

First Recorded Family Synopiidae (Crustacea: Amphipoda) from the Korean Waters

Young-Hyo Kim*, Jun-Haeng Heo

Department of Life Sciences, Dankook University, Cheonan 31116, Korea

ABSTRACT

A newly recorded species of gammaridean amphipod, *Synopia (Telsosynopia) trifidilla* Hughes and Lowry, 2006 belonging to the family Synopiidae Dana, 1853 was collected from the southern Korean coasts. *Synopia (Telsosynopia) trifidilla* Hughes and Lowry is characterized by the entire telson with a trifold apical margin. The species is described and fully illustrated in the present study. This is the first record of the family Synopiidae from Korea.

Keywords: Amphipoda, Synopiidae, *Synopia*, *Telsosynopia*, Korea

INTRODUCTION

The family Synopiidae Dana, 1853 is a small group, characterized by the massive head with a downturned rostrum, simple to sub-chelate gnathopods, and elongated telson (Lörz and Coleman, 2013). Synopiid amphipods are distributed worldwide and are commonly found in the deep sea (Barnard, 1972). The family contains 108 species in 17 genera, and among the genus, *Synopia* Dana, 1852 is distinguished from its congeners by having a short telson and an extremely stout mandibular palp. The genus *Synopia* was subdivided into two component subgenera; *S. (Synopia)* and *S. (Telsosynopia)* by Karaman (1986). Subgenus *S. (Telsosynopia)* is distinguished from *S. (Synopia)* by the entire telson and more or less tritritative molar of mandible. More recently, *Telsosynopia* Karaman, 1986 has been elevated to generic rank based on the entire telson by Hughes and Lowry (2006). Both of these classifications present slightly different generic compositions. In this study, we follow the classification proposed by Karaman (1986).

The subgenus *Synopia (Synopia)* has 6 species; *S. (Synopia) angustifrons* Dana, 1853, *S. (Synopia) caraibica* Bovallius, 1886, *S. (Synopia) gracilis* Dana, 1853, *S. (Synopia) orientalis* Kossmann, 1880, *S. (Synopia) scheeleana* Bovallius, 1886, and *S. (Synopia) ultramarina* Dana, 1853 and the sub-

genus *Synopia (Telsosynopia)* has 5 species; *S. (Telsosynopia) paravariabilis* (Ortiz and Lalana, 1997), *S. (Telsosynopia) rotunda* (Andres, 1984), *S. (Telsosynopia) triangula* (Andres, 1984), *S. (Telsosynopia) trifidilla* Hughes and Lowry, 2006, and *S. (Telsosynopia) variabilis* (Spandl, 1923). In this paper, not only the genus *Synopia* but also the family Synopiidae is reported from Korea for the first time.

MATERIALS AND METHODS

Specimens were collected with a light-trap (Holmes and O'Connor, 1988; Kim, 1992) from shallow waters of Korea. The specimens were fixed with 80% ethanol and dissected in glycerin on Cobb's aluminum hollow slides. Drawings and measurements were performed with the aid of a drawing tube, mounted on an Olympus SZX 12 stereomicroscope and Olympus BX 51 interference contrast compound microscope (Olympus, Tokyo, Japan). Body length was measured from the tip of the rostrum to the end of the telson, along the dorsal parabolic line of the body (Fig. 1A, B). Specimens are deposited at the National Institute of Biological Resources (NIBR), Incheon, Korea and the Department of Biological Science, Dankook University (DKU), Cheonan, Korea.

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***To whom correspondence should be addressed**
Tel: 82-41-550-3442, Fax: 82-41-559-7861
E-mail: yhkim@dankook.ac.kr

SYSTEMATIC ACCOUNTS

Order Amphipoda Latreille, 1816
 Suborder Gammaridea Latreille, 1803
¹*Family Synopiidae Dana, 1853
²*Genus *Synopia* Dana, 1852

³**Synopia (Telsosynopia) trifidilla* Hughes and Lowry, 2006 (Figs. 1–4)

Telsosynopia trifidilla Hughes and Lowry, 2006: 44, figs. 22, 23; Hughes, 2009: 887, figs. 5, 6.

Material examined. 1♀, Korea, Jeollanam-do: Yeosu-si, Geomundo Island, Seodo Port, 34°02'47"N, 127°17'46"E, 18 Oct 2013, Hong SS; 8♂♂ 22♀♀, Jeju-do: Jeju-si, Udo Island, Cheonjin Port, 33°29'19"N, 126°57'08"E, 20 Jul 2014, Hong SS, Kim SH.

