Journal of Species Research 10(4):364-386, 2021

Copepods of the family Kelleriidae (Crustacea, Copepoda, Cyclopoida) from tropical waters of the Asia-Pacific

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Six species of the family Kelleriidae, including four new species, are recorded from tropical waters of the Asia-Pacific, two of them from Phuket Island, Thailand, one each from Bohol Island, Philippines and Phu Quoc Island, Vietnam, and two from Kosrae Island, Micronesia. A new genus *Kelleriella* is proposed to accomodate one of these new species (*Kelleriella quadridens* n. sp.). There are three diagnostic features of the new genus: the terminal segment of antenna is armed with one strong claw and six setae, the armature of the maxilliped endopod is reduced, and the third exopodal segment of leg 4 is armed with four spines and five setae. The other three new species are *Kelleria latipes* n. sp., *Kelleria phuketensis* n. sp., and *Kelleria robusta* n. sp. As diagnostic features of these new species, their caudal rami are about 2.5, 3.2, and 1.72 times longer than wide, respectively, the exopod of leg 5 of them is smooth, without any process, about 1.9, 3.7, and 2.9 times longer than wide, respectively, and armed with one spine plus one seta in *Kelleria latipes* and *Kelleria phuketensis* or with 2 setae in *Kelleria robusta*. Additionally, *Kelleria javaensis* Mulyadi, 2009 is synonymized with *Kelleria regalis* Gurney, 1927 and *Kelleria grandisetiger* Kim, 2006 is synonymized with *Kelleria andamanensis* Sewell, 1949, and both species are redescribed.

Keywords: *Kelleria*, *Kelleriella* n. gen., new species, redescriptions, tropical waters

DOI:10.12651/JSR.2021.10.4.364

Introduction

Humes & Boxshall (1996) established the Kelleridae as a monotypic family represented by the genus *Kelleria* Gurney, 1927. According to them, *Kelleria* is the only genus in the superfamily Lichomolgoidea in which the female maxilliped retains four discrete setation elements on a well-developed endopodal segment. Humes & Boxshall (1996) counted 10 species of *Kelleria* those known at that time. The number of species of the genus has since been doubled, currently 21 including *Kelleria japonica* and *Kelleria pararegalis* which are the most recently described species by Oomoto & Ueda (2016). Species of *Kelleria* are associated with crinoid echinoderms or live in loose association with various burrowing invertebrates (Humes & Boxshall, 1996; Boxshall & Halsey, 2004).

In this paper six species of the Kelleriidae are recorded, two each from Kosrae Island, Micronesia and Phuket Island, Thailand, and one each from Bohol Island, Philippines and Phu Quoc Island, Vietnam.

Materials and Methods

Specimens studied in this paper were collected by SCUBA or using a light trap in the shallow subtidal water and by sucking up water of intertidal invertebrate burrows with a large pipette. Collected specimens were fixed and preserved in 80% ethanol. Prior to microscopic observation, selected specimens were immersed in lactic acid for about 10 minutes. Dissections were done using the reversed slide method of Humes & Gooding (1964). Dissected specimens were mounted with Hoyer's medium. In the species descriptions, body length is measured from the anterior margin of cephalothorax to the posterior margin of caudal rami, not including caudal setae. In the armature formula of antenna and legs 1–4, Roman numerals indicating spine and Arabic numerals represent setae. Terminology follows Huys & Boxshall (1991) and Humes & Boxshall (1996). Type specimens have been deposited in the Marine Biodiversity Institute of Korea (MABIK), Seocheon, Korea.

Systematic Accounts

Order Cyclopoida Burmeister, 1834
Family Kelleriidae Humes & Boxshall, 1996
Genus *Kelleria* Gurney, 1927

***Kelleria regalis* Gurney, 1927 (Figs. 1–3)**

Syn.: *Kelleria regalis* Gurney, 1927, p. 471, figs. 116, 117; Humes & Ho, 1969, p. 221, figs. 1–30.
Kelleria javaensis Mulyadi, 2009, p. 1373, figs. 6, 7.

Material examined. 6 ♀♀, 1 ♂ collected with a light trap, shallow water, 5°21′22.31″N, 162°57′46.59″E, Kosrae Island, Micronesia, 30 June 2016, Jimin Lee.

Female. Body (Fig. 1A) consisting of moderately broad prosome and slender urosome. Body length 1.25 mm. Maximum width 500 μm across cephalothorax. Prosome 677 μm long, consisting of cephalothorax and second to fourth pedigerous somites. Cephalothorax 478 μm long, with faint dorsal suture line delimiting cephalosome and first pedigerous somite; posterolateral corners of first pedigerous somite bluntly projected. Second pedigerous somite fringed with narrow membrane along posterolateral corners. Third and fourth pedigerous somites fringed with narrow membrane along lateral margins. Urosome (Fig. 1B) 5-segmented. Fifth pedigerous somite slightly wider than genital double-somite. Genital double-somite 1.43 times longer than wide (218 × 152 μm), with slightly broadened anterior third. Genital apertures positioning dorsolaterally at third of double-somite length. Three free abdominal somites 91 × 95, 67 × 90, and 50 × 84 μm, respectively. Genital double-somite and first and second free abdominal somites fringed with wavy membrane along posterior borders. Caudal ramus (Fig. 1C) 2.37 times longer than wide (83 × 35 μm), armed with 6 setae; lateral seta (seta II) naked and stiff, tipped with setule; small dorsal seta (seta VII) also naked; other 4 setae pinnate.

Rostrum (Fig. 1D) strongly tapering, with round distal apex. Antennule (Fig. 1E) 7-segmented, gradually narrowing from proximal to distal; armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; all setae naked, generally long and thin; aesthetascs also thin, setiform. Antenna (Fig. 1F) slender, 4-segmented, consisting of coxobasis and 3-segmented endopod; terminal segment (third endopodal segment) about 4.0 times longer than wide (91 × 23 μm); armature formula 1, 1, 2 + claw, and 5 + 2 claws; claws thin, setiform, geniculate near middle.

Labrum (Fig. 1G) with broad and deep posteromedian incision and round posterolateral lobes. Mandible (Fig. 1H) comprising gnathobase and distal lash; blade broad, with tuft of more than 15 needle-like spinules on convex outer side, about 10 large teeth along convex outer margin, 10 spinules (including smaller fifth and sixth ones) on inner margin; distal lash articulated from gnathobase, with fine spinules along both margins. Paragnath (Fig. 1I) as small, setulose lobe. Maxillule (Fig. 1J) lobate, armed with 4 unequal setae, 3 on distal margin and 1 on inner margin. Maxilla (Fig. 1K) consisting of syncoxa and basis; syncoxa unarmed but bearing claw-like process anterodistally (indicated by arrowhead in Fig. 1K); basis with 3 setae and spiniform, articulating distal lash; inner seta (seta I) large, spiniform, bearing about 10 spinules along distal margin and 9 spinules along proximal margin; anterior seta (seta II) simple, unornamented; proximal seta (seta III) rudimentary; distal margin of basis with 4 large and 3 or 4 small spines, 2 small ones of them positioning on distal lash. Maxilliped (Fig. 2A) 3-segmented; first segment (syncoxa) unarmed, but bearing small membranous flap (indicated by arrowhead in Fig. 2A) subdistally on inner surface; second segment (basis) with 2 large, spiniform setae on inner margin, both setae finely spinulose along distal margin, patch of spinules (distal one of them large) on proximal region of proximal margin; third segment (endopod) with 4 large setae consisting of outer, apical, and 2 inner; outer and inner distal setae subequal in length, spinulose along both margins, longer than segment; inner proximal seta elongate, more than twice length of segment, finely spinulose along distal margin; apical seta (distal lash) naked, wrinkled.

