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A new species of the genus *Apseudomorpha* Miller (Crustacea, Peracarida, Tanaidacea) from Korea

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A new species of Tanaidacea is described from the eastern coast of Korea, under the name of *Apseudomorpha magna* in the family Metapseudidae. The new species can be distinguished from its congeners by the following combination of characters: pleonites 2 and 5 and pleotelson have a large lateral seta; pleopods are biramous, in five pairs, each bearing a two-segmented exopod and a single-segmented endopod; the maxillular palp is two-segmented, with five setae on its distal segment; the pleotelson has a large seta on each anterolateral process; and the mandibular palp has 2, 7, and 13 setae on the first to third segments, respectively.

Keywords: *Apseudomorpha magna*, Korea, Metapseudidae, new species, sublittoral

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Introduction

Tanaids are small crustaceans belonging to the Peracarida, with elongate bodies of a few millimeters long, occurring on hydroids, bryozoans, coralline algae, barnacles, epibenthic organisms or mud (Cohen, 2007). They consist of about 1050 described species (Blazewicz-Paszkowycz *et al*., 2012) and mostly live in marine environments, with only four species reported from non-marine environments (Jaume and Boxshall, 2007). Tanaids can be a prey of fish (Huh and Kwak, 1998; huh *et al*., 2012) or an intermediate host of acanthocephalan parasites (Escobar-Briones *et al*., 1999).

No taxonomical record on tanaids had been made from Korean waters until Larsen (2014) recently described *Zeuxo koreaensis* as a new species from this country. The scanty of tanaid studies in Korea contrasts with records of a total of 48 species in 21 genera in Japan and the Russian Far East (Sirenko, 2013), the nearby geographical areas.

In the present report, the authors describe a new species of the genus *Apseudomorpha* collected in the shallow water on the eastern coast of Korea. For the microscopic observation, some of specimens were dissected and observed using the reverse slide method (Humes and Gooding, 1964). Type specimens have been deposited in the National Institute of Biological Resources (NIBR), Incheon, Korea.

Systematic Accounts

Order Tanaidacea Dana, 1849
Suborder Apseudomorpha Sieg, 1980
Superfamily Apseudoidea Leach, 1813
Family Metapseudidae Lang, 1970
Subfamily Metapseudinae Lang, 1970
Genus *Apseudomorpha* Miller, 1940

Apseudomorpha magna n. sp. (Figs. 1-4)

Material examined. 2♀♀ (with oostegites), 2♂♂ from washings of the tunicate *Halocynthia igaboja* Oka, taken as a fisheries bycatch, from the depth less than 10 m, off Sacheon Port, Gangneung, approximately 37°50′N, 128°53′E, 25 April 2012, coll. H. Hwang. Holotype (♀, NIBRIV0000305378) and allotype (♂, NIBRIV0000305379), both intact, have been deposited in the National Institute of Biological Resources (NIBR), Incheon, Korea.

Other material examined. 10♀♀ (with oostegites), 7♂♂, and 12 subadults, from a mussel community (*Mytilus coruscus* Gould), SCUBA, depth 2 m, Donghori, Yangyang, 38°03′55″N, 128°41′05″E, 29 March 2014, coll. I.-H. Kim.

Female (with oostegites)**.** Body (Fig. 1A) dorsoventrally depressed, with hard exoskeleton. Length 3.63 mm measured from frontal apex of carapace to posterior tip of pleotelson. Greatest width 869 μm across second pere-

