterior part of body (dorsal); B, antenna (right, dorsal); C, antennal peduncle (right, ventral); D, mandible (right, posterior); E, maxillule (right, posterior); F, maxilla (right, posterior); G, endopod of first thoracopod (right, anterior); H, endopod of second thoracopod (right, posterior); I, endopod of fourth thoracopod (right, posterior); J, endopod of sixth thoracopod (right, posterior); K, male genital appendage (right, lateral).

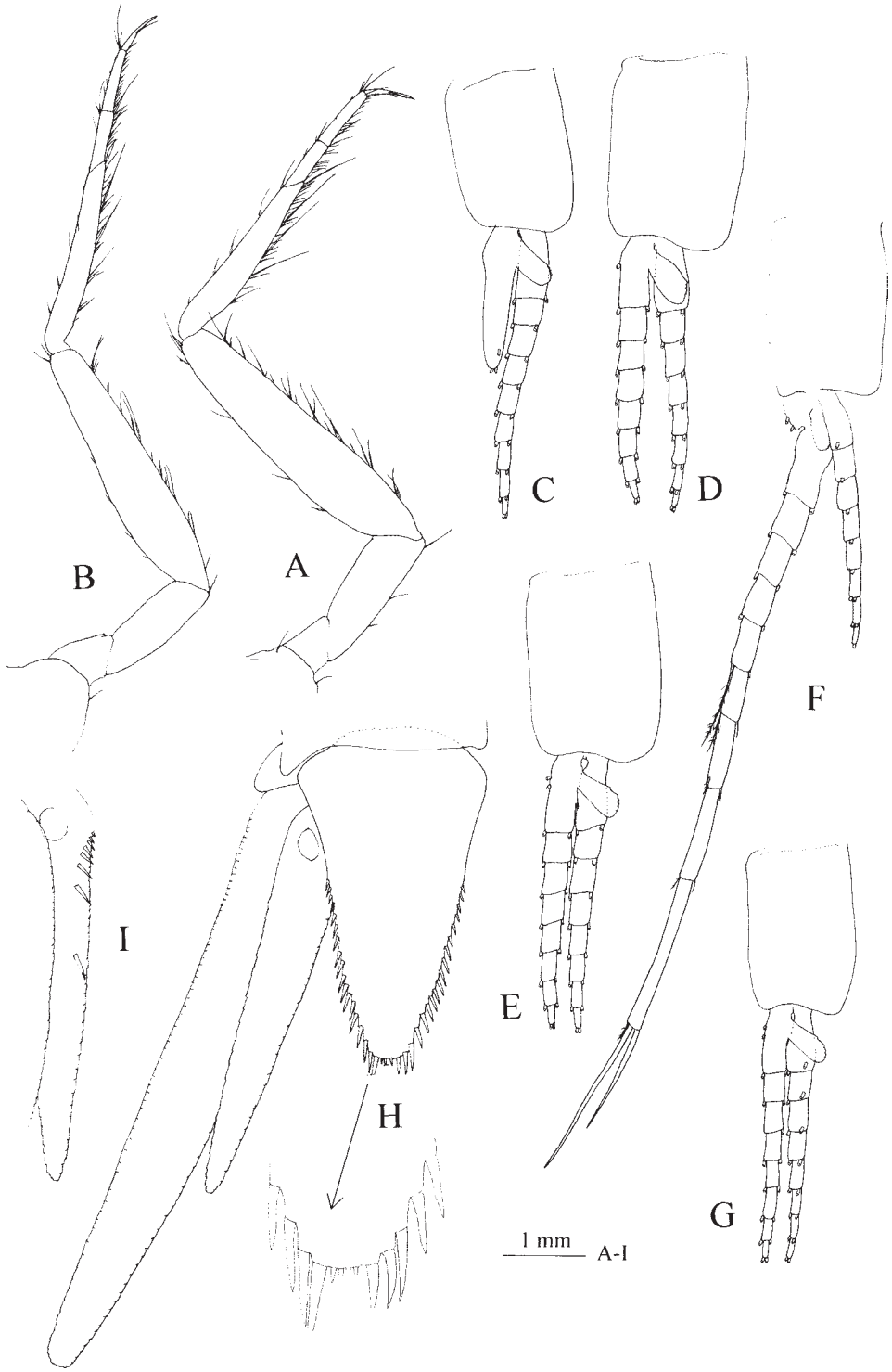

Fig. 11. *Holmesiella bisaetigera* sp. nov. Adult male (36.2 mm), holotype, NSMT-Cr 19703. A, endopod of seventh thoracopod (right); B, endopod of eighth thoracopod (right); C, first pleopod (right, anterior); B, second pleopod (right, anterior); E, third pleopod (right, anterior); F, fourth pleopod (right, anterior); G, fifth pleopod (right, anterior); H, uropod and telson (dorsal); I, uropodal endopod (right, ventral).

times as long as distal 2 subsgements combined, articulated obliquely from middle subsegment, distal subsegment slightly longer than middle subsegment, articulated transversely from middle subsegment; dactylus with long terminal claw. Exopods of all thoracopods flagelliform, with basal plate with rounded anterolateral angle.

Male genital appendage (Fig. 10K) armed with 12 long, curved setae on posterodistal margin.

All pleopods of male biramous. First pleopod (Fig. 11C) with endopod reduced to unsegmented lobe, exopod 9-segmented. Second, third and fifth pleopods (Fig. 11D–E, G) with both rami 8-segmented. Exopod of fourth pleopod (Fig. 11F) 8-segmented. Endopod of fourth pleopod (Fig. 11F) elongate, extending beyond apex of uropodal endopod, 9-segmented; seventh to ninth segments lengthened; seventh segment 1.4 times as long as sixth segment, armed with short seta on lateral and mesial corners of distal margin; eighth segment 1.9 times as long as sixth, armed with short seta on each corner; ninth segment 3 times longer than sixth, armed with 1 short and 2 long, unequal terminal setae, longer seta 1.1 times as long as ninth segment and 1.5 times as long as shorter one.

Uropodal endopod (Fig. 11H–I) extending beyond posterior margin of telson by 2/5 of its length, armed with 7 spines on mesial ventral margin from statocyst region to proximal 2/5, spines increasing in length and intervals becoming distantly posteriorly; exopod (Fig. 11H) 1.3 times longer than endopod.

Telson (Fig. 11H) subequal to sixth abdominal somite in length, 1.7 times as long as broadest part near base, triangular with truncate apex; lateral margin armed on distal 3/5 with 17 spines increasing in length posteriorly; distal margin armed with 2 pairs of spines and pair of median plumose setae, lateral pair of spines long, subequal to distalmost lateral spines in length, mesial pair of spines short, less than 1/5 of lateral pair in length.

Table 5. Comparison of characters in the three species of *Holmesiella* and *Pteromysis amemiyai* Ii, 1964.

	H. affinis Ii, 1937	*H. anomala* Ortmann, 1908	*H. bisaetigera* sp. nov.	*P. amemiyai* Ii, 1964
Antennular peduncle	proximal part of 3rd segment overhanging 2nd segment in dorsal view	normal	normal	proximal part of 3rd segment overhanging 2nd segment in dorsal view
Endopod of 4th male pleopod	1.3 times as long as exopod; armed with 1 short and 1 long terminal setae	2.0–2.6 times as long as exopod; armed with 1 short and 1 long terminal setae	2.5 times as long as exopod; armed with 1 short and 2 long terminal setae	1.4 times as long as exopod; armed with 1 short and 1 long terminal setae
Apical long spines of telson	1/5–1/4 of telson length; 1.7–2.2 times as long as distalmost lateral spines	1/8–1/6 of telson length; 1.4– 2.0 times as long as distalmost lateral spines	less than 1/10 of telson length; subequal to distalmost lateral spines	1/5 of telson length; 1.7–1.8 times as long as distalmost lateral spines
References	Ii (1937, 1964), Murano (1970b)	Ortmann (1908), W. Tattersall (1951), Murano and Krygier (1985)	present study	Ii (1964), Murano (1976)

Etymology. The specific name is from combination of Latin "*bi*", two, and "*saetiger*", having bristles, referring to two long terminal setae of the endopod of the fourth male pleopod.

Remarks. The present species differs from the generic diagnosis of *Holmesiella* Ortmann, 1908 in the number of the long terminal setae of the endopod of the fourth male pleopod, but well agrees with it in the other characters. Therefore, the present study revises the generic diagnosis of *Holmesiella* in this respect and assigns the present species to this genus.

Holmesiella bisaetigera is readily distinguishable from *H. affinis* and *H. anomala* by having two long spiniform terminal setae on the endopod of the fourth male pleopod (Table 5). Additionally, *H. bisaetigera* is distinguished from *H. affinis* by the character of the antennal peduncle, the endopod of the fourth male pleopod, and the telson (Table 5).

Holmesiella is related to *Pteromysis* Ii, 1964 by a combination of the antennal scale with a naked lateral margin, the eyes with globular cornea, the triangular telson with spines on the distal three-fifths of the lateral margin, and the fourth pleopod of the male, which has an elongate endopod. *H. bisaetigera* is distinguishable from *P. amemiyai* Ii, 1964 by the shape of the antennal peduncle and the length of the apical long spines of the telson (Table 5).