Legs 1–3 with 3-segmented rami (Fig. 2B, C). Leg 3 similar to leg 2, except its third endopodal segment (Fig. 2D) armed with fewer setae on inner margin. Leg 4 (Fig. 2E) with 3-segmented exopod and 1-segmented endopod; endopodal segment 2.9 times longer than wide (78 × 27 μm), with small cusp on outer margin; 2 distal spines 80 (inner) and 44 μm long (outer); inner seta not extending to distal margin of endopodal segment. Armature formula for legs 1–4 as follows:

	Coxa	Basis	Exopod	Endopod
Leg 1	0-1	1-0	I-0; I-1; III, I, 4	0-1; 0-1; I, 1, 4
Leg 2	0-1	1-0	I-0; I-1; III, I, 5	0-1; 0-2; I, II, 3
Leg 3	0-1	1-0	I-0; I-1; III, I, 5	0-1; 0-2; I, II, 2
Leg 4	0-1	1-0	I-0; I-1; II, I, 5	0, II, 1

Leg 5 consisting of small, pinnate dorsolateral seta on fifth pedigerous somite and free exopod (Fig. 1B); exopodal segment (Fig. 2F) 1.9 times longer than wide (126 × 66 μm), spinulose along inner and outer margins, with 1 minute cusp on outer margin, 1 digitiform process on inner margin, 1 cusp and 1 digitiform process on distal margin (latter process indicated by arrowhead distinct or indistinct), and armed distally 1 spine (72 μm long) and 1 geniculate seta (56 μm long). Leg 6 (Fig. 2G) positioning in genital aperture, represented by 1 small seta and 1 spinule on dorsal side and 1 large seta and 1 small cusp on lateral process.

Male. Body (Fig. 3A) similar to that of female, 1.10 mm long. Dorsal suture line obscure between cephalosome and first pedigerous somite. Urosome (Fig. 3B) 6-segmented. Fifth pedigerous somite 105 μm wide, narrower than genital somite. Genital somite slightly longer than wide (148 × 139 μm). Four abdominal somites 68 × 68, 66 × 61,

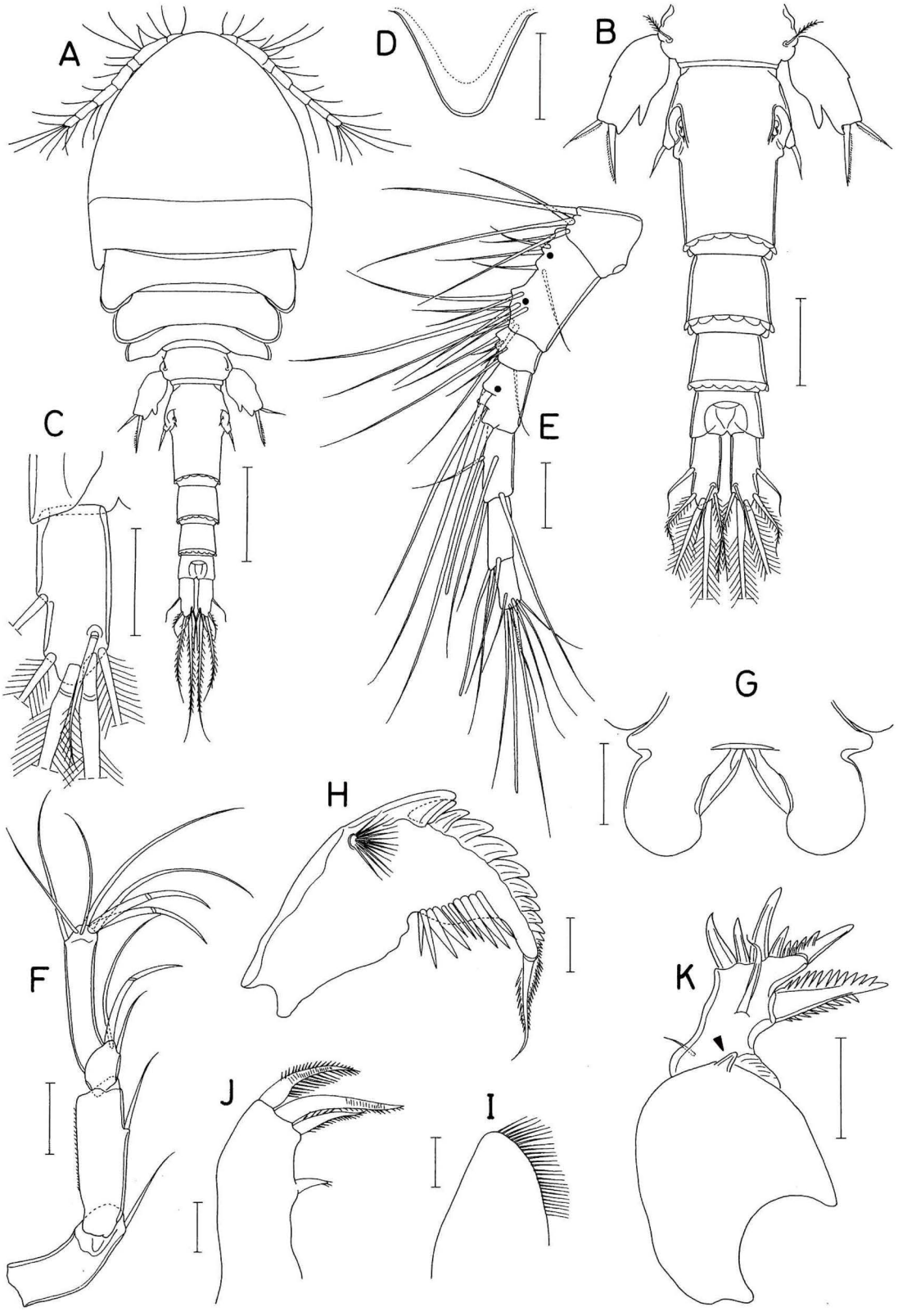

Fig. 1. *Kelleria regalis* Gurney, female. A, habitus, dorsal; B, urosome, dorsal; C, left caudal ramus, dorsal; D, rostrum; E, antennule; F, antenna; G, labrum; H, mandible; I, paragnath; J, maxillule; K, maxilla. Scale bars: A, 0.2 mm; B, 0.1 mm; C–G, K, 0.05 mm; H–J, 0.02 mm.