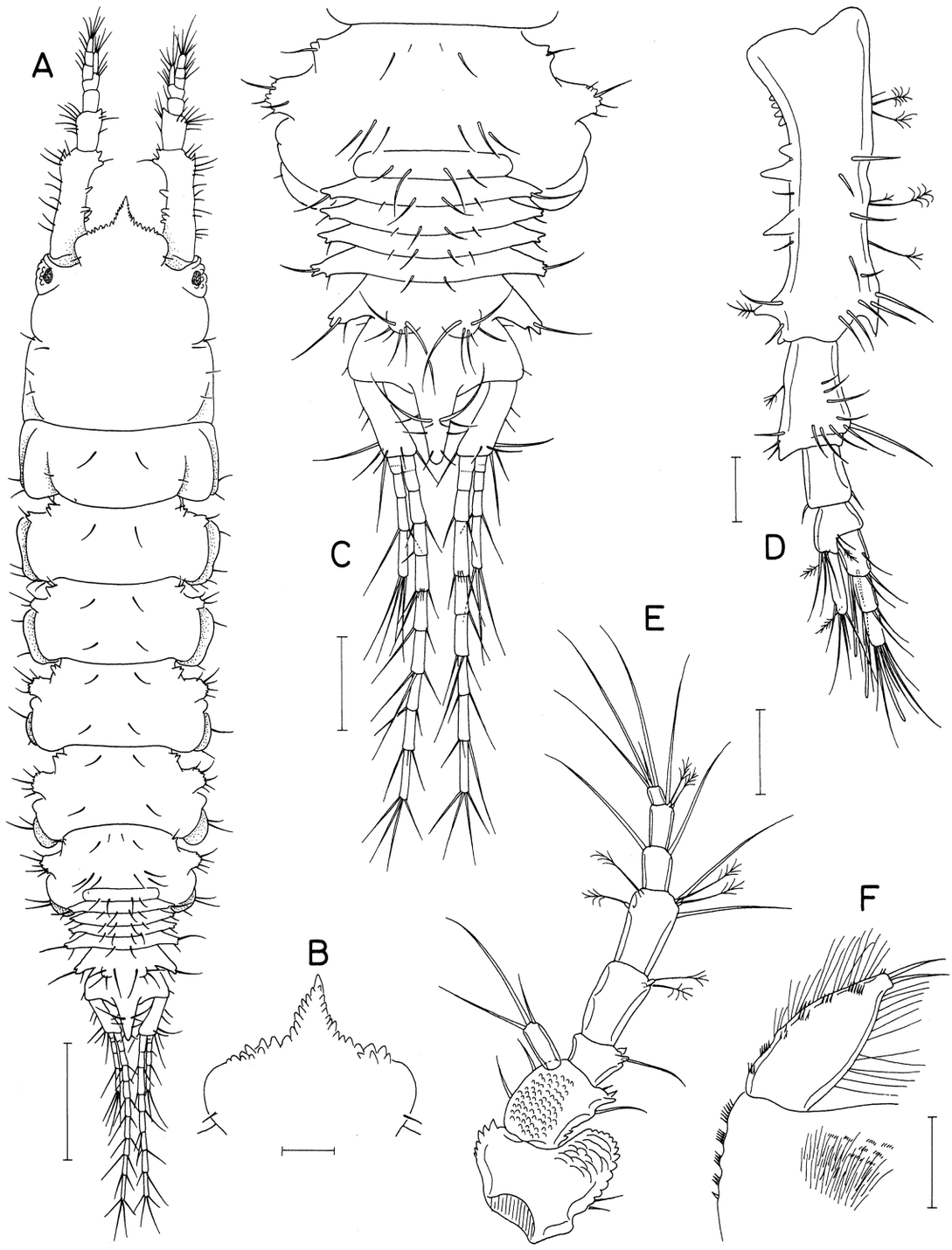

Fig. 1. *Apseudomorpha magna* n. sp., female. A, habitus, dorsal; B, rostrum; C, last pereonite and pleon; D, antennule; E, antenna; F, labial palp. Scale bars: A, 0.5 mm; B, D, E, 0.1 mm; C, 0.2 mm; F, 0.05 mm.

onite. Ratio of length to width of body 4.18 : 1.

Cephalothorax 1000 μm long and 815 μm wide (including apical process of rostrum), longer than wide, gradually broadened posteriorly, with slight lateral constriction. Rostrum (Fig. 1B) about 327 μm long and 415 μm wide, with crenate anterior margin and strongly pro-