Revised generic diagnosis of Holmesiella. Eyes developed, with globular cornea; antennal scale with naked lateral margin terminating in spiniform process; carpopropodus of third to eighth thoracopodal endopods divided into 3 subsegments; both rami of all male pleopods multi-segmented except first pleopodal endopod which is unsegmented; endopod of fourth male pleopod elongate, armed with 1 or 2 long spiniform terminal setae; uropodal endopod armed with spines on mesial margin; telson triangular with narrow truncate apex, lateral margin armed with spines on distal 3/5, and distal margin armed with 2 pairs of spines and pair of median plumose setae.

Meterythrops microphthalmus W. Tattersall, 1951

Meterythrops microphthalma W. Tattersall, 1951: 113–116, fig. 36: Banner, 1954: 580–581 (part?); Birstein and Tchindonova, 1958: 305; Ii, 1964: 319; Murano, 1971: 47; 1977: 171–176; Jo *et al*., 1998: 40–41, fig. 7.
Meterythrops robusta: Taniguchi, 1969, 47–48, fig. 5 [not *Meterythrops robustus* Smith, 1879].
Meterythrops microphthalmus: Fukuoka and Murano, 2006: 1645–1651, figs. 2–3, 12B–C.

Material examined. 1 adult female (21.2 mm), SO07-C3, NSMT-Cr 19704. 3 immature females (13.2–14.0 mm) and 1 juvenile (7.2 mm), SO07-C4-B1, NSMT-Cr 19705.

Distribution. Known from the cold-water region of the North Pacific (see Fukuoka and Murano, 2006).

Meterythrops robustus Smith, 1879

Meterythrops robusta Smith, 1879: 93–98, pl. 12; Hansen, 1908: 106–107; Zimmer, 1909: 85–87, figs. 168–172; Stephensen, 1912: 79–80; 1933: 12; W. Tattersall, 1933: 8; 1939: 283; Banner, 1948a: 377–379 (part?); W. Tattersall, 1951: 113, fig. 35; Banner, 1954: 580–581 (part?); Birstein and Tchindonova, 1958: 305–306; Daly and Holmquist, 1986: 1208; Kathman *et al*., 1986: 188, fig. a–h (p. 189).
Parerythrops robusta: G. Sars, 1879a: 98–102, tab. 39.
Meterythrops robustus: Fukuoka and Murano, 2006: 1655–1658, figs. 5–6, 12E–F.
not *Meterythrops robusta*: Holt and W. Tattersall, 1905: 143 [=*Parerythrops obesa* (Sars, 1864)]; Taniguchi, 1969: 47–48, fig. 5 [=*Meterythrops microphthalmus*].

Material examined. 2 adult females (11.5, 14.2 mm), WA9204, NSMT-Cr 19706. 1 adult female (damaged, ca 11.2 mm), WA06-F510, NSMT-Cr 19707. 1 adult female (14.3 mm), WA07-C350, NSMT-Cr 19708. 2 adult females (13.8, 14.3 mm), WA07-C410, NSMT-Cr 19709.

Distribution. Circumpolar (see Fukuoka and Murano, 2006).

Meterythrops sp.
(Fig. 12)

Meterythrops sp.: Murano, 1977: 177, fig. 24; Fukuoka and Murano, 2006: 1659–1661, fig. 7.

Material examined. 1 immature female (24.5 mm), SO07-C4-B1, NSMT-Cr 19710.

Distribution. Known from the Japan Sea (Murano, 1977).

Remarks. Murano (1977) reported *Meterythrops* sp. based on two damaged female specimens obtained from the stomach of a tadpole sculpin collected with a trawl net from the floor of the Japan Sea at a depth of 1035 m. Murano (1977) recognized that the specimens belonged to the genus *Meterythrops* and distinguished them from other species of this genus. Nevertheless, he retained them as undescribed species due to the absence of a male specimen. The present specimen is also an immature female.

Mysimenzies borealis sp. nov.
(Figs. 13–14)

Material examined. Holotype: adult male (27.3 mm), SO07-O3, NSMT-Cr 19711. Paratypes: 2 adult males (20.0, 20.5 mm) and 2 adult females (26.1, 30.6 mm), SO07-O3, NSMT-Cr 19712; 2 adult males (broken) and 2 adult females (damaged), SO07-O4, NSMT-Cr 19713.

Description. Integument not hispid. Thoracic somites without sternal processes. First to fifth abdominal somites subequal in length; sixth somite twice as long as fifth.

Carapace produced anteriorly into triangular rostral plate with rounded apex extending to 1/2 of first segment of antennular peduncle (Fig. 13A–B); anterolateral corner rounded; posterior margin emarginate, leaving last thoracic somite exposed dorsally.

Antennular peduncle of male (Fig. 13A) more robust than that of female (Fig. 13B); first segment with sensory fossette in middle of dorsal side and longitudinal lobe in middle of ventral side

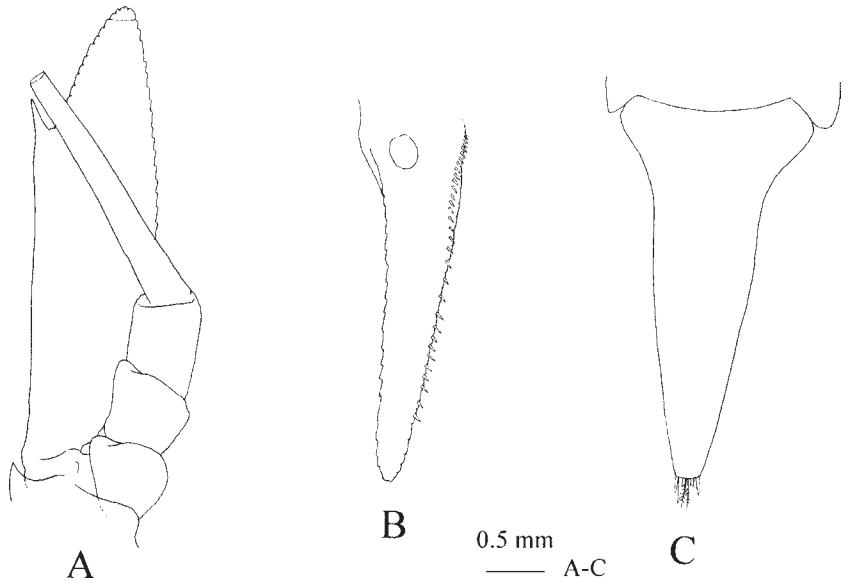

Fig. 12. *Meterythrops* sp. Murano, 1977. Immature female (24.5 mm), NSMT-Cr 19710. A, antenna (right, ventral); B, uropodal endopod (right, ventral); C, telson (dorsal).