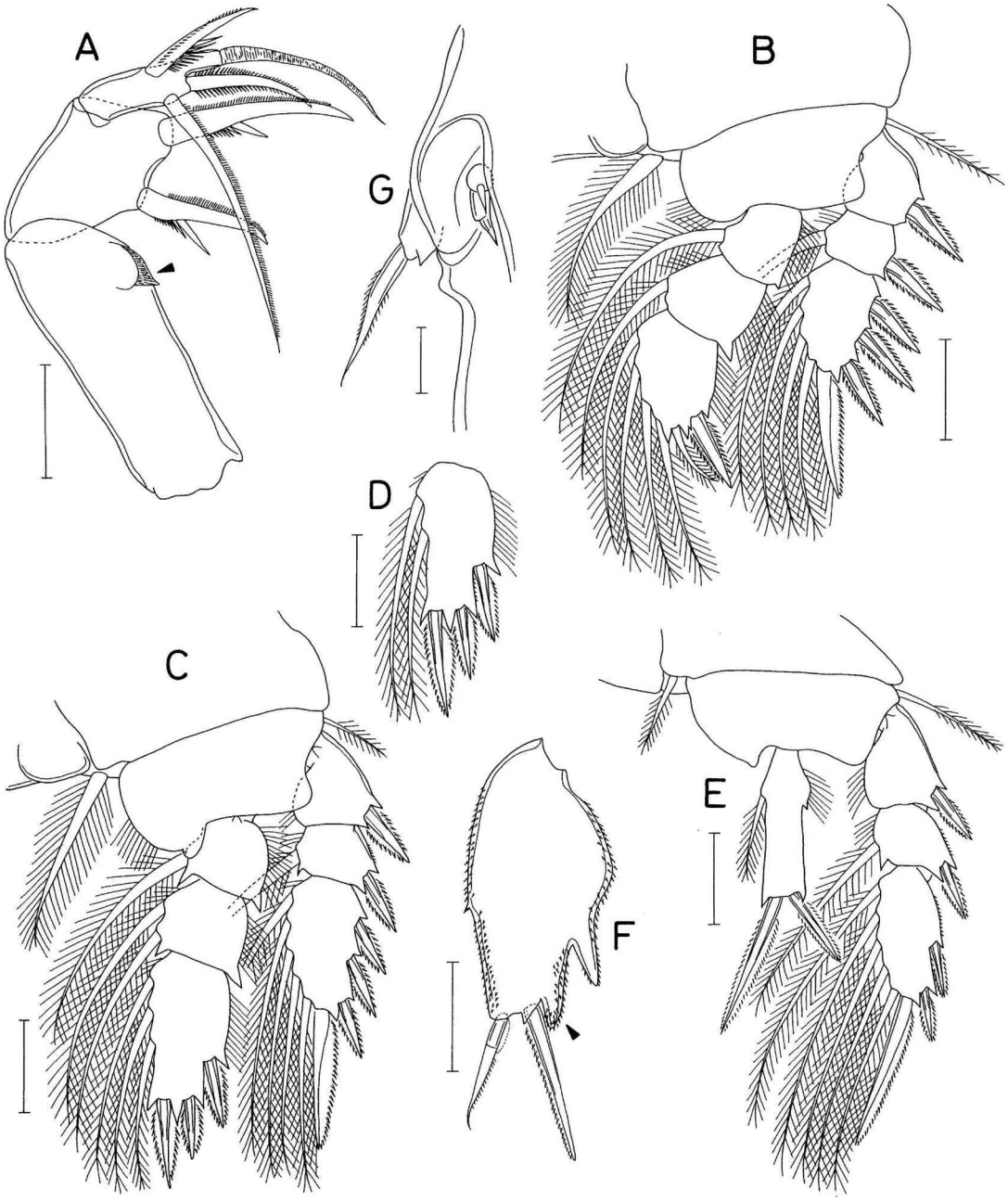

Fig. 2. *Kelleria regalis* Gurney, female. A, maxilliped; B, leg 1; C, leg 2; D, third endopodal segment of leg 3; E, leg 4; F, exopod of leg 5; G, left genital aperture, dorsal. Scale bars: A, C–F, 0.05 mm; B, 0.02 mm.

49 × 57, and 45 × 63 μm, respectively. Caudal ramus 2.57 times longer than wide (77 × 30 μm).

Rostrum as in female. Antennule with 3 additional aesthetascs, 2 on second and 1 on fourth segments, as indicated by dark circles in Fig. 1E. Antenna as in female.

Labrum, mandible, and maxillule as in female. Maxilla (Fig. 3C) lacking anterodistal claw-like process on syncoxa; basis with spiniform distal lash and 3 large and 4 or 5 small spines on distal margin, arranged as 1 large, 2 small, 1 large, and 2 or 3 small from proximal to distal, and 1 large spine on distal lash. Maxilliped (Fig. 3D) consisting of 3 segments and terminal claw; first segment (syncoxa) unarmed; second segment (basis) armed proximally with 2 small setae (proximal one of them strongly curved, domino-shaped, and finely spinulose along convex margin, as shown in Fig. 3E) and ornamented with 2 longitudinal rows of spinules on inner surface (shorter row of short spinules and longer row of long spinules);

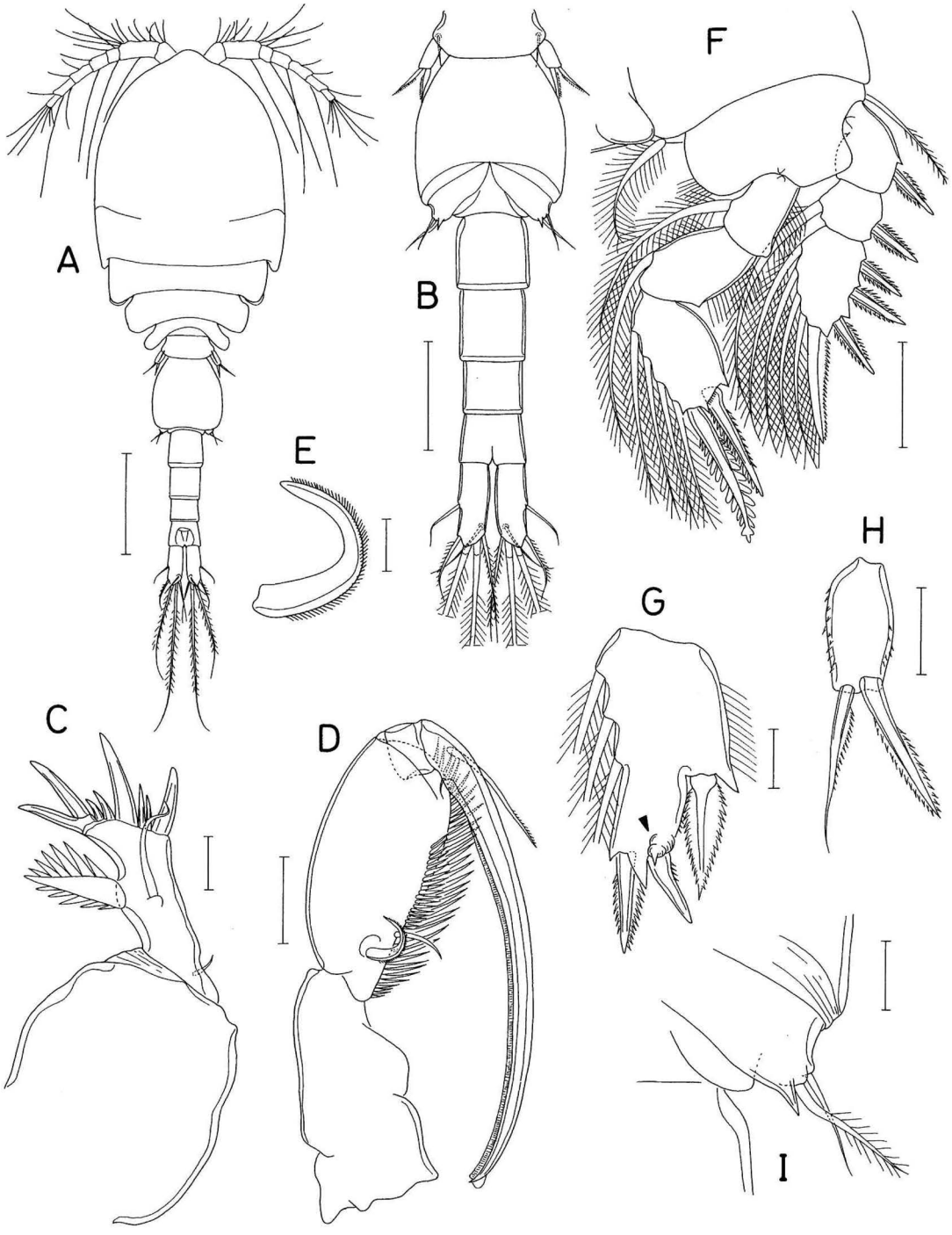

Fig. 3. *Kelleria regalis* Gurney, male. A, habitus, dorsal; B, urosome, ventral; C, maxilla; D, maxilliped; E, proximal seta on basis of maxilliped; F, leg 1; G, third endopodal segment of leg 2; H, exopod of leg 5; I, leg 6. Scale bars: A, 0.2 mm; B, 0.1 mm; C, G–I, 0.02 mm; D, F, 0.05 mm; E, 0.01 mm.

small third segment unarmed; terminal claw gently arched, elongate, with membranous fringe along concave inner margin and proximally 1 slender seta and 1 minute setule.