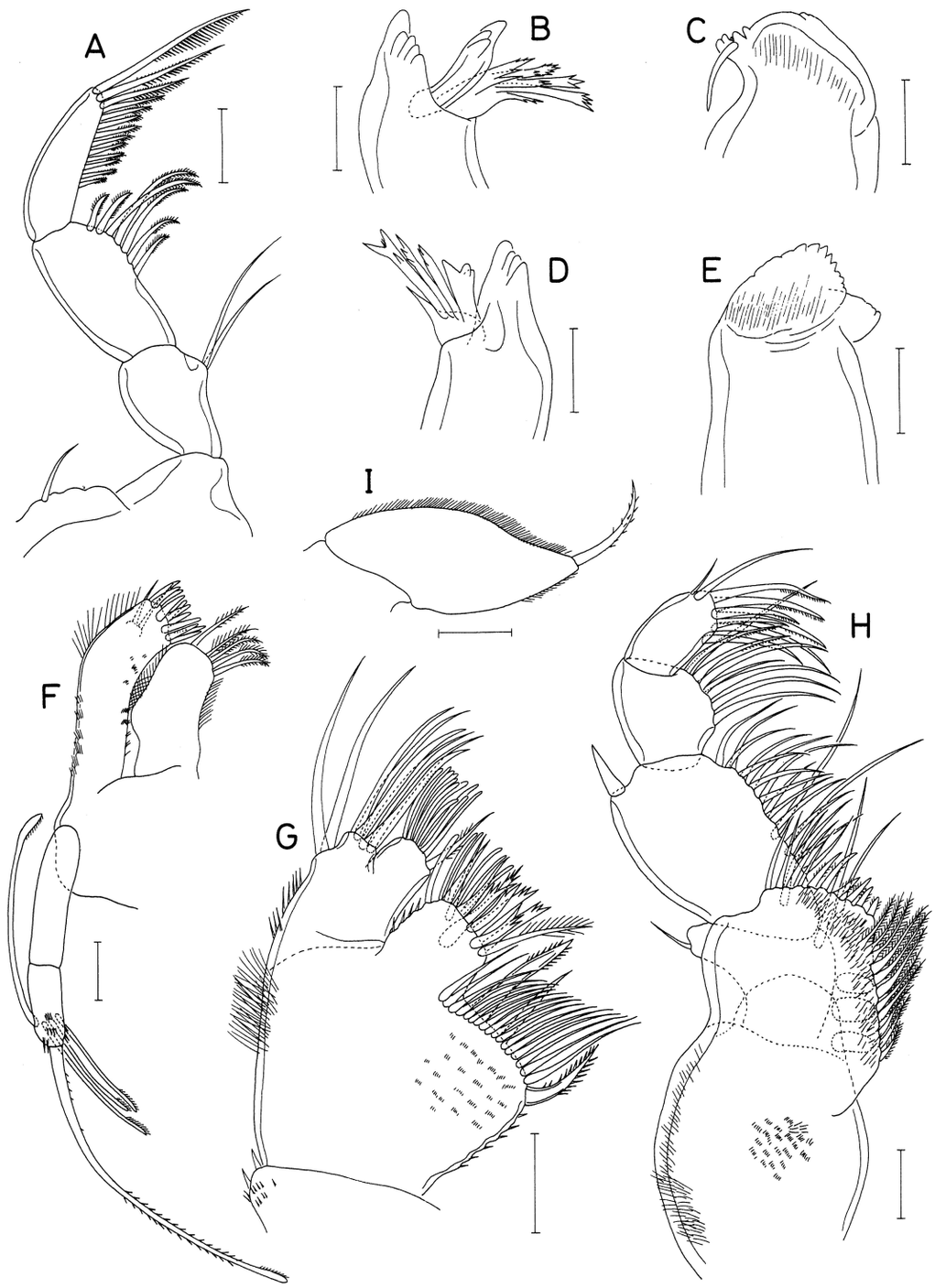

Fig. 2. *Apseudomorpha magna* n. sp., female. A, palp of left mandible; B, pars incisiva, lacinia mobilis and setiferous lobe of left mandible; C, pars molaris of left mandible; D, pars incisiva, lacinia mobilis and setiferous lobe of right mandible; E, pars molaris of right mandible; F, maxillule; G, maxilla; H, maxilliped; I, epignath. Scale bars: A-H, 0.05 mm; I, 0.1 mm.

duced, tapering anterior apex. Ocular lobe indistinctly defined.