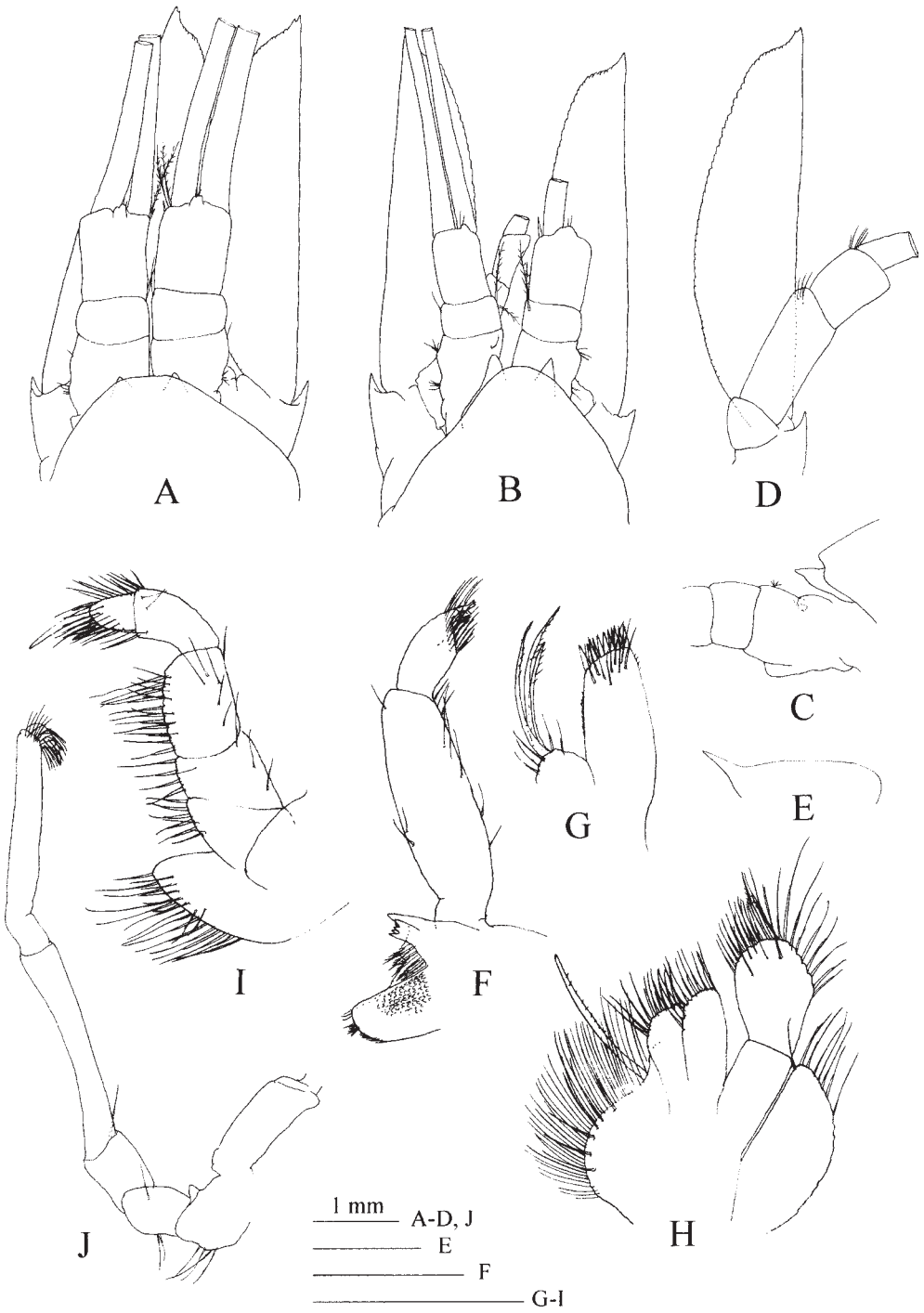

Fig. 13. *Mysimenzies borealis* sp. nov. A, C–J, adult male (27.3 mm), holotype, NSMT-Cr 19711; B, adult female (26.1 mm), paratype, NSMT-Cr 19712. A, B, anterior part of body (dorsal); C, first and second segments of antennular peduncle (left, lateral); D, antenna (left, ventral); E, labrum (lateral); F, mandible (left, ventral); G, maxillule (left, posterior); H, maxilla (left, posterior); I, endopod of first thoracopod (left, posterior); J, endopod of second thoracopod (left, posterior).

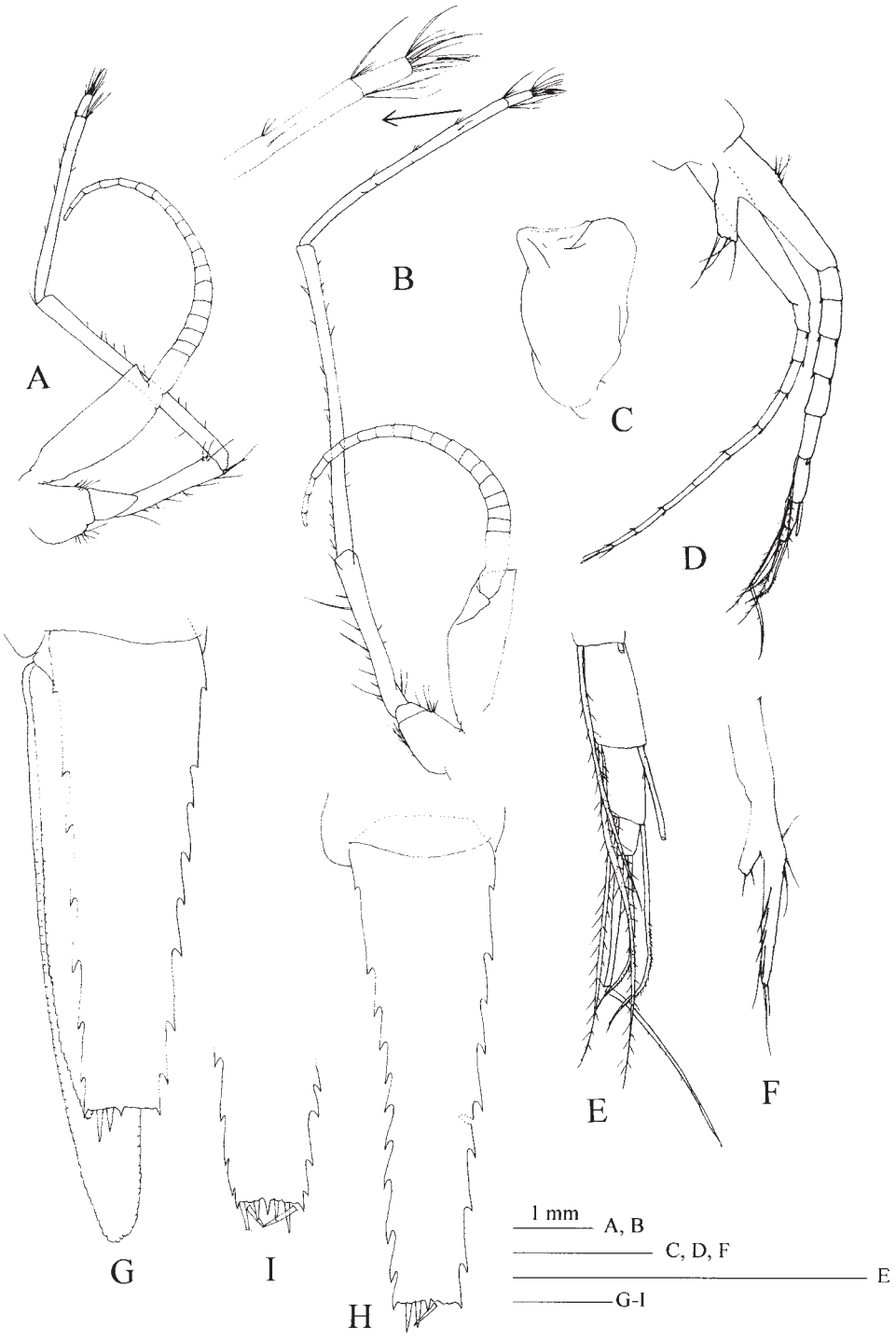

Fig. 14. *Mysimenzies borealis* sp. nov. A–B, I, adult female (damaged), paratype, NSMT-Cr 19713; C–G, adult male (27.3 mm), holotype, NSMT-Cr 19711; H, adult female (26.1 mm), paratype, NSMT-Cr 19712. A, third thoracopod (right, posterior); B, fifth thoracopod (right, anterior); C, male genital appendage (left, lateral); D, fourth pleopod of male (left, posterior); E, distal part of endopod of fourth male pleopod (left, posterior); F, fifth pleopod of male (left, posterior); G, uropod and telson of male (dorsal); H, telson of female (dorsal); I, distal part of telson (dorsal).

(Fig. 13C); third segment 4/5 length of first in male, and 3/5 length of first in female.

Antennal scale (Fig. 13A–B, D) extending beyond antennular peduncle by 1/2 of its length in male and by 2/5 of its length in female, 4 times as long as broad, without apical lobe; lateral margin almost straight, naked, terminating in spiniform process. Antennal peduncle (Fig. 13D) extending to 1/2 of scale. Antennal sympod (Fig. 13D) with spiniform process at anterolateral angle.

Eye (Fig. 13A–C) reduced to triangular processes without visual elements, extending to distal 1/3 of first segment of antennular peduncle.

Labrum (Fig. 13E) with short, spiniform, frontal process. Mandibular palp (Fig. 13F) with second segment cylindrical; third segment 2/5 of second segment in length. Lateral lobe of maxillule (Fig. 13G) armed with 14 spines on distal margin and 9 setae on posterior surface. Endopod of maxilla (Fig. 13H) with second segment 1.2 times as long as broad.

Endopod of first thoracopod (Fig. 13I) short, robust. Endopod of second thoracopod (Fig. 13J) long, robust; carpopropodus 1.2 times as long as merus. Endopods of third and fifth thoracopods (Fig. 14A–B) long, slender; carpus 3/4 length of merus in third thoracopod and 4/5 length in fifth thoracopod, undivided constriction present in distal 1/5; propodus short, 1/7 length of carpus in third thoracopod and 1/8 length in fifth thoracopod. Endopods of other thoracopods broken or missing. Exopods of all thoracopods with 18- or 19-segmented flagella.

Male genital appendage (Fig. 14C) broadened distally.

Marsupium of female composed of 3 pairs of oostegites.

First to third and fifth pleopods of male (Fig. 14F) and all pleopods of female reduced to unsegmented single lobe. Fourth pleopod of male (Fig. 14D–E) developed, biramous; exopod 10-segmented, proximal segment long, all segments except distal 2 segments armed with tiny seta on lateral and mesial angles of distal margin, penultimate segment armed with short seta on each distal angle, ultimate segment short, with 2 short, unequal terminal setae; endopod shorter and thicker than exopod, 9-segmented, proximal segment as long as succeeding 4 segments combined, second to fourth segments armed with tiny seta on each distal angle, sixth and seventh segments armed with long setae on each distal angle, penultimate segment armed on mesial angle with modified seta which is setulose on distal 2/3 except for distal naked part, ultimate segment armed with 2 unequal, modified setae, shorter one similar to modified seta on penultimate segment in structure, longer one twice as long as shorter one.

Uropodal endopod (Fig. 14G) extending to distal margin of telson, setose on entire margin, without spines on mesial margin; exopod (Fig. 14G) 1.3 times longer than endopod, setose on margins.

Telson (Fig. 14G–I) 1.1 times as long as sixth abdominal somite, 3.2–3.3 times as long as broadest part at base, with truncate apex; lateral margin with 8–11 denticles on entire length; distal margin with median small denticle, and 3 pairs of spines decreasing in length mesially and less than 1/10 of telson length.