Leg 1 (Fig. 3F) endopod geniculate between second and third segments; third endopodal segment armed with 2 spines (outer and terminal) and 4 inner setae; terminal spine ornamented with broad, leaf-like spinules along both margins. Third endopodal segment (Fig. 3G) of leg 2 with fleshy outer distal process (indicated by arrowhead

in Fig. 3G); outer distal spine almost naked. Legs 3 and 4 as in female.

Leg 5 exopodal segment (Fig. 3H) nearly rectangular, 2.0 times longer than wide (30 × 15 μm), with slightly convex inner margin; distal spine and seta 36 and 37 μm long, respectively. Leg 6 (Fig. 3I) represented by 2 setae (1 naked and 1 pinnate) and 1 cusp on distal apex of genital operculum.

Remarks. Gurney (1927) originally recorded *Kelleria regalis* discovered from the Suez Canal. Humes & Ho (1969) redescribed this species in detail on the basis of samples collected from Madagascar. The female maxilliped of *Kelleria regalis* exhibits characteristic morphological features of this species; its first segment (syncoxa) bears a peculiar subdistal membranous flap and the third segment (endopod) is armed with unusually large setae. Our specimens from Kosrae also exhibit these characteristic features. *Kelleria javaensis* Mulyadi, 2009 recorded from Indonesia (Mulyadi, 2009) also has the same form of the female maxilliped. The forms of the body, maxilla, and leg 5 exopod of *Kelleria javaensis* are not significantly different either from the specimens of Humes & Ho (1969) and ours. *Kelleria javaensis* is here synonymized with *Kelleria regalis* which is now proved to be a widely distributed species in the Indo-West Pacific.

Kelleria andamanensis Sewell, 1949 (Figs. 4–6)

Syn.: *Kelleria andamanensis* Sewell, 1949, p. 112, text-fig. 7.
Kelleria grandisetiger Kim, 2006, p. 1, figs. 1, 2.

Material examined. 2 ♀♀, 5 ♂♂ collected with a light trap, shallow subtidal, 5°21′27.17″N, 162°57′51.23″E, Kosrae, Micronesia, by J. Lee, 2 July 2016.

Female. Body (Fig. 4A) moderately broad. Body length of dissected specimen 1.34 mm. Prosome 680 μm long, half as long as body length. All prosomal somites bearing blunt lateral corners. Cephalothorax 490 × 423 μm. Fifth pedigerous somite as wide as genital double-somite, characteristically bearing digitiform posterolateral process near base of exopod of leg 5 (Fig. 5F and as indicated by arrowhead in Fig. 4B). Genital double-somite slightly longer than wide (220 × 200 μm), gradually narrowing distally; genital apertures large, positioning laterally, with 2 small, naked setae on genital operculum and 1 large, feebly spinulose seta positioning at middle of lateral margin of double-somite. Three free abdominal somites 68 × 103, 48 × 97, and 64 × 100 μm, respectively. Caudal ramus (Fig. 4C) 2.23 times longer than wide (89 × 40 μm), strongly tapering along its distal third, with pore at distal apex, and armed with 6 setae; outer seta (seta II) naked, positioning at 52% region of outer margin; small dorsal seta (seta VII) also naked; other 4 setae pinnate. Egg sac (Fig. 4D) oval, 364 × 195 μm; each egg 64 μm in diameter.

Rostrum (Fig. 4E) strongly tapering, with round distal apex. Antennule (Fig. 4F) 7-segmented; armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; setae thin and naked; aesthetascs thin, setiform. Antenna (Fig. 4G) slender, 4-segmented; armature formula 1, 1, 2 + claw, and 5 + 2 claws; claws slender, geniculate near middle, with fine spinules along inner margin; second and terminal segments (first and third endopodal segments) ornamented with fine spinules along outer margin; terminal segment (third endopodal segment) 3.95 times longer than wide (83 × 21 μm).

Labrum (Fig. 4H) with deep posteromedian incision and broad posterolateral lobes. Mandible (Fig. 4I) with elongate, serrate distal lash, about 14 teeth along convex outer margin of gnathobase, 8 spinules along inner margin, and tuft of spinules consisting of 5 longer and 3 or 4 shorter spinules on convex side near base of gnathobase; convex margin proximal to gnathobase bearing narrow membranous fringe. Maxillule (Fig. 4J) as elongate lobe armed with 4 setae, consisting of 2 longer distal setae, 1 shorter subdistal seta, and 1 naked, process-like inner margin seta. Maxilla (Fig. 4K) consisting of syncoxa and basis; syncoxa unarmed; basis with spiniform distal lash (or process), large spiniform inner seta (seta I) bearing 6 spinules on both margins, slender anterior seta (seta II), rudimentary proximal seta (set III), and 7 unequal spines along distal margin arranged as 1 large, 3 small, 2 large, and 1 small from proximal to distal; small last spine locating on distal lash; distal lash incompletely articulated basally. Maxilliped (Fig. 5A) 3-segmented; first segment (syncoxa) the longest but unarmed; second segment (basis) with a small angle on outer margin, and armed with 2 large setae on inner margin, proximal seta naked along proximal margin but with row of about 15 large spinules along distal margin, distal seta slightly longer than proximal seta, ornamented with fine spinules along both margins; third segment (endopod) small, armed with 4 elements consisting of small outer spine, small, naked inner proximal seta, pinnate inner distal seta, and elongate, wrinkled, process-like apical seta.

Legs 1–3 with 3-segmented rami (Fig. 5B, C). Leg 3 same as leg 2 except bearing 3 spines and 2 setae on third endopodal segment (Fig. 5D). Leg 4 (Fig. 5E) with 3-segmented exopod and 1-segmented endopod; endopodal segment 2.84 times longer than wide (91 × 32 μm), with 1 cusp on outer margin, patch of spinules on outer side distal to cusp, and dentiform outer distal corner; 2 distal spines 41 (outer) and 59 μm long (inner), respectively; inner seta short, not extending to distal margin of endopodal segment. Armature formula for legs 1–4 as in *Kelleria regalis*.

Leg 5 (Fig. 5F) consisting of 1 pinnate dorsolateral seta on fifth pedigerous somite and free exopod; exopodal seg-