Description. Male (cat No. NIBRIV0000798745): body about 6.2 mm long.

Head (Fig. 2A) galeate, slightly increasing in depth posteriorly; rostrum rounded, short; eye comparatively large, rounded oval, occupying much of the head, composed of ommatidia, black in alcohol; accessory eye present with 3 ommatidia. Pleonites subequal in length to each other.

Epimeron 1 (Fig. 2B) subrounded; epimera 2–3 (Fig. 2C, D) similar to each other in form, subquadrate posteroventrally.

Antenna 1 (Fig. 2E) subequal in length to head and pereonites combined; peduncle short, length ratio of peduncular articles 1–3 = 1.00 : 0.50 : 0.37; accessory flagellum biarticulate, proximal article with unequal setae, distal article short, 0.26 times as long as proximal article; flagellum 23-articulate,

proximal article elongate, 2.33 times as long as peduncular article 3, with tufted aesthetascs anteriorly.

Antenna 2 (Fig. 2F) elongate; peduncular article 4 about 1.5 times as long as article 5, with row of setules anteriorly; flagellum elongate, 28-articulate.

Lower lip (Fig. 2G), outer and inner lobes with densely pubescent on apical and inner margins, mandibular process small and blunt.

Left mandible (Fig. 2H), incisor with 5 blunt teeth; lacinia mobilis with 4 blunt teeth; molar well developed, prominently produced, truncate and triturative; accessory spine row with 5 spines; palp 3-articulate, article 2 broad and enlarged, with 3 sparse plumose setae, distal article short, with 2 sparse plumose setae.

Right mandible (Fig. 2I) similar to left one, except for the bifurcate lacinia mobilis and accessory spine row with 9 spines.

Maxilla 1 (Fig. 2J), inner plate small, with 10 plumose setae; outer plate with 9 dentate spine-teeth; palp biarticulate, distal article with 7 apical spines.

Maxilla 2 (Fig. 2K), inner plate with row of 19 simple setae medially, several pectinate and dentate setae distally; outer plate slightly longer than inner one with pectinate and simple setae apically.

Maxilliped (Fig. 2L), inner plate with row of 7 plumose and 1 penicillate setae; outer plate tapering distally, reaching less than distal end of article 2 of palp, with row of plumose setae medial and apical margins; palp slender, 4-articulate, article 2 elongate, with 15 plumose setae medially.

Gnathopod 1 (Fig. 3A) weakly subchelate; coxa subquadrate, truncate distally; basis slightly curved proximally, with 2 plumose setae anterodistally and simple seta posteriorly;

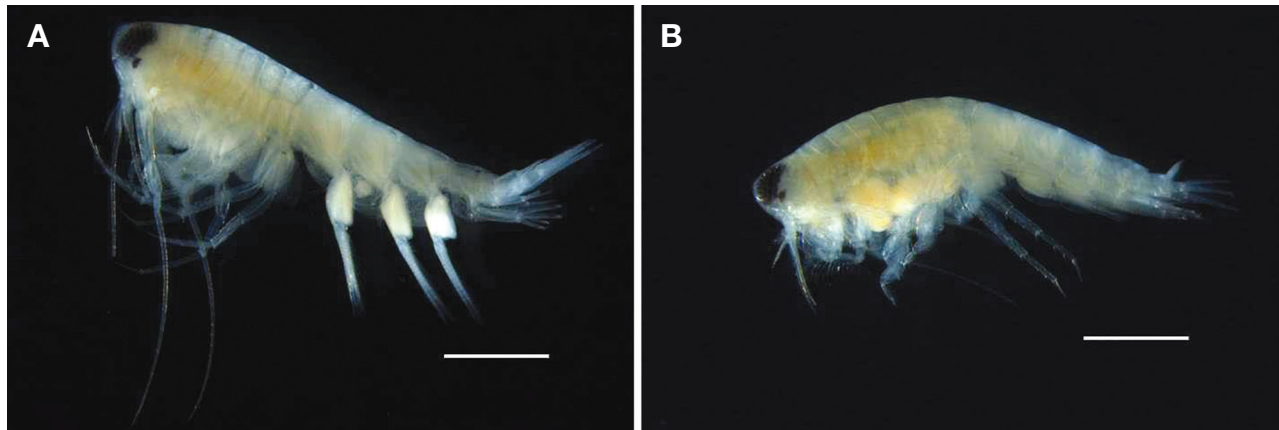


Fig. 1. *Synopia (Telsosynopia) trifidilla* Hughes and Lowry, 2006. A, Male, 4.6 mm; B, Female, 4.5 mm, Cheonjin Port, Udo Island, Jeju-si, Korea. Scale bars: A, B = 1 mm.