Etymology. The specific name is from Latin "*boreas*", north, referring to the type locality.

Remarks. *Mysimenzies* Bacescu, 1971 was established for *M. hadalis* Bacescu, 1971 which was described on the basis of a single female specimen collected from the Peru Trench. The related genus *Marumomysis* Murano, 1999 was established later. *Marumomysis* differs from *Mysimenzies* in the character of the antennular peduncle without a sensory fossette in the proximal segment and the first thoracopod with a flagelliform exopod (Murano, 1999; San Vincente, 2007).

The present species differs from *Marumomysis* in the presence of a fossette in the proximal segment of the antennular peduncle and in the male pleopods. In *Marumomysis*, all pleopods (first, second and fourth pleopods of *M. hakuhoae* unknown for missing: Murano, 1999) have multisegmented endopods and exopods except the first pleopodal endopod, which is unsegmented, whereas in the present species the first to third and fifth pleopods have only reduced unsegmented

endopods and the fourth pleopod has a multi-segmented endopod and exopod.

This species agrees with the generic diagnosis of *Mysimenzies* except for the presence of the flagelliform exopod in the first thoracopod and is therefore placed tentatively in *Mysimenzies*.

Mysimenzies borealis is distinguished from *M. hadalis* as follows. The antennal scale of *M. borealis* does not produce into an apical lobe, whereas that of *M. hadalis* does (Bacescu, 1971). The carpopropodus of the third to eighth thoracopodal endopods is divided into two segments (carpus and propodus) by a transverse articulation in *M. borealis*, whereas it is divided into three subsegments by a proximal oblique articulation and a distal transverse articulation in *M. hadalis* (Bacescu, 1971). *Mysimenzies borealis* has an exopod in the first thoracopod, which *M. hadalis* lacks (Bacescu, 1971).

Bacescu (1971) placed this genus in the tribe Erythropini tentatively, and noted that the exact systematic position of this genus can be elucidated only when the morphology of the male is known. However, other specimens of *M. hadalis* have not been reported. The structure of the male pleopods of *M. borealis* differs from the character of the tribe Erythropini. The finding of the male specimen of *M. hadalis* makes clear the systematic position of *Mysimenzies*.

Neoamblyops gen. nov.

Type species. *Neoamblyops latisquamatus* sp. nov., by monotypy.

Diagnosis. Eyes united to single plate without visual elements. Antennal scale exceptionally broad, lateral margin naked on proximal 1/2 and without spiniform process. Endopods of third to eighth thoracopods long, slender. Marsupium of female composed of 3 pairs of oostegites. All pleopods of male biramous; endopod reduced to unsegmented lobe in first pleopod, multi-segmented in second to fifth pleopods; all exopods multi-segmented; fourth pleopod with modified setae on endopod and exopod. All pleopods of female reduced to unsegmented single lobe. Telson with posterior cleft, unarmed with spines on lateral margin, armed with 2 spines on each posterior end; cleft broadly rounded, smooth except pair of plumose setae on anterior end.

Etymology. The generic name is from combination of Greek "*neo*", new, and the genus *Amblyops*; gender masculine.

Remarks. *Neoamblyops* is characterized by the eye, antennal scale and telson. In the tribe Erythropini, *Euchaetomeropsis* W. Tattersall, 1909, *Heteroerythrops* O. Tattersall, 1955 and several species of *Hyperamblyops* Birstein and Tchindonova, 1958 shares the antennal scale with a naked lateral margin without a terminal spiniform process. However, *Neoamblyops* is entirely different from those in the reduced eyes without visual elements, elliptical antennal scale and bifid telson.

The 14 genera of the tribe Erythropini are characterized by reduced eyes. However, *Neoamblyops* is readily distinguishable from them by the telson with a bifid apex.

Neoamblyops latisquamatus sp. nov.
(Figs. 15–16)

Material examined. Holotype: adult male (12.1 mm), KT-07-29-K2, NSMT-Cr 19714. Paratype: 1 immature female (11.7 mm), KT-07-29-K2, NSMT-Cr 19715.

Description. Integument smooth. Thoracic somites without sternal processes. First to fifth abdominal somites subequal in length; sixth somite twice as long as fifth.

Carapace (Fig. 15A–B) produced anteriorly into low rounded rostral plate; anterolateral corner pointed; posterior margin emarginate, exposing 1/2 of last thoracic somite dorsally.

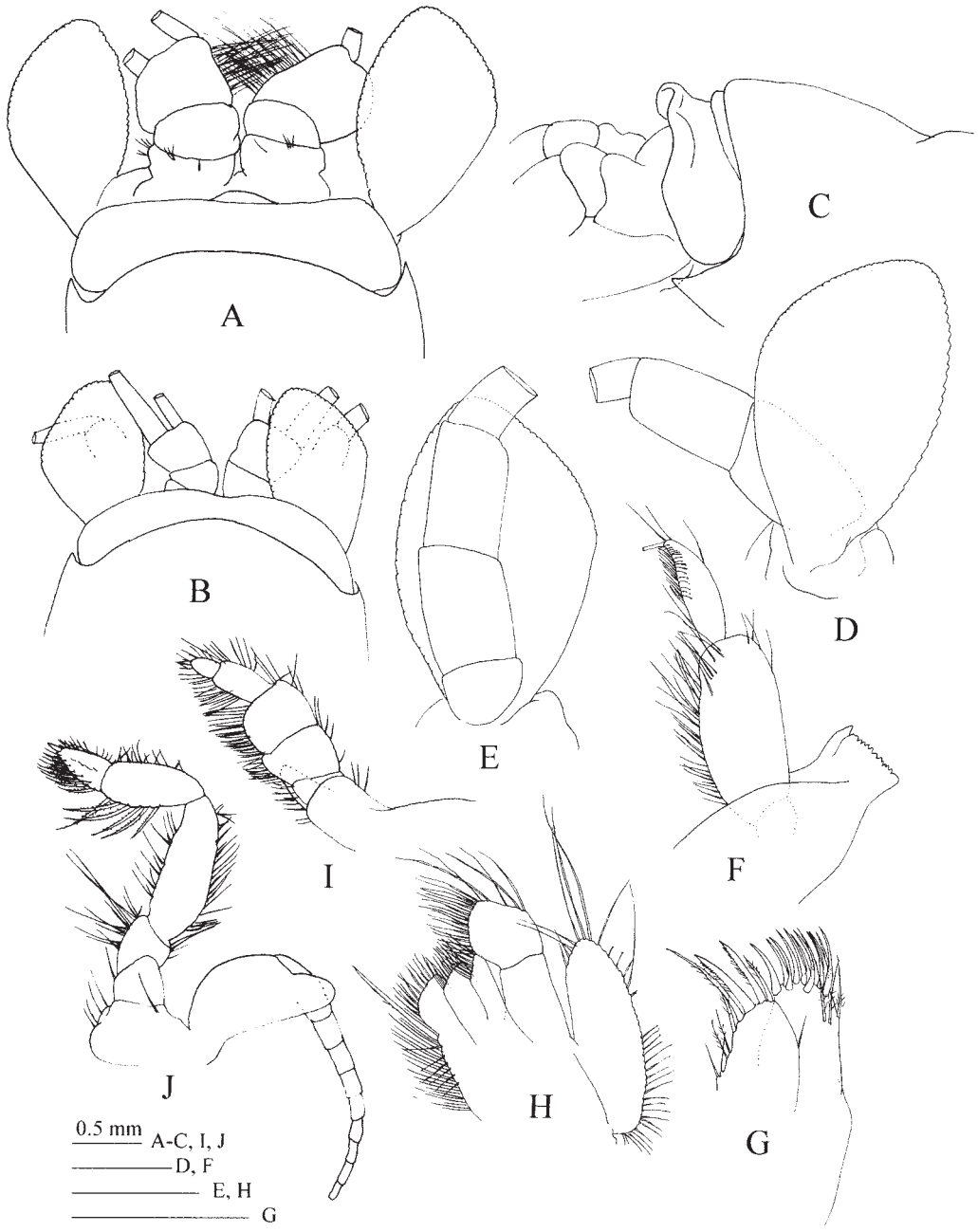

Fig. 15. *Neoamblyops latisquamatus* gen. et sp. nov. A, C–D, F–J, adult male (12.1 mm), holotype, NSMT-Cr 19714; B, E, immature female (11.7 mm), paratype, NSMT-Cr 19715. A–B, anterior part of body (dorsal); C, anterior part of body (lateral); D, antenna (left, dorsal); E, antenna (left, ventral); F, mandible (left, anterior); G, maxillule (left, posterior); H, maxilla (left, posterior); I, endopod of first thoracopod (left, posterior); J, second thoracopod (left, posterior).

Antennular peduncle (Fig. 15A–B) robust in male than in female; third segment of male with well developed appendix masculina.