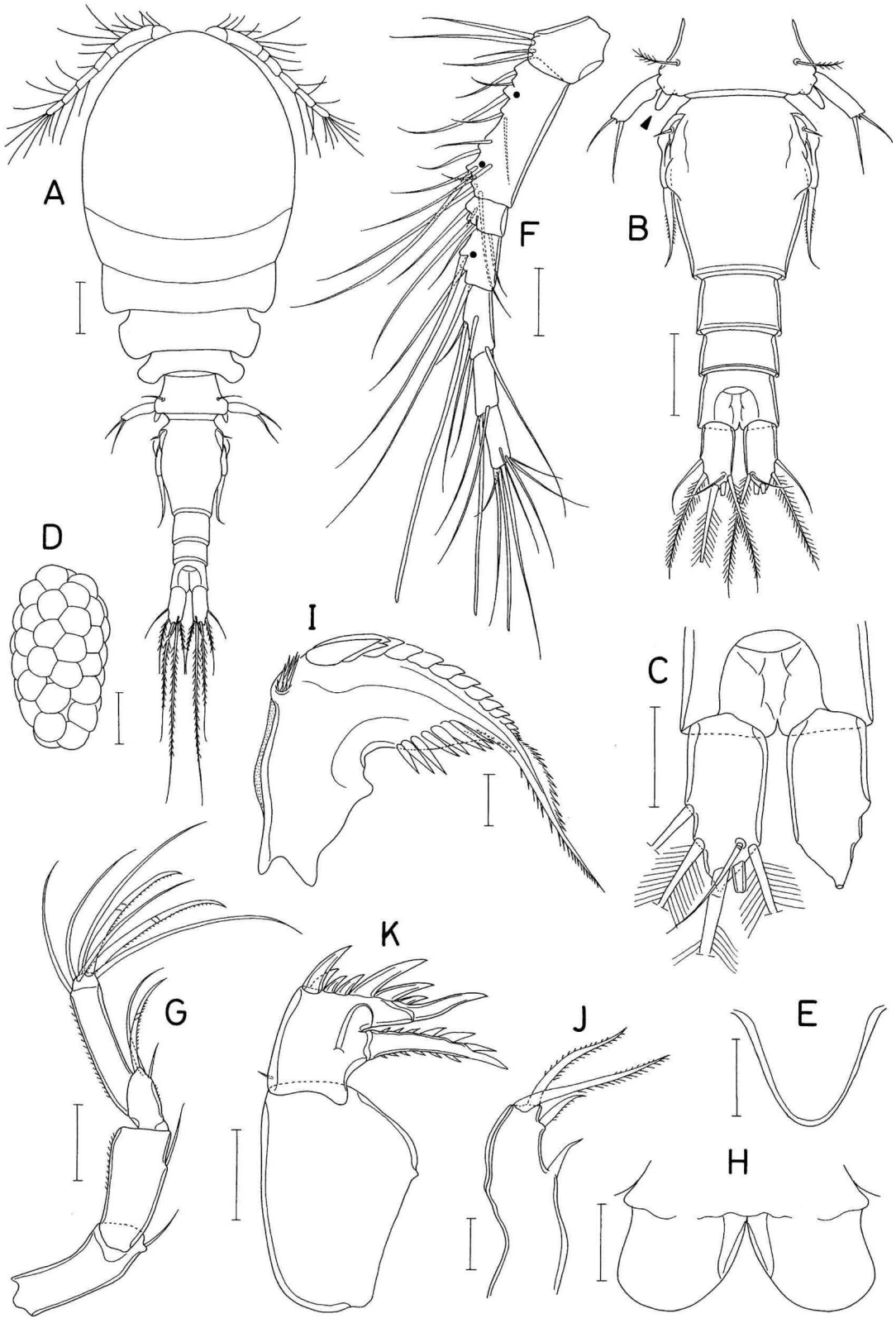

Fig. 4. *Kelleria andamanensis* Sewell, 1949, female. A, habitus, dorsal; B, urosome, dorsal; C, caudal rami, dorsal; D, egg sac; E, rostrum; F, antennule; G, antenna; H, labrum; I, mandible; J, maxillule; K, maxilla. Scale bars: A, B, D, 0.1 mm; C, E−H, K, 0.05 mm; I, J, 0.02 mm.

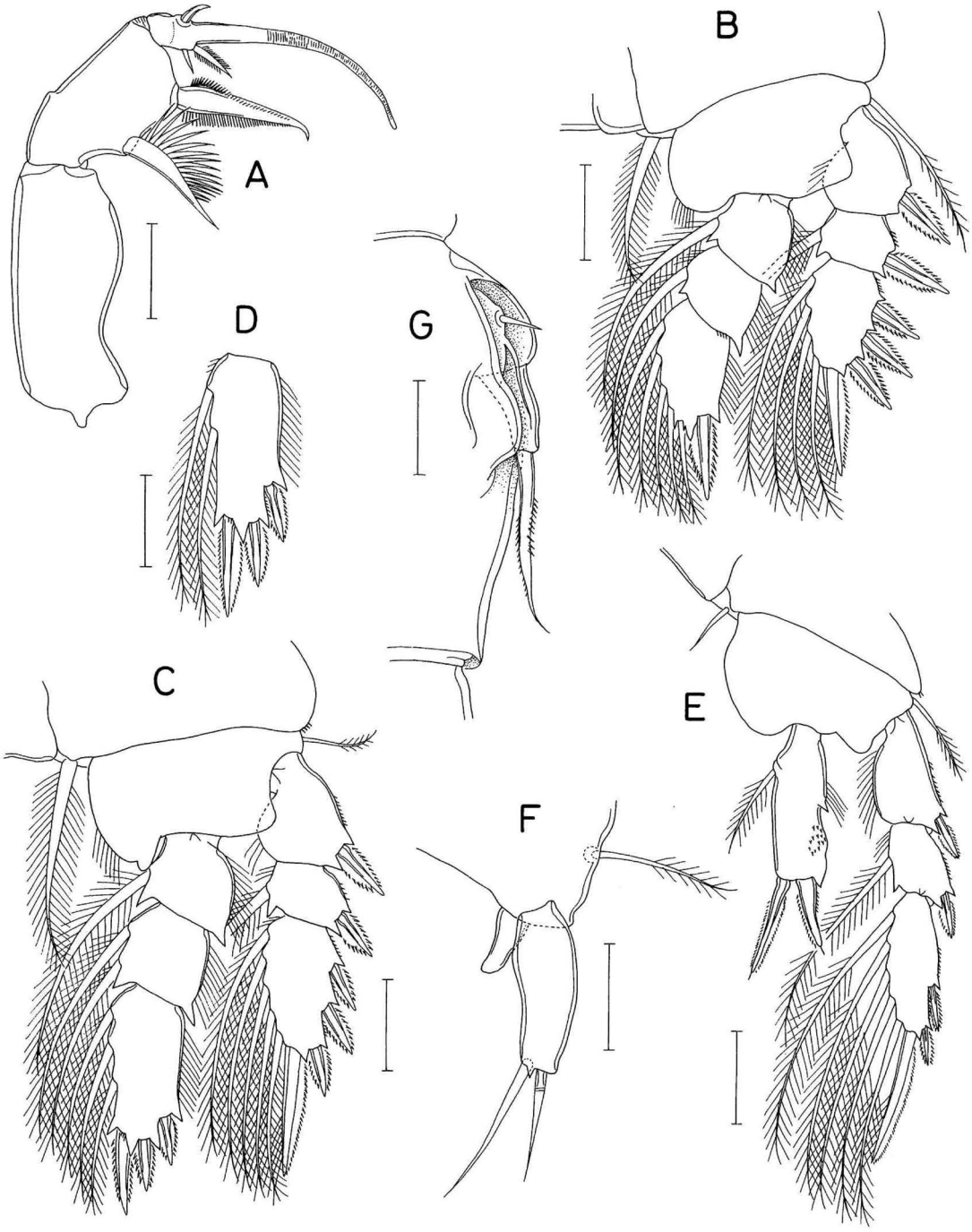

Fig. 5. *Kelleria andamanensis* Sewell, 1949, female. A, maxilliped; B, leg 1; C, leg 2; D, third endopodal segment of leg 3; E, leg 4; F, leg 5; G, right side of genital double-somite, dorsal. Scale bars: 0.05 mm.

ment 2.57 times longer than wide (77 × 30 μm), slightly broadened in proximal half, with 1 cusp on distal margin, and armed with 2 naked distal setae, outer one of which annulated proximally. Leg 6 (Fig. 5G) represented by 2 small setae on genital operculum and 1 large, separated seta on lateral margin of genital double-somite.

Male. Body (Fig. 6A) narrower than that of female. Body length 1.15 mm. Dorsal suture line between cephalosome and first pedigerous somite incomplete. Urosome (Fig. 6B) 6-segmented. Genital somite distinctly wider than fifth pedigerous somite, 150 × 146 μm. Four abdominal somites 68 × 82, 59 × 77, 39 × 70, and 52 × 77 μm, respectively. Caudal ramus 2.22 times longer than wide (80 × 36 μm).