Korean name: ¹*투구옆새우과 (신칭), ²*투구옆새우속 (신칭), ³*세갈래꼬리투구옆새우 (신칭)

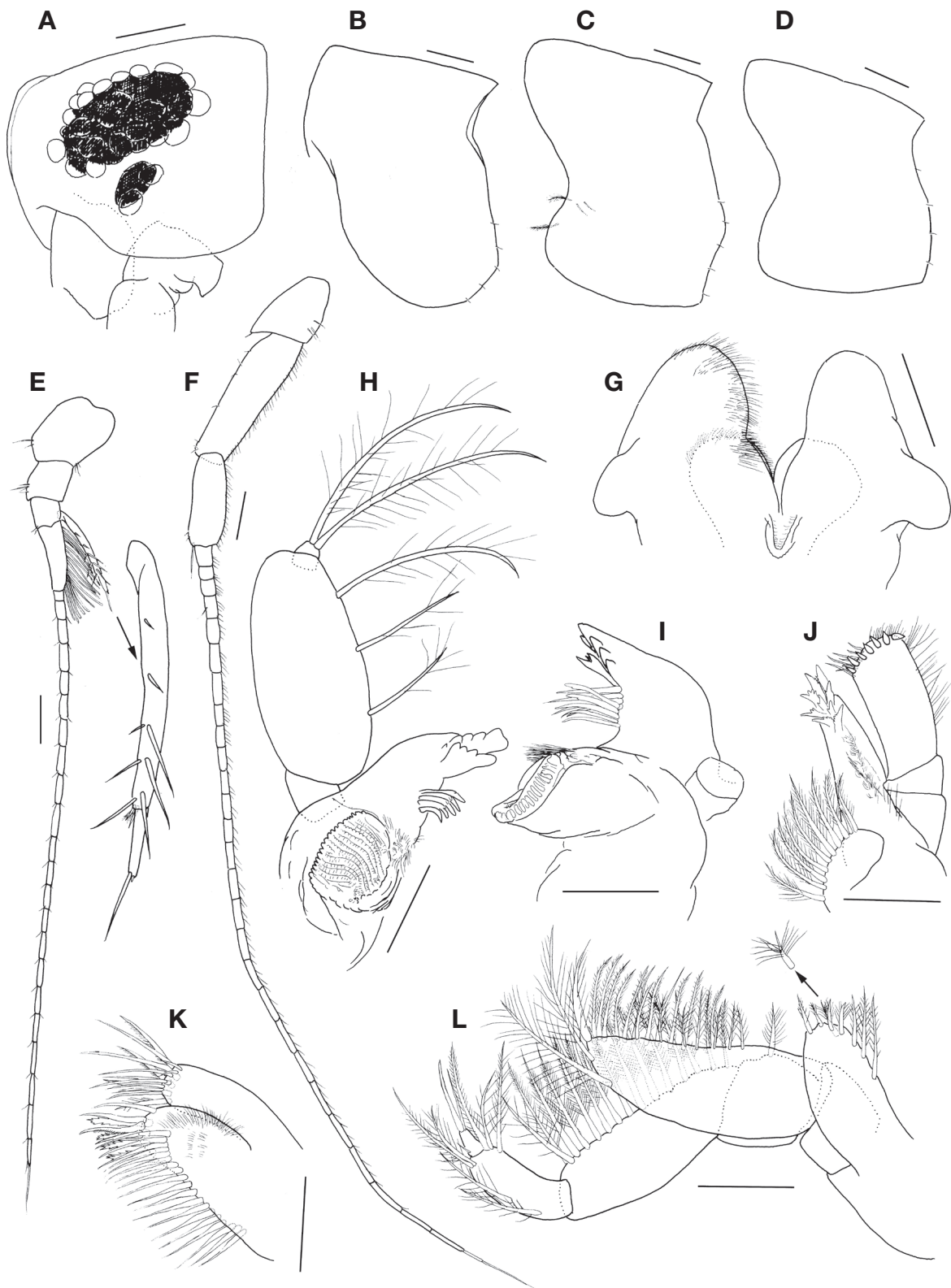


Fig. 2. *Synopia (Telsosynopia) trifidilla* Hughes and Lowry, 2006, male, 6.2 mm. A, Head; B-D, Epimeral plates 1-3; E, Antenna 1; F, Antenna 2; G, Lower lip; H, Left mandible; I, Right mandible; J, Maxilla 1; K, Maxilla 2; L, Maxilliped. Scale bars: A-F=0.2 mm, G-L=0.1 mm.