Antennal scale (Fig. 15A–B, D–E) extending beyond anterior end of antennular peduncle by 1/10 of its length in male and by 1/7 of its length in female, 1.6–1.7 times as long as broad; lateral

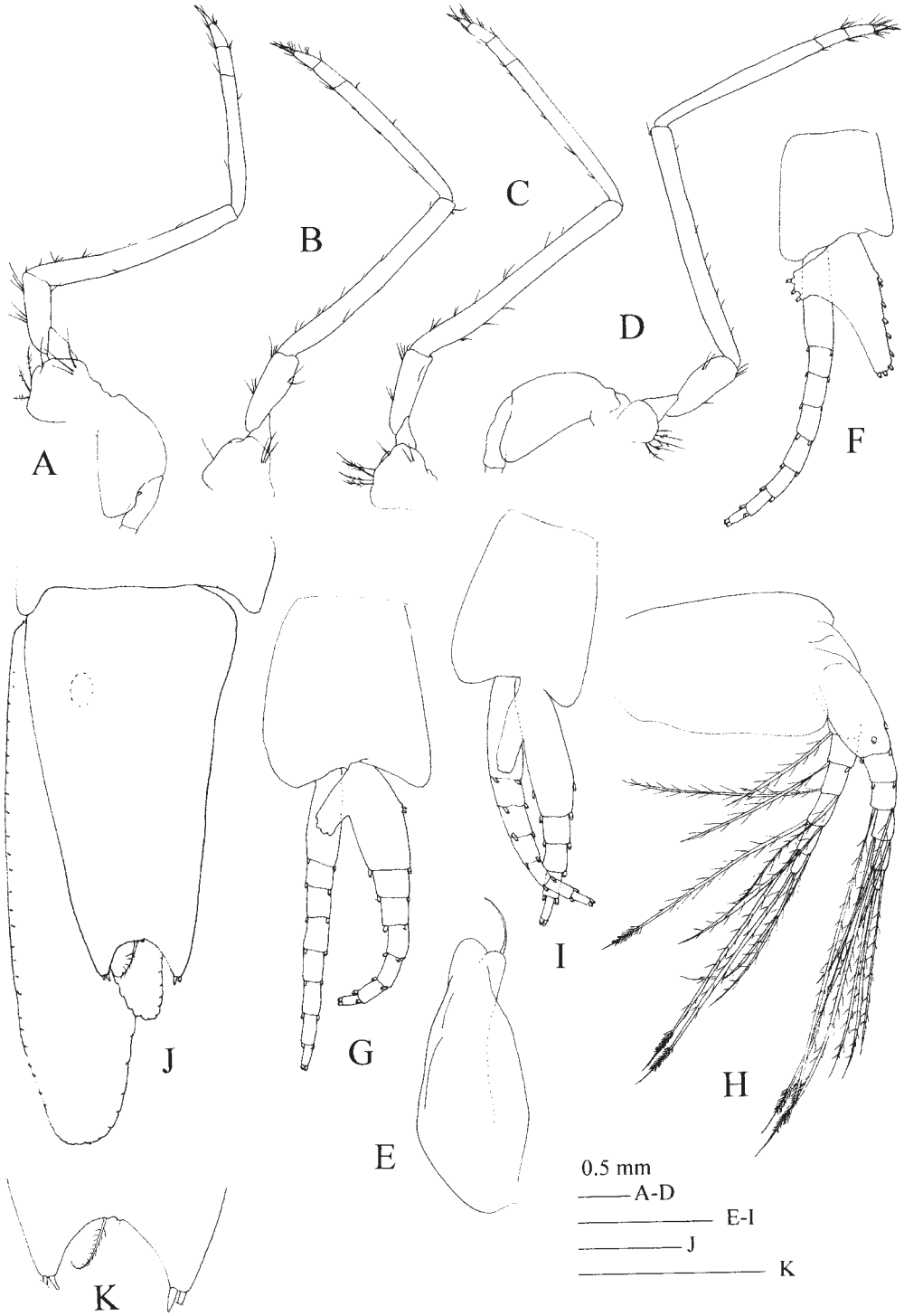

Fig. 16. *Neoamblyops latisquamatus* gen. et sp. nov. Adult male (12.1 mm), holotype, NSMT-Cr 19714. A, third thoracopod (left, posterior); B, endopod of fourth thoracopod (left, posterior); C, endopod of fifth thoracopod (left, posterior); D, seventh thoracopod (right, posterior); E, male genital appendage (left, lateral); F, first pleopod (left, anterior); G, second pleopod (left, anterior); H, fourth pleopod (left, lateral); I, fifth pleopod (left, anterior); J, uropod and telson (dorsal); K. distal part of telson (dorsal).

margin convex, smooth in proximal 1/2, without spiniform process. Antennal peduncle (Fig. 15D–E) slightly shorter than scale. Antennal sympod (Fig. 15D–E) without spiniform processes at anterolateral angle.

Eye (Fig. 15A–C) united to single plate with slight median depression, without visual elements.

Labrum with rounded anterior margin. Mandibular palp (Fig. 15F) with second segment setose on lateral margin. Lateral lobe of maxillule (Fig. 15G) armed with mesially curved, rather slender spines on distal margin and with 3 setae on lateral posterior surface. Maxilla (Fig. 15H) with exopod extending to distal margin of proximal segment of endopod; second segment of endopod almost as long as broad.

Endopod of first thoracopod (Fig. 15I) short, robust; ischium and merus expanded mesially. Endopod of second thoracopod (Fig. 15J) robust; carpopropodus armed with barbed, spiniform setae on mesial margin; dactylus tapering toward apex, with short terminal claw. Endopods of third to seventh thoracopods (Fig. 16A–D) long, slender; carpopropodus divided into 3 subsegments, proximal subsegment long, 2/3–3/4 of merus in length, 2.5–2.7 times as long as distal 2 subsgements combined, distal 2 subsegments subequal in length; dactylus with terminal claw. Endopod of eighth thoracopod unknown for missing.

Genital appendage of male (Fig. 16E) armed with single seta on distal margin.

Marsupium of female composed of 3 pairs of oostegites.

All pleopods of male (Fig. 16F–I) biramous; endopod reduced to unsegmented lobe in first, 7-segmented in second and third, 6-segmented in fourth, and 5-segmented in fifth pleopods, proximal segment longest; exopod 8-segmented in first and second, 7-segmented in third and fifth, and 6-segmented in fourth pleopods; fourth pleopod with modified seta at distomesial angle of distal 3 segments of endopod and distal 4 segments except ultimate segment of exopod. All pleopods of female reduced to unsegmented single lobe.

Uropodal endopod (Fig. 16J) extending beyond apex of telson by 1/10 of its length, without spines on mesial margin; exopod (Fig. 16J) broad, 1.3 times longer than endopod.

Telson (Fig. 16J–K) 1.5 times as long as sixth abdominal somite, 1.8 times as long as maximum breadth near base, with apical cleft; lateral margin smooth; apical lobes with 2 short spines on each apex; apical cleft broadly rounded with smooth margin except pair of plumose setae on anterior end.

Etymology. The specific name is derived from Latin "*latus*", broad, and "*squamatus*", scale, referring to the broad antennal scale.

Remarks. The characteristics of this species were discussed in the remarks on the generic diagnosis.

Paramblyops hamatilis sp. nov.
(Figs. 17–18)

Material examined. Holotype: adult male (9.1 mm), SO07-K1, NSMT-Cr 19716. Paratypes: 1 adult male (9.0 mm) and 7 adult females (9.3–10.5 mm), SO07-K1, NSMT-Cr 19717.
Other material. 6 immature males (5.8–8.7 mm), 5 adult females (7.8–9.8 mm), 11 immature females (7.6–8.5 mm) and 8 juveniles (4.7–6.2 mm), SO07-K1, NSMT-Cr 19718. 1 adult male (9.6 mm), KT-07-29-K2, NSMT-Cr 19719.

Description. Integument smooth. Cephalon with median spear-shaped process immediately in just front of labrum (Fig. 17C), its apex extending to distal 1/3 of third segment of antennular peduncle in male and to anterior end of antennular peduncle in female. Thoracic somites without sternal processes. First to fifth abdominal somites subequal in length; sixth somite twice as long as