Pereon slightly more than twice as long as carapace. Six pereonites similar in lengths; widths 846, 869, 815, 785, 746, and 685 μm, respectively, from anterior to posterior. Second to sixth pereonites each with pair of

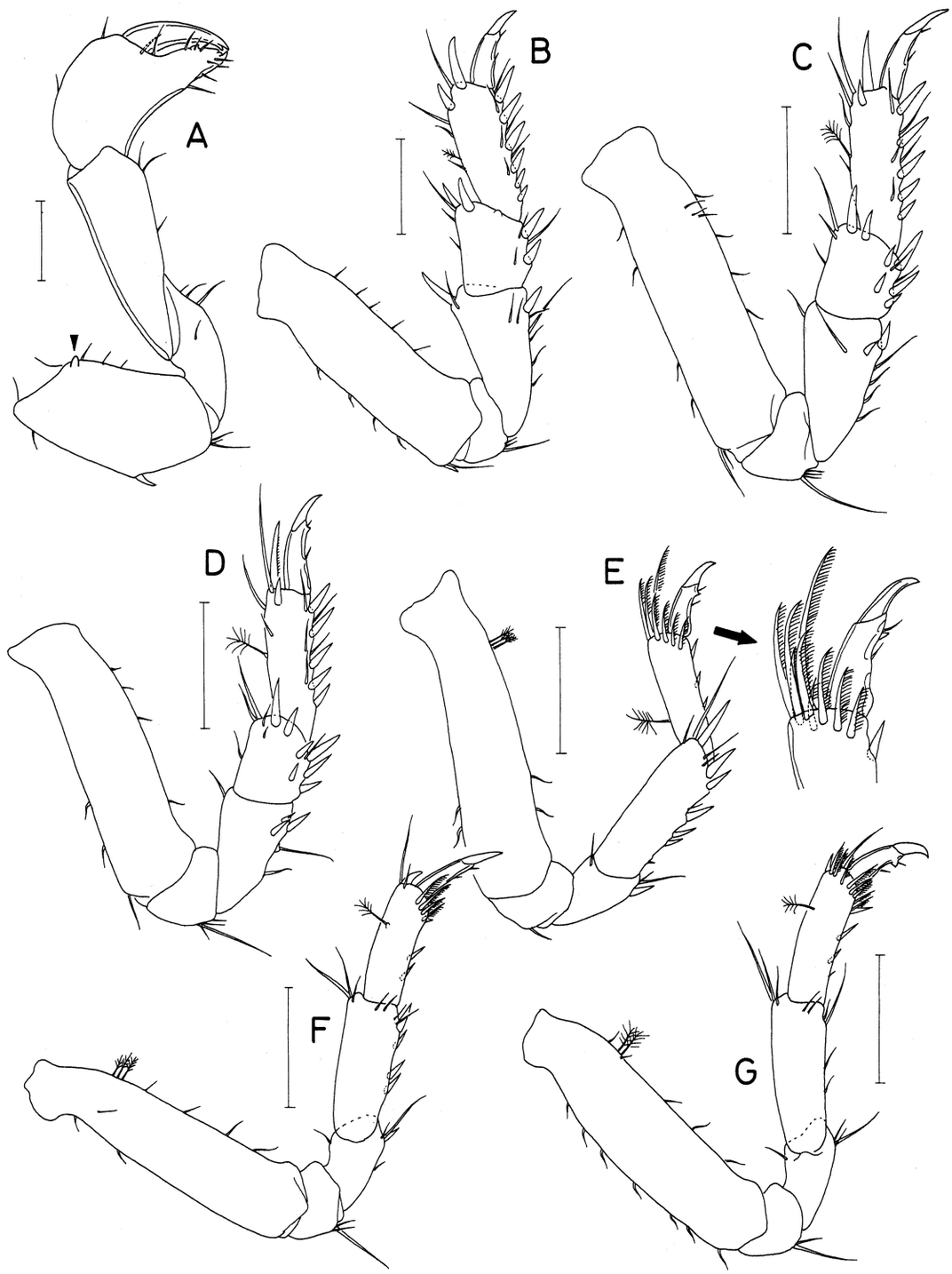

Fig. 3. *Apseudomorpha magna* n. sp., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6. Scale bars: A, 0.02 mm; B-G, 0.2 mm.

anterolateral tubercles on both sides; anterior one of these tubercles usually bifurcate at tip and decreasing in size from anterior to posterior pereonites; posterior one of tubercles larger than anterior one, tipped with 1-5 setulues, and increasing in size from anterior to posterior pereonites.