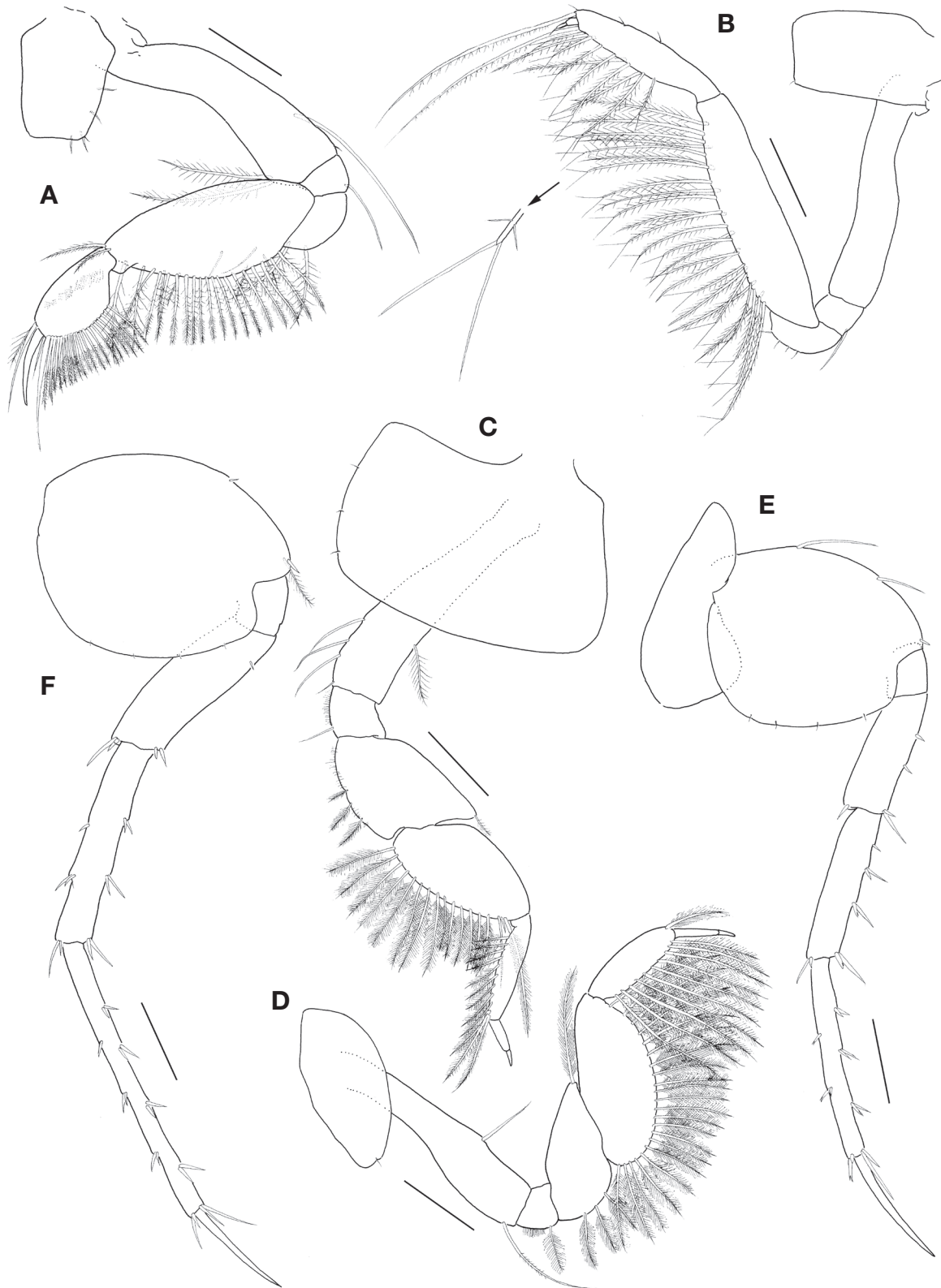


Fig. 3. *Synopia (Telsosynopia) trifidilla* Hughes and Lowry, 2006, male, 6.2 mm. A, Gnathopod 1; B, Gnathopod 2; C, Pereopod 3; D, Pereopod 4; E, Pereopod 5; F, Pereopod 6. Scale bars: A-F=0.2 mm.