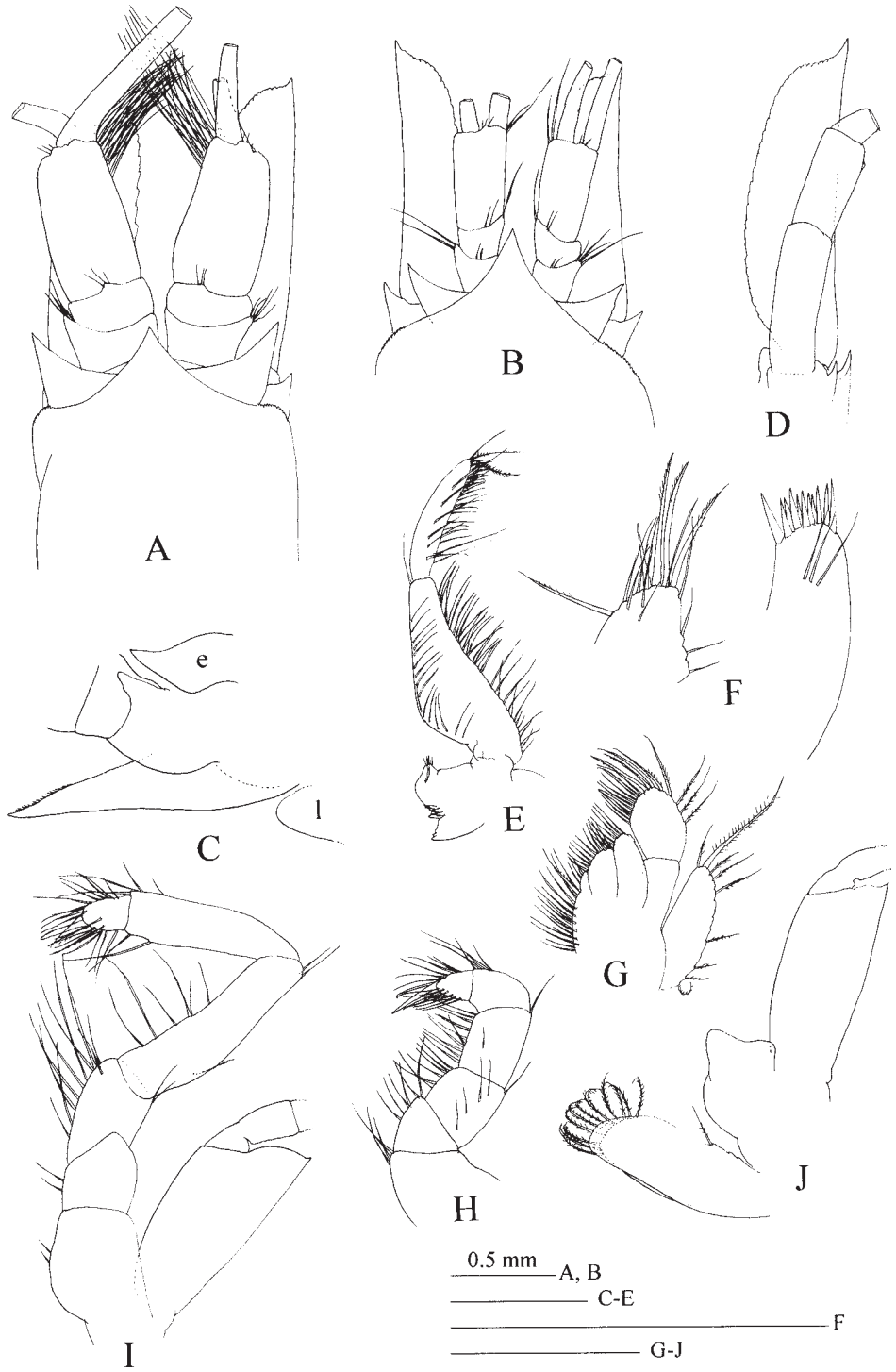

Fig. 17. *Paramblyops hamatilis* sp. nov. A, C, E–J, adult male (9.1 mm), holotype, NSMT-Cr 19716; B, D, adult female (10.3 mm), paratype, NSMT-Cr 19717. A–B, anterior part of body (dorsal); C, anterior part of body (lateral), e=eye, l=labrum; D, antenna (left, ventral); E, mandible (left, ventral); F, maxillule (left, posterior); G, maxilla (left, posterior); H, endopod of first thoracopod (left, posterior); I, endopod of second thoracopod (left, posterior); J, male genital appendage (left, lateral).

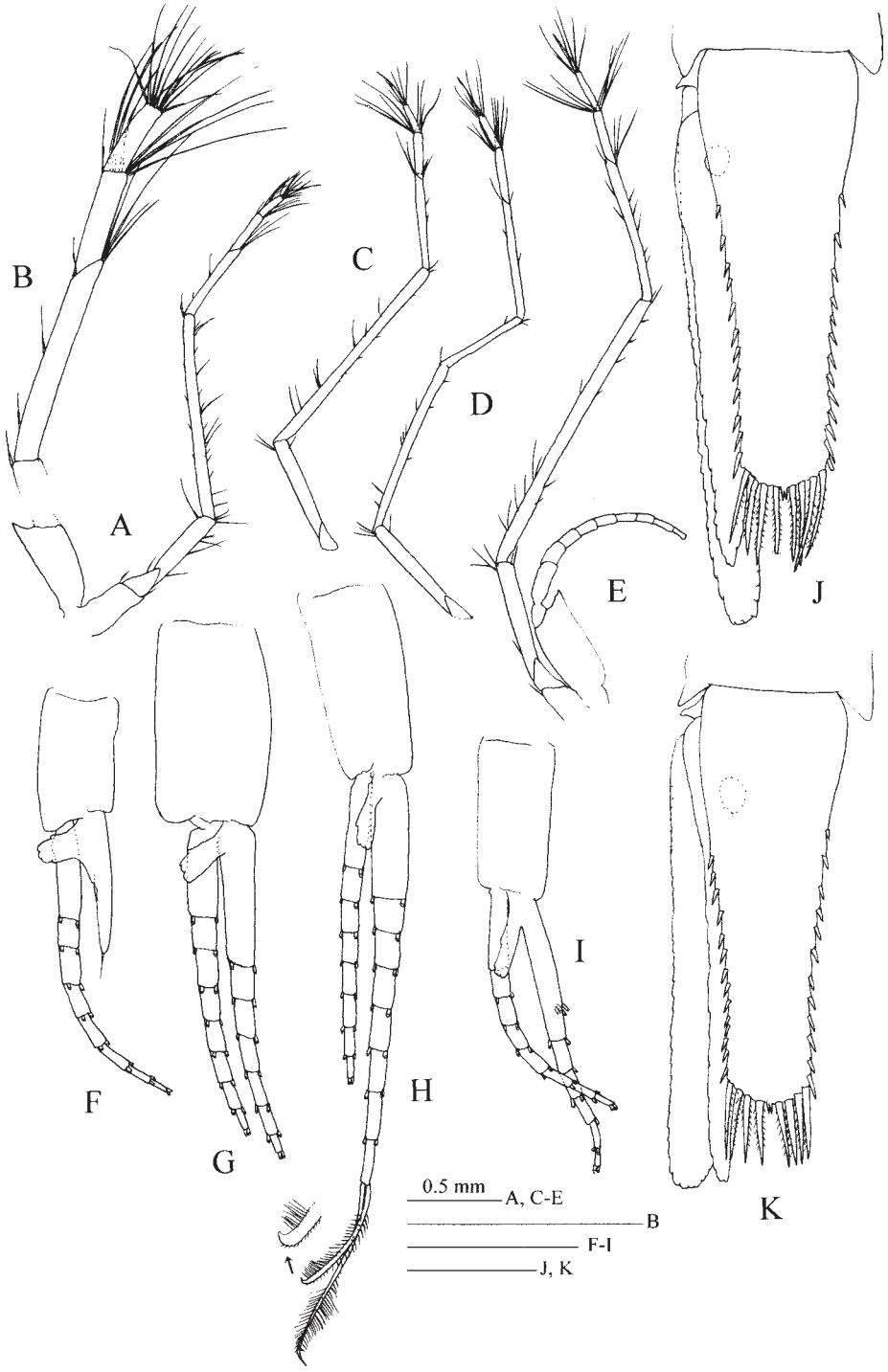

Fig. 18. *Paramblyops hamatilis* sp. nov. A–J, adult male (9.1 mm), holotype, NSMT-Cr 19716; K, adult female (10.3 mm), paratype, NSMT-Cr 19717. A, endopod of third thoracopod (right, mesial); B, carpopropodus of endopod of third thoracopod (right, mesial); C, endopod of fourth thoracopod (left, mesial); D, endopod of fifth thoracopod (left, mesial); E, sixth thoracopod (left, mesial); F, first pleopod (left, anterior); G, third pleopod (left, anterior); H, fourth pleopod (left, anterior); I, fifth pleopod (left, anterior); J–K, uropod and telson (dorsal).

fifth one.

Anterior margin of carapace (Fig. 17A–B) triangular with acute apex extending beyond 1/2 of first segment of antennular peduncle in male and to 1/2 of second segment in female. Anterolateral angle of carapace with spinules (Fig. 17A–B). Posterior margin of carapace emarginate, leaving last thoracic somite exposed dorsally.

Eye (Fig. 17A–B) reduced to flattened plate without visual elements, separated, triangular with sharply pointed lateral corner and concave anterior margin in dorsal view.

Antennular peduncle of male (Fig. 17A) more robust than that of female (Fig. 17B); first and second segments subequal in length; third segment twice as long as proximal 2 segments combined in male and 1.5 times as long as in female.

Antennal scale (Fig. 17A–B, D) extending beyond antennular peduncle by 1/4 of its length in male and by 1/3 of its length in female, 3.6 times as long as broad; lateral margin naked, terminating in spiniform process; apical lobe wanting. Antennal peduncle (Fig. 17D) extending to distal 1/5 of scale in male and to distal 1/3 in female. Antennal sympod (Fig. 17D) with 2 spiniform processes on anterolateral angle.

Labrum without frontal processes. Mandibular palp (Fig. 17E) with second segment armed with setae on lateral and mesial margins; third segment 2/3 of second segment in length. Maxillule (Fig. 17F) with lateral lobe armed with 11 spines on distal margin and 3 setae on posterior surface. Maxilla (Fig. 17G) with exopod extending to distal margin of proximal segment of endopod; second segment of endopod 1.3 times as long as broad.