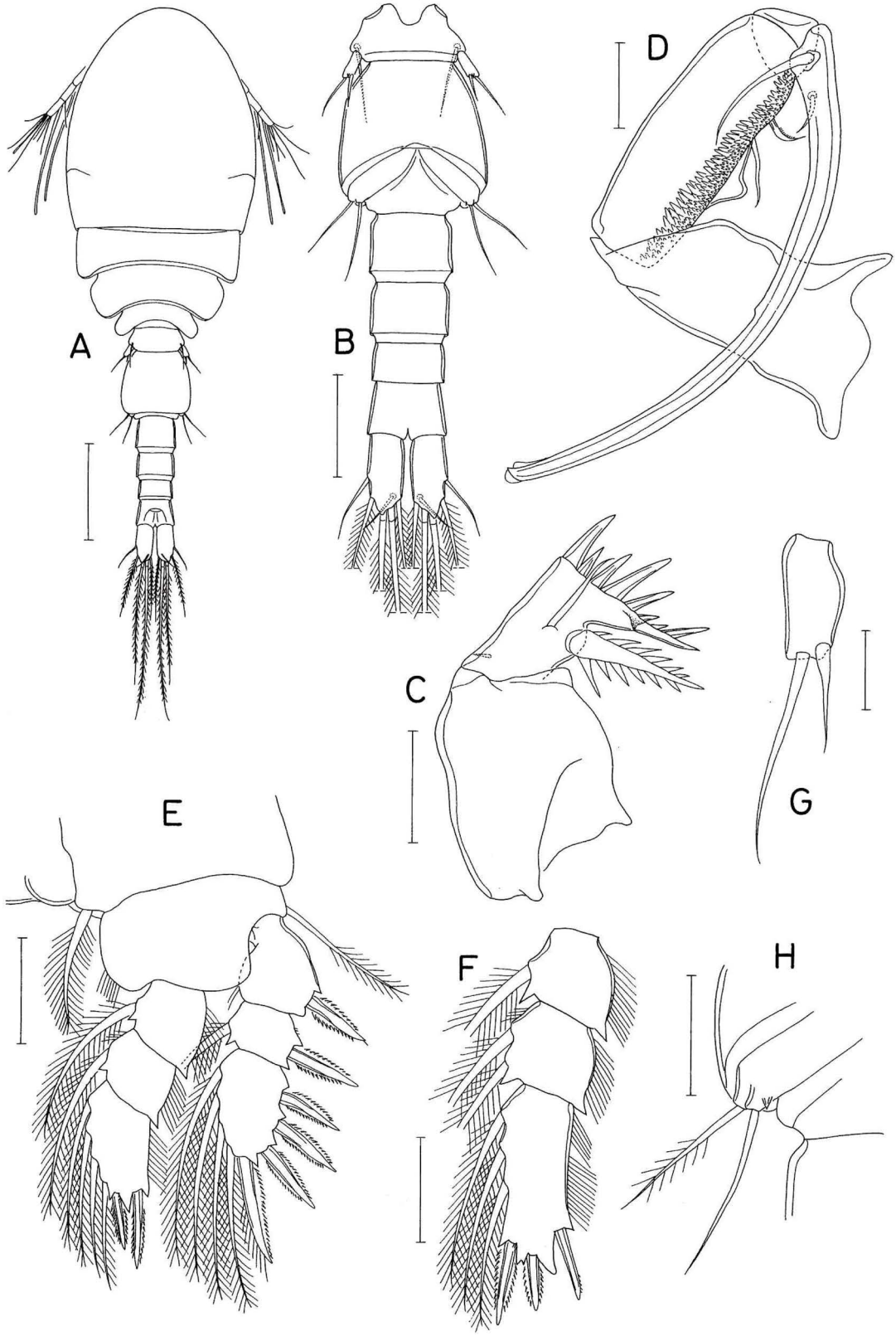

Fig. 6. *Kelleria andamanensis* Sewell, 1949, male. A, habitus, dorsal; B, urosome, ventral; C, maxilla; D, maxilliped; E, leg 1; F, endopod of leg 2; G, exopod of leg 5; H, leg 6. Scale bars: A, 0.2 mm; B, 0.1 mm; C−F, H, 0.05 mm; G, 0.02 mm.

Rostrum as in female. Antennule with 3 additional aesthetascs at places indicated by dark circles in Fig. 4F. Antenna armed as in female, but terminal segment 3.22 times longer than wide (74 × 23 μm), shorter than that of female.

Labrum, mandible, and maxillule as in female. Maxilla (Fig. 6C) slightly different from that of female in arrangement of spines on distal margin of basis; these spines 7 or 8 in number and arranged as 1 large, 2 small, 2 large, 1 or 2 small, and 1 large from proximal to distal; distal lash not articulated at base. Maxilliped (Fig. 6D) consisting of 3 segments and terminal claw; first segment (syncoxa) unarmed; second segment (basis) with triangular expansion and 2 unequal setae on inner margin, and numerous spinules on inner surface; small third segment unarmed; terminal claw elongate, arched, longer than combined proximal 3 segments, bearing 2 unequal setae proximally.

Leg 1 (Fig. 6E) with third endopodal segment armed with 2 spines and 4 setae (armature formula I, I, 4); 2 distal spines unequal in length, outer one about 1.3 times longer than inner one. Third endopodal segment of leg 2 slightly sexually dimorphic; mid-terminal process bicuspid, and outer spine elongated and almost naked. Legs 3 and 4 as in female.

Leg 5, exopodal segment (Fig. 6G) 2.0 times longer than wide (30 × 15 μm), with convex inner margin, armed distally with 2 unequal, naked setae, inner seta 26 μm long and outer seta 52 μm long. Leg 6 (Fig. 6H) represented by 2 setae (1 pinnate and 1 naked) of equal length and 1 small cusp on genital operculum.

Remarks. Our specimens from Kosrae are identifiable with *Kelleria grandisetiger* Kim, 2006 which was recorded from Korea (Kim, 2006). This disjunct distribution of the species leaded us to a close comparison between this and other known species and a reconsideration to the validity of *Kelleria grandisetiger*. Kim (2006) differentiated *Kelleria grandisetiger* from its close relative *Kelleria andamanensis* Sewell, 1949 known from the Andaman Islands (Sewell, 1949) by different forms of the caudal rami and mandible. However, these differences seem not enough to recognize them as separate species. Sewell (1949) described and illustrated a row of "5 long spine-like teeth" on the convex outer side of the mandible, which are interpretable as a schematic expression of the tuft of 5 thin spinules (other 3 or 4 smaller spinules were overlooked) exhibited in our specimens and *Kelleria grandisetiger*. *Kelleria grandisetiger* is here synonymized with *Kelleria andamanensis*.

As diagnostic features of *Kelleria andamanensis*, (1) the fifth pedigerous somite of the female bears a pair of the digitiform posterolateral processes; (2) the genital double-somite in the female has a large seta (as an element of leg 6) on the lateral margin; (3) the distal margin of the maxillary endopod of the female is armed with 7 spines arranged as 1 large, 3 small, 2 large, and 1 small ones from proximal to distal; (4) the proximal seta on the second segment (basis) of the female maxilliped is naked along proximal margin but ornamented with about 15 large spinules along distal margin; and (5) the mandible bears a tuft of 5 longer and 3 or 4 shorter, thin spinules on convex outer side.

Kelleria latipes n. sp. (Figs. 7, 8)

Material examined. 7 ♀♀ from intertidal invertebrate burrows (inhabited mainly by shrimps and polychaetes), Ko Sireh, Phuket, Thailand, approximately 7°52′26″N, 98°25′235″E, 12 July 2015, I.-H. Kim & J.-S. Hong. Holotype (♀, MABIK CR00247449) and paratypes (5 ♀♀, MABIK CR00247450) have been deposited in the Marine Biodiversity Institute of Korea (MABIK), Seocheon, Korea. Dissected paratype (1 ♀) is retained in the collection of IHK.