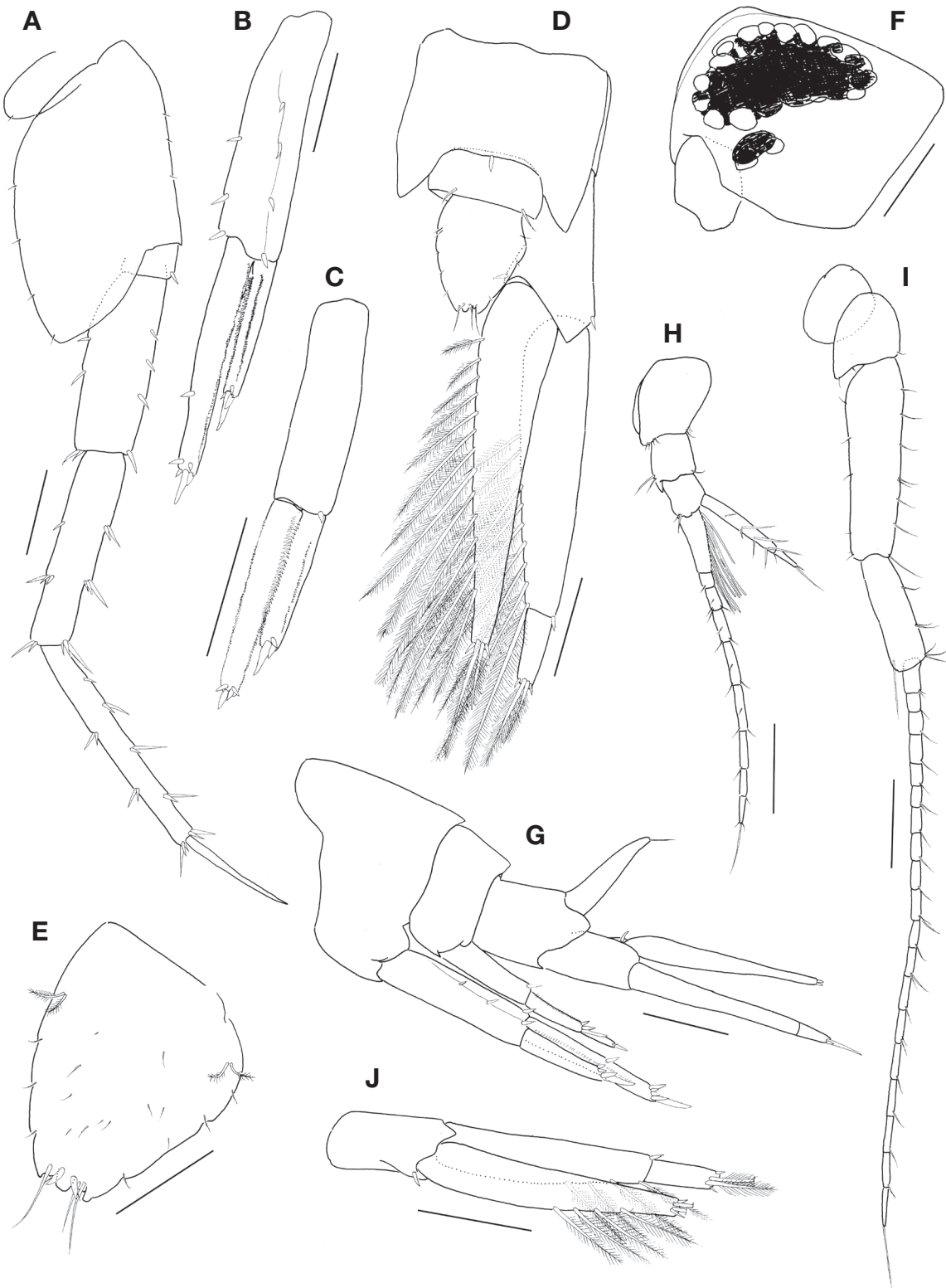


Fig. 4. *Synopia (Telsosynopia) trifidilla* Hughes and Lowry, 2006. A-E, Male, 6.2 mm: A, Pereopod 7; B, Uropod 1; C, Uropod 2; D, Uropod 3; E, Telson; F-J, Female, 4.4 mm; F, Head; G, Urosomites; H, Antenna 1; I, Antenna 2; J, Uropod 3. Scale bars: A-D, F-J=0.2 mm, E=0.1 mm.

carpus slightly shorter than basis, posterior margin broadly convex, with row of pinnate setae; propodus subovate, 0.49 times as long as carpus, posterior margin convex, with row of pinnate setae; dactylus slender, falcate, 0.76 times as long as propodus.