Endopod of first thoracopod (Fig. 17H) short, robust, with robust terminal claw. Endopod of second thoracopod (Fig. 17I) relatively short, robust. Endopods of third to sixth thoracopods (Fig. 18A–E) long, slender, gradually increasing in length from third to sixth thoracopod; carpopropodus divided into 3 subsegments, proximal subsegment longest, 1.2–1.5 times as long as distal 2 subsegments combined, middle subsegment divided from proximal subsegment by oblique articulation, slightly longer or as long as distal subsegment; dactylus with slender terminal claw. Seventh and eighth thoracopods missing.

Male genital appendage (Fig. 17J) 3 times as long as broad in lateral view, armed with 11 plumose setae on distal margin.

Marsupium of female composed of 2 pairs of developed oostegites.

All pleopods of male developed, biramous. First pleopod (Fig. 18F) with 8-segmented exopod, and unsegmented endopod. Second and third pleopods (Fig. 18G) with 8-segmented exopod; endopod slightly longer than exopod, 7-segmented, proximal segment long, extending to distal margin of second segment of endopod. Exopod of fourth pleopod (Fig. 18H) 8-segmented, without modified setae. Endopod of fourth pleopod (Fig. 18H) 1.3 times longer than exopod, 8-segmented; proximal segment long, extending near distal margin of second segment of exopod; ultimate segment with 2 unequal, modified setae, longer seta 4.4 times as long as ultimate segment, setulose on distal 3/5 except distal naked part, shorter seta 2/3 of longer one in length, with curved tip. Fifth pleopod (Fig. 18I) with 8-segmented exopod, and 6-segmented endopod; proximal segment of endopod extending to distal margin of fourth segment of exopod. Pseudobranchial lobe (Fig. 18F–I) rectangular.

All pleopods of female reduced to unsegmented single lobe.

Uropodal endopod (Fig. 18J–K) extending to or slightly beyond apex of apical spines of telson, without spines on mesial margin. Uropodal exopod (Fig. 18J–K) 1.1 times longer than endopod in male and subequal length to endopod in female.

Telson (Fig. 18J–K) 1.1–1.2 times as long as sixth abdominal somite, 2.8–3.4 times as long as broadest part; lateral margin armed with 12–14 subequal short spines on distal 2/3; distal margin slightly convex, armed with 4 pairs of long, setulose spines and pair of short, median spines, long

spines subequal in length, 1/5 of telson length, short spines less than 1/5 of long spines in length.

Etymology. The specific name is from Latin "*hamatus*", hooked, and is given in reference to the shape of the tip of the short modified seta on the fourth male pleopod.

Remarks. Murano (2002a) divides the species of *Paramblyops* into three groups. *P. hamatilis* is distinguished into the *rostratus*-group by a rostrum with a pointed apex, the presence of a spear-shaped process arising from just front of the labrum, an antennal sympod with two spines on the anterolateral angle, and a telson lacking a pair of plumose setae. The *rostratus*-group includes four species: *P. brevirostris* O. Tattersall, 1955, *P. rostratus* Holt and W. Tattersall, 1905, *P. spatulicaudus* Murano, 2002, and *P. tenuicaudus* Murano, 2002. *P. hamatilis* is most allied to *P. spatulicaudus* in the telson with four pairs of long apical spines, but differs from it in the eyes, uropods and telson. The anterolateral corner of the eyes is curved mesially in *P. spatulicaudus* (Murano, 2002a), but does not show this shape in *P. hamatilis*. The uropodal exopod of the female is 1.1 times longer than the endopod in *P. spatulicaudus* (Murano, 2002a), as opposed to subequal length to the endopod in *P. hamatilis*. The lateral spines of the telson are half the length of the long apical spines in *P. spatulicaudus* (Murano, 2002a) and less than one-third the length in *P. hamatilis*, and the apical long spines of the telson are smooth in *P. spatulicaudus* (Murano, 2002a) and setulose in *P. hamatilis*.

Paramblyops hamatilis is readily distinguished from *P. rostratus* by the shape of the rostrum, the structure of the modified setae of the fourth male pleopod, and the armature of the telson, and from *P. brevirostris* and *P. tenuicaudus* by the armature of the telson.

Pseudomma crassidentatum Murano, 1974

Pseudomma crassidentatum Murano, 1974b: 318–321, figs. 17–18.

Material examined. 1 immature male (damaged), KT-07-29-E3, NSMT-Cr 19720. 2 adult males (10.9, 12.7 mm), 1 immature male (12.3 mm) and 2 adult females (12.4, 13.7 mm), KT-07-29-K2, NSMT-Cr 19721. 1 immature male (13.2 mm), 3 adult females (12.2–12.5 mm) and 1 immature female (damaged), KT-07-29-K3, NSMT-Cr 19722. 1 adult male (11.7 mm) and 1 immature female (11.6 mm), KT-07-29-M3-3, NSMT-Cr 19723. 3 adult females (11.2–11.8 mm) and 1 immature female (damaged), KT-07-29-H2, NSMT-Cr 19724.

Distribution. Previously known from Suruga Bay, Japan (Murano, 1974b).

Pseudomma izuensis Murano, 1966

Pseudomma izuensis Murano, 1966: 8–12, figs. 3–5; 1974b: 329–330, fig. 25.

Material examined. 1 adult female (11.5 mm), WA06-EF425D, NSMT-Cr 19725. 11 immature males (7.1–12.4 mm), 5 adult females (11.2–13.4 mm) and 3 immature females (11.5–11.9 mm), SO07-C2-B, NSMT-Cr 19726. 3 immature males (13.5 mm, broken) and 2 adult females (damaged), SO07-C4-B1, NSMT-Cr 19727.

Distribution. Known from Sagami Bay, Japan (Murano, 1966) and the Japan Sea (Murano, 1974b).

Scolamblyops japonicus Murano, 1974
(Fig. 19)

Scolamblyops japonicus Murano, 1974a: 226–228, figs. 1–8.

Material examined. 1 adult female (10.5 mm), KT-07-29-H2, NSMT-Cr 19728.

Distribution. Previously known from Suruga Bay, Japan (Murano, 1974a).

Remarks. This species was established on the basis of the two female specimens by Murano (1974a) and has not been recorded afterwards.

The present specimen is larger than the type specimens (10.5 mm in the present specimen, and 7.0 and 7.6 mm in the type specimens), however agrees well with the original description.

Tribe Mysini

Inusitatomysis insolita Ii, 1940

Inusitatomysis insolita Ii, 1940: 163–164, figs. 34–37; 1964: 413–417, fig. 105; Holmquist, 1982: 482–486, figs. 4B, 5; Kathman *et al*., 1986: 184, fig. a–j (p.185).
Inusitatomysis sp. Banner, 1948b: 67–70, fig. 10.
Inusitatomysis serrata W. Tattersall, 1951: 160–162, fig. 60; Banner, 1954: 581.
Inusitatomysis californica Bacescu and Gleye, 1979: 131–133, fig. 1A–H.

Material examined. 1 adult female (11.5 mm), WA91-03, NSMT-Cr 19729.

Distribution. Previously known from the Korea Straits (Ii, 1940, 1964), the Bering Sea (W. Tattersall, 1951), off British Columbia (Banner, 1948b; Holmquist, 1982; Kathman *et al.*, 1986), and off California (Bacescu and Gleye, 1979).

Parastilomysis paradoxa Ii, 1936

Parastilomysis paradoxa Ii, 1936: 3–6, figs. 1–14; 1964: 418–420, fig. 106; Murano, 1970a: 264; 1970b: 146–147; Wang and Liu, 1997: 213–214; Liu and Wang, 2000: 216–217, fig. 76; Fukuoka *et al*., 2005: 32, figs. 1–2.

Material examined. 1 adult female (16.8 mm), WA05-H150, NSMT-Cr 19730.

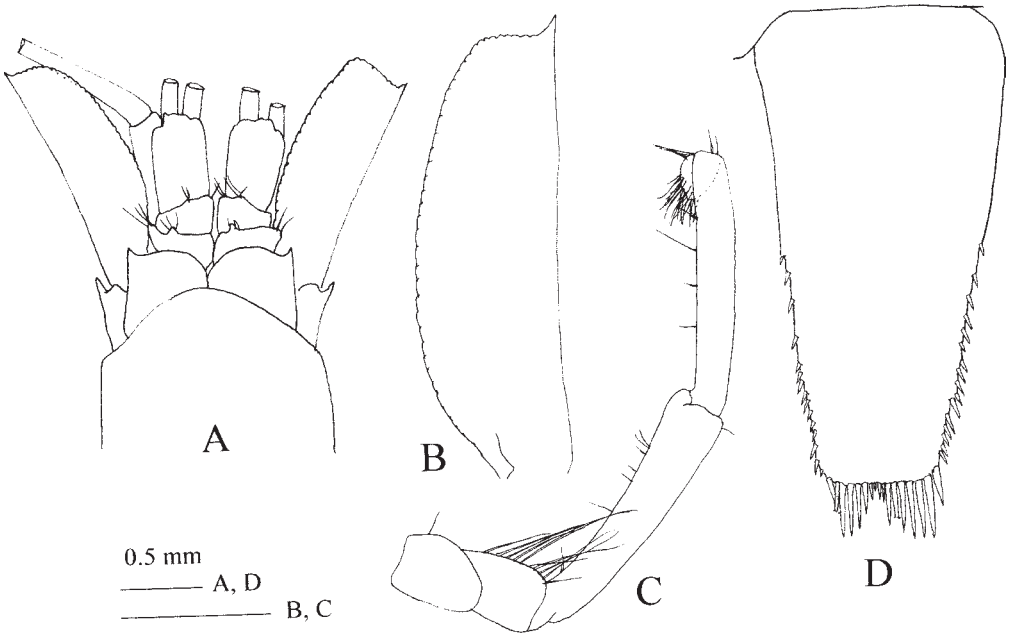

Fig. 19. *Scolamblyops japonicus* Murano, 1974. Adult female (10.5 mm), NSMT-Cr 19728. A, anterior part of body (dorsal); B, antennal scale (left, ventral); C, endopod of second thoracopod (left, posterior); D, telson (dorsal).