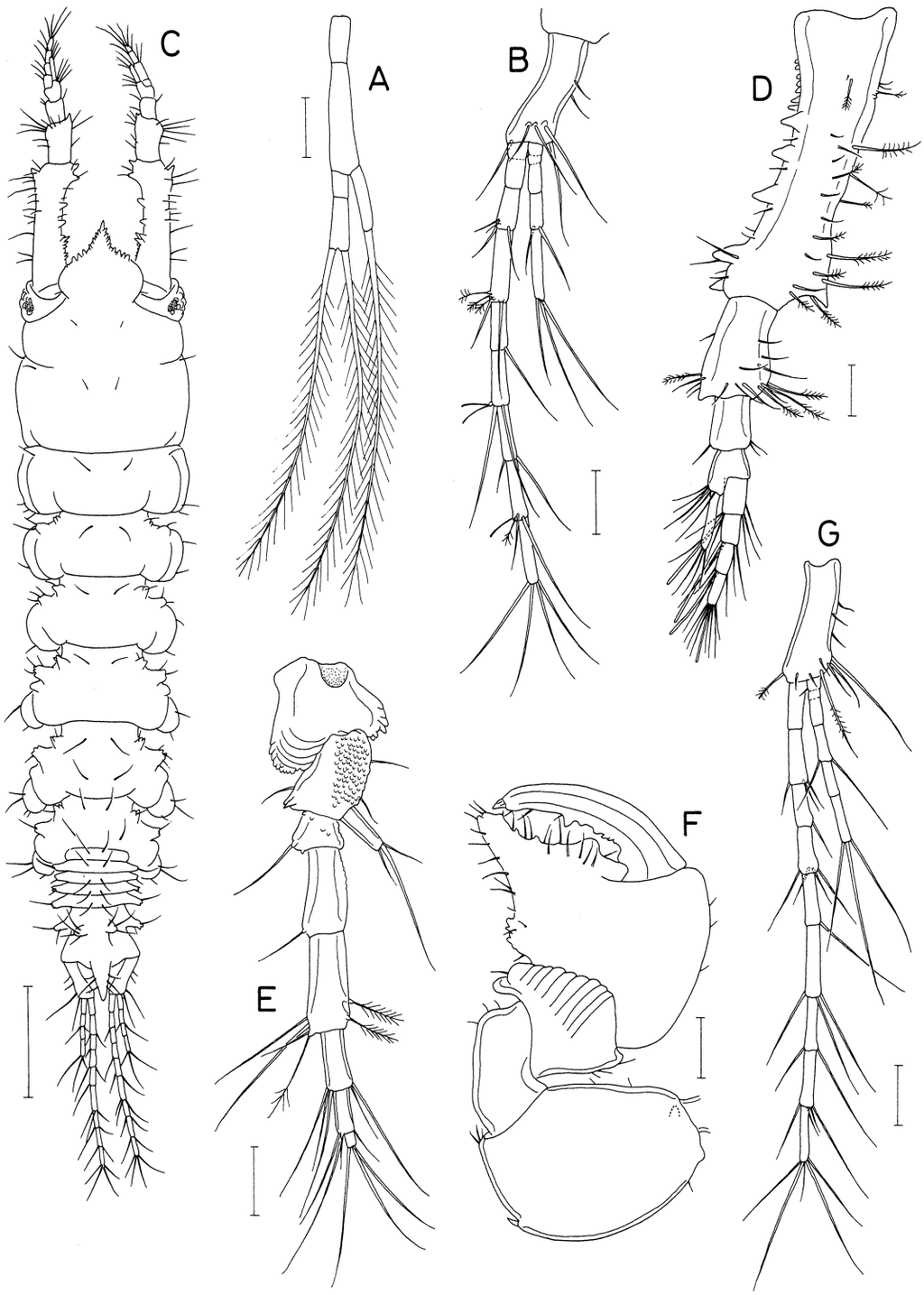

Fig. 4. *Apseudomorpha magna* n. sp. Female: A, pleopod 1; B, uropod. Male: C, habitus, dorsal; D, habitus, lateral; E, chelipd. Scale bars: A, 0.05 mm; B, 0.1 mm; C, D, 0.5 mm; E, 0.2 mm.

Pleon (Fig. 1C) nearly as long as last 2 pereonites combined. Each pleonite much wider than long. First pleonite with rounded lateral margin. Second to fifth pleonites with tapering lateral projections bearing weakly bifurcate lateral apex. Second and fifth pleonites with large seta at lateral apex. Pleotelson distinctly longer than combined

pleonites, with prominent anterolateral projections each tipped with 1 large and 1 small setae, elongate, tapering posteromedian projection bearing 1 pair of large setae and several pairs of small setae, and 1 pair of dorsal tubercles each bearing several unequal setae.