Female. Body (Fig. 7A) narrow. Body length 981 μm in dissected specimen. Mean body length 1.03 mm (0.98–1.10 mm, n = 6). Prosome 636 μm long, occupying 65% of body length. Cephalothorax longer than wide (395 × 345 μm), with faint dorsal suture line between cephalosome and first pedigerous somite; posterolateral corners not projected. Second pedigerous somite with slightly angular posterolateral corners. Lateral corners of other prosomal somites rounded or blunt. Urosome (Fig. 7B) 5-segmented. Fifth pedigerous somite 103 μm wide. Genital double-somite wider than long (117 × 130 μm), consisting of laterally expanded anterior and narrower posterior parts; genital apertures large, positioning dorsolaterally at expanded anterior part. Three free abdominal somites 38 × 65, 30 × 59, and 40 × 58 μm, respectively. Anal somite 1.33 times longer than second free abdominal somite. Caudal ramus (Fig. 7C) 2.52 times longer than wide (68 × 27 μm), 1.70 times longer than anal somite, armed with 6 setae, bearing small pore at distal apex; lateral seta (seta II) and dorsal seta (seta VII) naked, other 4 setae pinnate; lateral seta positioning at midway of ramus length; 2 mid-terminal setae (setae IV and V) broadly flattened, tape-like, along proximal two-thirds.

Rostrum (Fig. 7D) narrow, tapering, with blunt distal apex. Antennule (Fig. 7E) 255 μm long, 7-segmented; armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; setae naked and thin; aesthetascs setiform. Antenna (Fig. 7F) 4-segmented, consisting of coxobasis and 3-segmented endopod; armature formula 1, 1, 2 + claw, and 5 + 2 claws; claws slender, geniculate in middle; first and third endopodal segments ornamented with minute spinules along outer margin; third endopodal segment 3.58 times longer than wide (68 × 19 μm).

Labrum (Fig. 7G) with deep posteromedian incision and broad posterolateral lobes bearing round posterior mar-

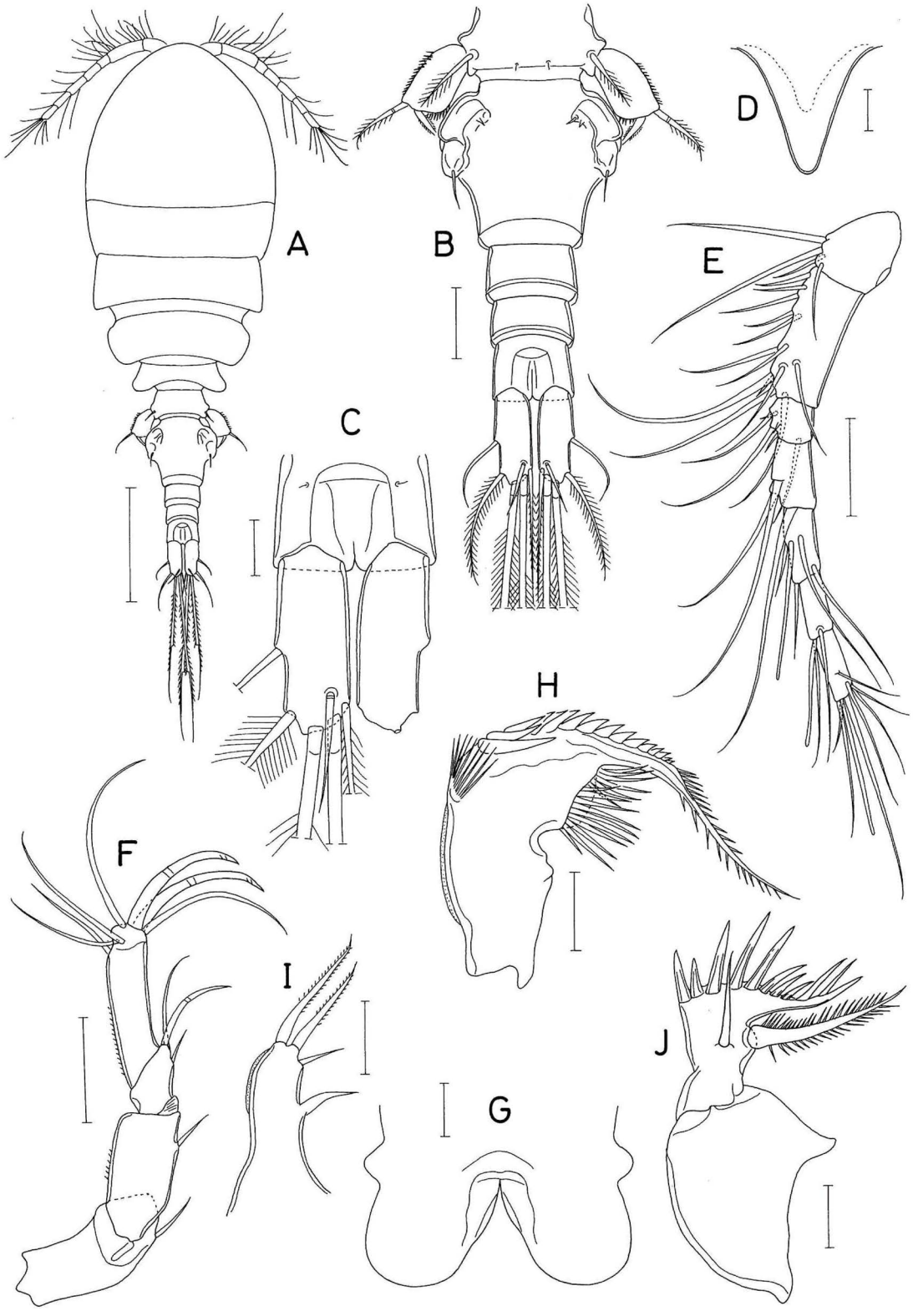

Fig. 7. *Kelleria latipes* n. sp., female. A, habitus, dorsal; B, urosome, dorsal C, caudal rami, dorsal; D, rostrum; E, antennule; F, antenna; G, labrum; H, mandible; I, maxillule; J, maxilla. Scale bars: A, 0.2 mm; B, E, F, 0.05 mm; C, D, G–J, 0.02 mm.