Gnathopod 2 (Fig. 3B) simple; coxa subquadrate, width 0.64 times length; basis slender, subrectangular, unarmed; carpus and propodus slender, with row of posterior plumose setae bearing bifid setules apically, carpus 1.11 times as long as basis, propodus 0.65 times as long as carpus; dactylus minute, vestigial.

Pereopod 3 (Fig. 3C), coxa subquadrate, width 0.62 times length, ventral margin with 3 setules; basis subrectangular, slightly narrowing proximally; merus broad, subequal to carpus; carpus subovate, narrowing distally, with row of plumose setae posteriorly; propodus slender, 0.79 times as long as carpus, with row of plumose setae posteriorly.

Pereopod 4 (Fig. 3D) similar to pereopod 3, except coxa 4 elliptical, much smaller than coxa 3 and carpus longer than that of pereopod 3.

Pereopod 5 (Fig. 3E), coxa broad, bilobate, posterior lobe protruding downward; basis ovate, width 0.86 times length, roundly expanded posteriorly; length ratio of articles 2–7 = 1.00 : 0.23 : 0.63 : 0.74 : 0.93 : 0.58.

Pereopod 6 (Fig. 3F) similar to pereopod 5, but each article (especially propodus) longer and larger in proportion than pereopod 5.

Pereopod 7 (Fig. 4A), basis subrectangular, width 0.58 times length, anterior margin rather straight, posteroventral lobe subacute, produced backward; length ratio of articles 2–7 = 1.00 : 0.12 : 0.60 : 0.67 : 0.79 : 0.40.

Uropod 1 (Fig. 4B), peduncle subrectangular, subequal to inner ramus, with row of 4 dorsolateral and 3 dorsomedial spines; outer ramus short, 0.60 times as long as inner one; medial margin of outer ramus and lateral margin of inner ramus slightly serrulate.

Uropod 2 (Fig. 4C), peduncle slightly longer than inner ramus, with 1 apicolateral spine; outer ramus 0.72 times as long as inner one; both margins of rami serrulate.

Uropod 3 (Fig. 4D), peduncle short, 0.48 times as long as inner ramus, with 1 apicolateral spine; outer ramus biarticulate, slightly longer than inner one; both rami with row of plumose setae medially.

Telson (Fig. 4E) entire, subtriangular, width 0.80 times length, apex trifid, with a pair spines and 1 and 2 setae on the notches.

Female (cat No. DKUAMP201702): body about 4.4 mm long.

Antenna 1 (Fig. 4H), peduncle much shorter than that of male; flagellum 9-articulate.

Antenna 2 (Fig. 4I) about twice as long as antenna 1; pe-

duncular articles 4–5 with sparse setules anteriorly; flagellum elongate, 19-articulate.

Uropod 3 (Fig. 4J) similar to that of male, but rami less setose.

Remarks. Karaman (1986) defined the subgenus *Synopia* (*Telsosynopia*) as “with characters of the genus *Synopia* except, telson entire and mandibular (sic) more or less triturative.” Hughes and Lowry (2006) elevated *Telsosynopia* Karaman, 1986 to generic rank. However, the mandibular molar “more or less triturative,” originally used to help diagnose the subgenus *Telsosynopia*, is ineffective in separating *Synopia* from *Telsosynopia* because all species are now known to have a triturative molar (Hughes and Lowry, 2006). Therefore, it is plausible to think of them as belonging to the same genus, because *Synopia* Dana, 1852 and *Telsosynopia* Karaman, 1986 are closely similar to each other in form, except for the shape of the telson. Further molecular phylogeny study of the genus *Synopia* is necessary to elucidate its suitable rank with nucleotide sequence data. Our Korean specimens examined generally conform to the original description of Hughes and Lowry (2006) based on the specimens from Australia, except for the shape of the telson, which is broader, 0.80 times wider than long, whereas it is 0.73 times wider than long in the original description.

Distribution. Australia, Korea (South Sea).

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