Antennule (Fig. 1D) as long as cephalothorax. Peduncle 3-segmented; first segment 500 μm long, with 4 large tubercles (distalmost one tipped with 1 feathered seta) and 4 small proximal tubercles on inner margin, 1 pointed subdistal process, about 5 feathered setae and several simple setae on outer margin; second segment 173 μm long, gradually broadened distally, with angular inner distal corner, 1 feathered seta and more than 10 simple setae; third segment 96 μm long, distinctly narrower than second segment, with 2 small setae distally. Common segment distally with 1 simple and 1 feathered setae near base of outer flagellum and 1 feathered seta and 3 simple setae near base of inner flagellum. Outer flagellum 183 μm long and 3-segmented; segments similar in length, each with 1 aesthetasc and several simple setae. Inner flagellum 96 μm long, about 4 times as long as wide, with 1 feathered seta and 5 simple setae on distal region.

Antenna (Fig. 1E) consisting of squama, peduncle and flagellum. Squama 62 μm long and 23 μm wide, about 2.7 times as long as wide, and tipped with 3 unequal setae. Peduncle 5-segmented; first segment much wider than long, with broad, prominent inner distal expandion, crenate distal region of inner and outer margins, and 2 small setae on inner margin; second segment 102 μm long, as long as but much narrower than first segment, covered with numerous granule-like small tubercles, with 2 processes at inner distal corner and a few setae; third segment short, 44 μm long, with 2 processess and 1 seta at inner distal corner; fourth segment 100 μm long, with 2 feathered setae at inner distal corner; fifth segment 97 μm long, with 2 simple and 4 feathered setae. Flagellum 3-segmented; first segment 51 μm long with 2 setae distally; second segment 51 μm long, as long as the first, with 2 feathered and 1 simple setae distally; third segment small, 23 μm long, and tipped with 3 large and 1 small setae.

Mandibles with 3-segmented palp (Fig. 2A). First segment of palp 77 μm long, narrow proximally, with 2 smooth setae on inner margin; second segment 102 μm long, with 7 spinulose setae (3 middle ones larger than other 4) on inner margin; third segment 100 μm long, tapering, with 13 spinulose or pinnate setae along inner and distal margins, these 13 setae increasingly longer from proximal to distal. Right mandible with 5 distal teeth on pars incisiva (Fig. 2B); lacinia mobilis with 2 subdistal subsidiary teeth; setiferous lobe with 5 forked setae; pars molaris (Fig. 2C) with 4 small tubercles and 1 seta apically. Left mandible with 4 distal teeth on pars incisiva (Fig. 2D); setiferous lobe with 3 forked and 1 small, pointed setae; lacinia mobilis confluent with setiferous lobe at base, with 2 subsidiary teeth subdistally; pars molaris (Fig. 2E) with crenate distal margin, with lateral protuberance subdistally.

Labium (Fig. 1F) on basal lobe with 1 proximal denticle and several patches of spinules on outer margin and patches of setules and rows of minute spinules on ventral surface. Palp fusiform, 92 μm long and 43 μm wide, more than twice as long as wide, with 2 naked setae apically, setules and patches of spinules on outer margin and setules on inner margin.

Maxillule (Fig. 2F) consisting of palp and outer and inner endites. Palp 2-segmented; basal segment 119 μm long and unarmed; distal segment 69 μm long with several spinules in distal half and armed with 5 unequal setae (1 large distal seta and 1 mudium-sized and 3 small subdistal setae), all of these setae distally expanded and spinulose unilaterally; largest distal seta weakly pinnate in distal half. Outer endite curved, with 11 distal setae and 2 subdistal setae and ornamented with spinules and setules on lateral margins. Inner endite shorter than outer endite with broad protuberance on outer margin, setules on lateral margins, and 5 distal pinnate setae.

Maxilla (Fig. 2G) with setules and spinules on outer margin and spinules on inner margin. Movable endite with 8 long setae on outer lobe and 12 setae (11 blunt and 1 pinnate) on inner lobe. Fixed endite with 16 setae (6 blunt, 6 forked, 3 simple, and 1 pinnate) on outer lobe and 20 setae (17 simple, 1 thick, and 2 thick, spinulose) on inner lobe.