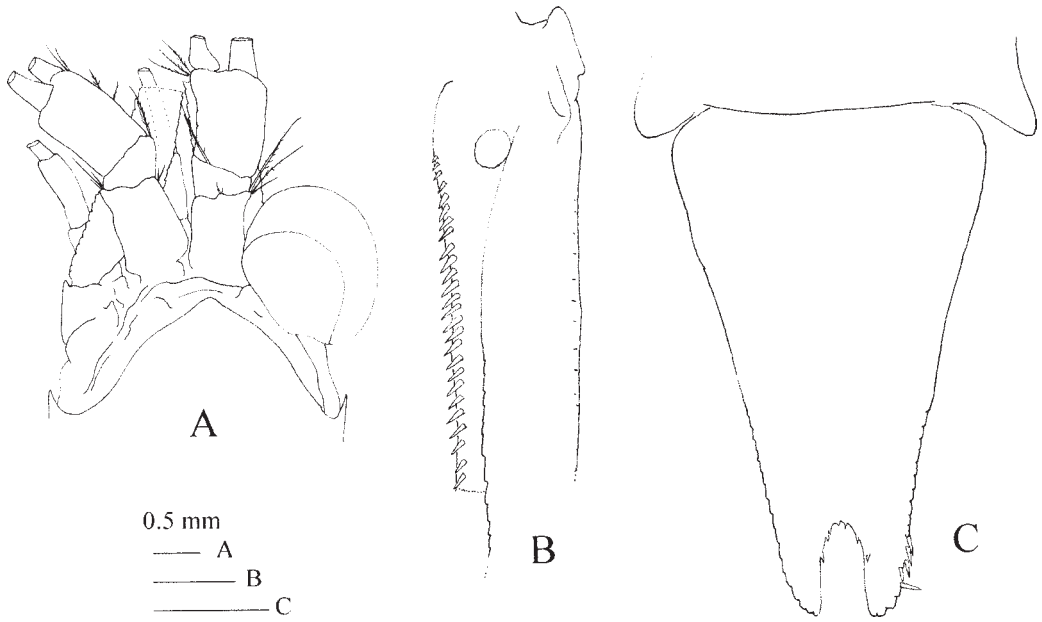

Fig. 20. ?*Mysidetes farrani* (Holt and W. Tattersall, 1905). Adult female (22.3 mm), NSMT-Cr 19738. A, anterior part of body (dorsal); B, uropod (right, ventral); C, telson (dorsal).

Distribution. Known from the Japanese warm-water region and mixed water region between the Oyashio cold current and the Kuroshio Extension, and from the East China Sea (see Fukuoka *et al.*, 2005).

Parastilomysis prominula Fukuoka, Bravo and Murano, 2005

Parastilomysis prominula Fukuoka *et al*., 2005: 37–42, figs. 6–8.

Material examined. 1 adult male (17.5 mm), WA91-03, NSMT-Cr 19731. 2 adult males (17.9, 19.8 mm), 5 adult females (17.3–21.0 mm) and 40 immature females (12.7–16.0 mm), WA07-D210D, NSMT-Cr 19732. 1 adult female (broken), YA-06-4, NSMT-Cr 19733.

Distribution. Known from Japan: Suruga Bay, Sagami Bay and off Onagawa (Fukuoka *et al.*, 2005).

Stilomysis major W. Tattersall, 1951

Stilomysis major W. Tattersall, 1951: 177–179, fig. 67A–B.

Material examined. 1 adult male (36.5 mm) and 1 adult female (31.0 mm), WA06-E425, NSMT-Cr 19734. 1 adult female (39.0 mm), WA06-E450, NSMT-Cr 0019735000. 1 adult female (47.0 mm), WA07-B350, NSMT-Cr 19736. 1 adult female (38.5 mm), WA07-C410, NSMT-Cr 19737.

Distribution. Previously known from the Japan Sea (W. Tattersall, 1951).

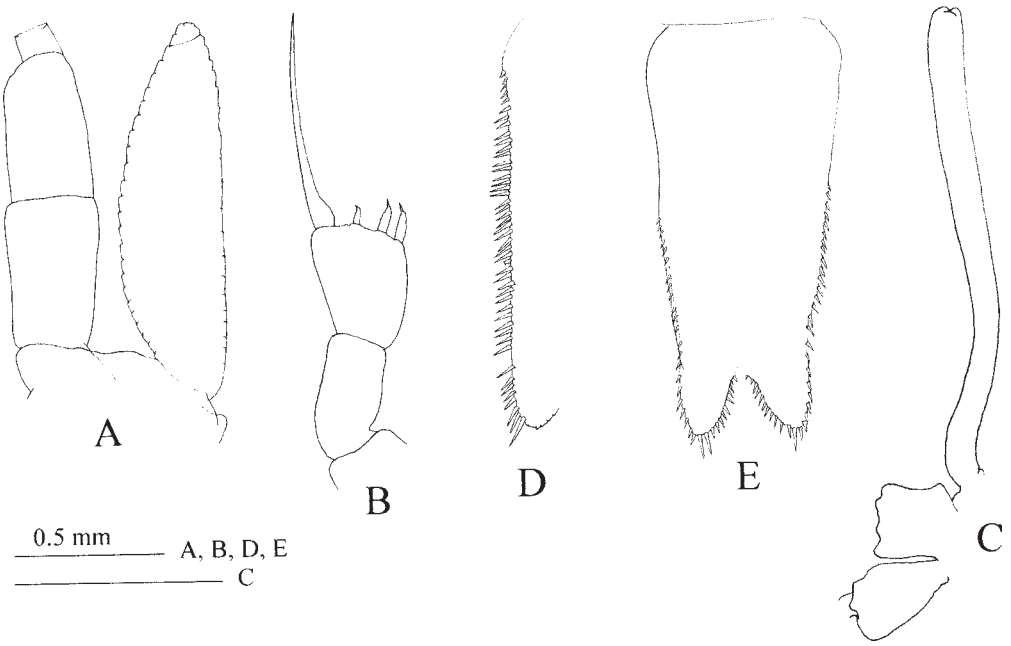

Fig. 21. *Mysidella tanakai* Ii, 1964. Adult male (9.1 mm), NSMT-Cr 19739. A, antenna (right, dorsal); B, distal part of endopod of second thoracopod (left, anterior); C, male genital appendage (left, anterior); D, uropodal endopod (left, ventral); E, telson (dorsal).

Tribe Heteromysini

?***Mysidetes farrani*** (Holt and W. Tattersall, 1905)

(Fig. 20)

Mysideis (?) *farrani* Holt and W. Tattersall, 1905: 127–128, 146.

Mysidetes farrani: Holt and W. Tattersall, 1906: 40–44, pl. 5; W. Tattersall, 1909: 140; W. Tattersall and O. Tattersall, 1951: 305–310, figs. 76–78; Lagardère and Nouvel, 1980: 855–859, figs. 41–46.

Material examined. 1 adult female (20.0 mm), WA07-C900, NSMT-Cr 19738.

Distribution. Previously known from European waters (W. Tattersall and O. Tattersall, 1951; Lagardère and Nouvel, 1980).

Remarks. *Mysidetes farrani* has been observed to have considerable variation in body size (10 to 33 mm), the shape of the antennal scale, uropod and telson, and the armature of the uropodal endopod and telson (W. Tattersall and O. Tattersall, 1951). The smaller specimens have a short, obtuse rostrum, less pronounced anterolateral angles of the carapace, a broader antennal scale, less slender thoracopodal endopods and uropodal endopod with fewer spines on the mesial margin, fewer spines on the telson, and a much shallower cleft of the telson (W. Tattersall and O. Tattersall, 1951).

The present specimen is damaged but is similar to the illustrations of the large race of *M. farrani* by W. Tattersall and O. Tattersall (1951).

Subfamily Mysidellinae

Mysidella tanakai Ii, 1964

(Fig. 21)

Mysidella tanakai Ii, 1964: 574–577, fig. 153; Murano, 1970b: 147; 2002b: 83–85, fig. 11.

Material examined. 1 adult male (9.1 mm), KT-07-29-K1, NSMT-Cr 19739.

Distribution. Known only from Japan: Suruga Bay (Ii, 1964; Murano, 2002b), Tateyama Bay (Murano, 1970b), and Sagami Bay (Murano, 2002b).

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