Maxilliped (Fig. 2H) basis longer than wide, with setules and minute spinules. Palp 4-segmented; first segment with 1 outer distal and 1 inner distal setae; second segment with 18 setae (2 of them longer than others) on inner margin and 1 spiniform seta on outer distal corner; third segment about half as long as second segment, with 8 setae on inner margin; fourth segment nearly as long as third segment, with 9 setae, some them spinulose along inner distal margin. Endite with 11 pinnate setae and 3 couplers on inner margin and 12 setae on distal margin.

Cheliped (Fig. 3A) slender. Basis about 1.5 times as long as wide, with 1 spine near distal third and 1 proximal and 3 distal setae on sternal margin. Exopod (indicated by arrowhead in Fig. 3A) rudimentary, wart-like, located at proximal region of basis. Merus with 4 small setae on distosternal region. Carpus about twice as long as merus, with 2 distal and 1 middle setae on sternal margin. Propodus with 2 setae on convex tergal margin. Fixed finger with 4 setae on tergal margin and 5 setae on sternal margin; claw small. Dactylus gently curved, distinctly narrower than fixed finger, with bifurcate tip.

Pereopod 1 (Fig. 3B) longer than other pereopods. Basis about 3.5 times as long as wide, with setae on sternal

and tergal margin. Ischium short, with 1 longer and 2 smaller setae at distosternal corner. Merus with 1 spine and several setae on sternal side and 1 spine and 1 seta at distotergal corner. Carpus with 2 spines and 3 setae on sternal side, 2 spines at distotergal corner, and 3 setae on tergal margin. Propodus as long as merus, with 6 spine and several setae on sternal side, 2 spines distally, and 4 simple setae and 1 feathered seta on tergal margin. Dactylus with 2 minute spinules on sternal margin. Claw about half as long as dactylus.

Pereopod 2 (Fig. 3C) basis about 3.8 times as long as wide, with several setae on tergal and sternal margins each. Ishchium as in pereopod 1. Merus with 2 spines and 4 setae on sternal side; distotergal corner lacking spine. Carpus similar to that of pereopod 1, but with 3 additional spines on sternal side. Propodus similar to that of pereopod 1, but with 5 spines on sternal margin. Dactylus and claw as in pereopod 1.

Pereopod 3 (Fig. 3D) smaller than pereopod 2. Basis about 3.7 times as long as wide, with 4 setae on tergal margin and 3 setae on sternal margin. Ischium with 4 distosternal setae. Merus with 3 spines and 2 setae on sternal side and 1 seta at distotergal corner. Carpus similar to that of pereopod 2. Propodus also as in pereopod 2, but distotergal spine finely spinulose along sternal margin. Dactylus with small additional distosternal tubercle. Claw as in pereopod 2.

Pereopod 4 (Fig. 3E) basis about 4 times as long as wide, with 3 proximal feathered setae and 2 subdistal setae on tergal margin and 2 subdistal setae on sternal margin. Ischium with 1 distosternal seta. Merus with 1 spine and 2 setae near distosternal corner and 1 seta at distotergal corner. Carpus much longer than that of pereopod 3 and longer than propodus. Propodus with 3 small spines on sternal margin and 9 pectinate setae distally. Dactylus smaller than that of pereopod 3, but claw as in pereopod 3.

Pereopod 5 (Fig. 3F) basis similar to that of pereopod 4. Carpus with 4 spines on sternal margin and several setae distally. Propodus similar to that of pereopod 4, but distally with 4 pectinate setae and 1 distotergal, simple spine. Claw narrower than that of pereopod 4.

Pereopod 6 (Fig. 3G) Basis with several setae on tergal and sternal margins each and 2 feathered setae at proximal region of tergal margin. Merus and carpus lacking spines. Propodus with 8 pectinate setae, 2 simple setae and 1 small spine at distal region. Dactylus with prominent distosternal tubercle.

Pleopods (Fig. 4A) slender, in 5 pairs. Protopod elongate, about 5 times as long as wide. Endopod 1-segmented and tipped with 1 pinnate seta. Exopod 2-segmented, longer than endopod; basal segment unarmed; distal segment more than twice as long as basal segment and tipped with 2 pinnate setae.

Uropod (Fig. 4B) biramous. Protopod about 2.3 times as long as wide, with 2 setae on inner margin, 3 setae subdistally, and 2 setae distally. Endopod 2-3 times as long as exopod, 6 to 8-segmented; first segment unarmed, with trace of segmentation; armatures in case of 8-segmented condition: 3 seta and 1 small aesthetasc on second segment, 2 setae and 3 feathered setae on third, 1 seta on fourth, 2 setae and 2 aesthetasc on fifth, 2 setae on sixth, 2 setae, 1 feathered seta, and 1 aesthetasc on seventh, and 4 setae on eighth. Exopod 3-segmented; first segment unarmed, with 2 traces of segmentations; second segment with 2 distal setae; third segment with 3 distal setae.

Male. Body (Fig. 4C, D) resembling that of female. Cheliped larger than that of female. Basis broad, slightly longer than wide; convex sternal margin with 1 spine at distal third, 3 small setae at distosternal corner, and 1 small seta proximally; tergal margin with 2 small setae. Exopod rudimentary, knob-like, located proximally on basis. Merus narrow, with 3 small setae on sternal margin. Carpus distally corrugated, with 1 seta on sternal margin and 3 small setae on tergal margin. Propodus large, with crenate proximosternal region, 3 setae on tergal margin, and about 10 setae on sternal margin of propodus and fixed finger. Fixed finger blunt at tip, lacking claw, with more than 10 setae on tergal (distal) side. Dactylus gently curved, with about 5 indistinct teeth and 3 small setae on concave sternal margin; claw small and brown in color.

Other appendages as in female.

Etymology. The specific name *magna* is derived from the Latin *magnus* (= large), alluding to the relatively large body size of the new species.

Remarks. *Apseudomorpha magna* n. sp. agrees with the diagnosis of the genus defined by Gutu (2006). The most recent taxonomic description of species in this genus was given by Gutu (2009) in which he recognized 11 species as valid in the genus, treating two nominal species *A. hirsuta* (Stebbing, 1910) and *A. timaruvia* (Chilton, 1882) as *incertae sedis*. In the key to species of *Apseudomorpha*, he (Gutu, 2009) considered the presence or absence of a large seta on the lateral apex of pleonites as a major character to distinguish species. *A. magna* n. sp. has a large seta on the lateral apex of pleonites 2 and 5, but lacking in pleonites 1, 3, and 4. Among 11 congeners, this setal distribution is shared with five species: *A. fontainei* Gutu, 1987, *A. glebosa* (Menzies, 1953), *A. martinicana* Gutu, 2009, *A. negoescuae* Gutu, 2007, and *A. vestafricana* Gutu, 2006. These five congeners can be distinguished from *A. magna* n. sp. by their features, as follows:

Apseudomorpha fontainei: the first peduncular segment of antennule bears only two processes on the inner margin; the maxillular palp has only two setae on the

distal segment; pleopods are uniramous; and the uropod has a two-segmented exopod (Gutu, 1987).

A. glebosa: the first peducular segment of the antennules bears only 2 processes on the inner margin; the maxillular palp has three setae on the distal segment; the pleopods has single-segmented rami (Menzies, 1953).

A. martinicana: the apical process of rostrum is small, not prominent; the outer flagellum of the antennule is four-segmented; the mandibular palp bears one, three, and six setae on the first to third segments, respectively; the maxillular palp has three setae on the distal segment (Gutu, 2009).

A. negoescuae: the apical process of the rostrum is small; the mandibular palp has 0, three, and six setae on the first to third segments, respectively; the maxillular palp has three setae; pereopod 1 has a spiniform proximotergal denticle (Gutu, 2007).

A. vestafricana: the first peducular segment of the antennule has a denticle on each of inner and outer margins; pleonites have rounded lateral margins; pleopods are absent; and the uropod has a two-segmented exopod (Gutu, 2006).

One of remarkable features of *A. magna* n. sp. is the two-segmented condition of the exopod of pleopods. In this genus this segmentation of the exopod is reported previously only in *A. magdalenensis* (Menzies, 1953), although the ramification of the pleopods and the segmentation of their exopod are variable in that species, as illustrated by Menzies (1953). However, in the latter species, the third and fourth pleonites have large lateral setae and the uropod has a six-segmented exopod and a three-segmented endopod, which are the features not corresponding with *A. magna* n. sp. *A. magdalenensis* and the above five congeners are known from the Red Sea (*A. fontainei*), the East Pacific (*A. glebosa* and *A. magdalenensis*), the Caribbean (*A. martinicana*), the Indian Ocean (*A. negoescuae*), or the East Atlantic (*A. vestafricana*).

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