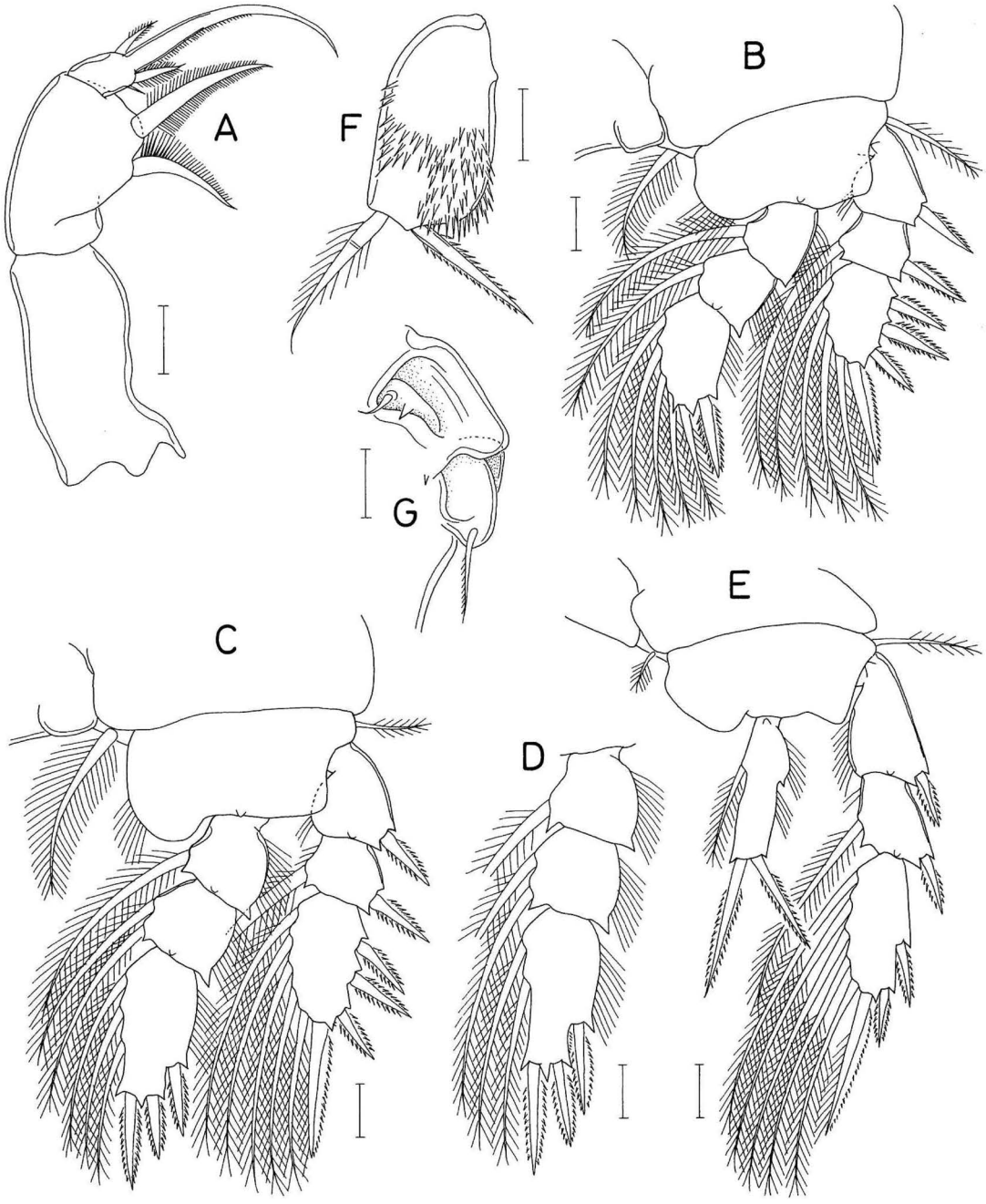

Fig. 8. *Kelleria latipes* n. sp., female. A, maxilliped; B, leg 1; C, leg 2; D, endopod of leg 3; E, leg 4; F, exopod of leg 5; G, right genital aperture, dorsal. Scale bars: 0.02 mm.

gin. Mandible (Fig. 7H) with elongate, spinulose distal lash, row of about 10 thin spinules at convex side, 16 elongate spinules (grouped as 10 and 6) on inner margin, about 15 teeth along convex outer margin of gnathobase, and narrow membranous flange along proximal outer margin. Maxillule (Fig. 7I) armed with 4 setae consisting of 2 longer, weakly pinnate distal setae, smallest subdistal inner seta, and process-like inner margin seta; outer margin fringed with narrow membrane along distal third. Maxilla (Fig. 7J) with unarmed syncoxa; basis with spiniform distal lash, large, spiniform inner seta (seta I) bearing spinules along both margins, slender, naked anterior seta (seta II), and 9 or 10 spines along distal margin (arranged as 2 small, 3 large, 4 or 5 small ones from proximal to distal); seta III not discernible. Maxilliped (Fig. 8A) 3-segmented; first segment (syncoxa) unarmed; second seg-

ment (basis) with protruded inner margin bearing 2 large setae, proximal seta with dense row of thin spinules along distal margin, distal seta longer than proximal seta, bearing dense row of fine spinules along both margins; small third segment (endopod) terminating in elongate, whip-like apical seta, with small, pinnate outer and inner distal setae, and minute inner proximal setule.

Legs 1–3 with 3-segmented rami (Fig. 8B–D). Leg 4 (Fig. 8E) with 3-segmented exopod and 1-segmented endopod. All setae on these legs pinnate. Leg 4 endopodal segment 3.1 times longer than wide (56 × 18 μm), extending to distal border of second exopodal segment, with small cusp on outer margin; 2 distal spines 42 (outer) and 55 (inner) μm long; inner margin seta extending to distal margin of segment. Armature formula for legs 1–4 as in *Kelleria regalis*.

Leg 5 consisting of dorsolateral seta on fifth pedigerous somite and free exopod; exopodal segment (Fig. 8F) broad, broadening distally, 1.88 times longer than wide (62 × 33 μm) armed distally with 1 spinulose spine (43 μm long) and 1 pinnate, geniculate seta (47 μm long), and ornamented with numerous spinules on surfaces of distal half of segment. Leg 6 (Fig. 8G) represented by 1 small seta, 1 small cusp, and posterolaterally isolated, weakly pinnate seta in genital aperture.

Male. Unknown.

Etymology. The specific name is a combination of the Latin words *lat* (=broad) and *pes* (=a foot), depicting the broad exopodal segment of female leg 5.

Remarks. *Kelleria latipes* n. sp. may be differentiated from its congeners by two ways, as follows:

The proximal seta on the second segment (basis) of the female maxilliped is ornamented with spinules or setules along its distal margin, but naked, unornamented along its proximal margin. This form of the seta (with naked proximal margin) is shared by four congeners, *Kelleria andamanensis* Sewell, 1949, *Kelleria gradata* Stock, 1967, *Kelleria indonesiana* Mulyadi, 2009, and *Kelleria multioviger* Kim, 2009. Of these, *Kelleria andamanensis*, *Kelleria gradata*, and *Kelleria multioviger* are not confusable with the new species, because these species have the exopod of leg 5 armed with 2 setae, in contrast to the armature of 1 spine and 1 seta in the new species. *Kelleria indonesiana* has a large process on the inner margin of the exopodal segment of leg 5, which is absent in the new species, thus is easily distinguished from the new species.

In most species of *Kelleria* the genital double-somite of the female is longer than wide. In contrast, the double-somite of *Kelleria latipes* n. sp. is wider than long and only three congeners, *Kelleria gradata*, *Kelleria multioviger*, and *Kelleria vaga* Kim, 2000 share this form of the genital double-somite with *Kelleria latipes* n. sp. The new species can readily be distinguished from the three congeners by the form of the caudal ramus which is 2.52 times longer than wide, against to 1.90 times longer than wide in *Kelleria gradata*, according to Stock (1967) who described the size of its caudal ramus as 91 μm long and 48 μm wide, 1.80 times longer than wide in *Kelleria multioviger*, according to Kim (2009), and 4.76 times longer than wide in *Kelleria vaga*, as described by Kim (2000).

The characteristic form of the exopodal segment of female leg 5, which is broad, without any process or cusp, alone may characterize the new species.

Kelleria phuketensis n. sp. (Figs. 9, 10)

Material examined. 6 ♀♀ from intertidal invertebrate burrows (inhabited mainly by shrimp and polychaetes), Ko Sireh, Phuket, Thailand, approximately 7°52′26″N, 98°25′235″E, 12 July 2015, I.-H. Kim & J.-S. Hong. Holotype (♀, MABIK CR00247451) and paratypes (4 ♀♀, MABIK CR00247452) have been deposited in the Marine Biodiversity Institute of Korea (BABIK), Seocheon, Korea. Dissected paratype (1 ♀) is retained in the collection of IHK.

Female. Body (Fig. 9A) rather narrow. Body length 0.95 mm. Prosome 600 μm long, occupying 63% of body length. Maximum width of prosome 356 μm. Dorsal suture line between cephalosome and first pedigerous somite faint. Epimera of second pedigerous somite slightly extended posterolaterally, with blunt posterolateral corners. Urosome (Fig. 9B) 5-segmented. Fifth pedigerous somite 114 μm wide, distinctly narrower than genital double-somite. Genital double-somite as long as wide (134 × 136 μm), consisting of laterally expanded anterior two-thirds and narrower posterior third. Genital apertures large, positioning dorsolaterally at anterior expanded region. Three free abdominal somites 31 × 64, 24 × 56, and 42 × 56 μm, respectively. Genital double-somite and first 2 free abdominal somites with membranous fringe along posterior border (Fig. 9C). Anal somite (Fig. 9C) with minute spinules along posteroventral margin. Caudal ramus (Fig. 9C) 3.21 times longer than wide (77 × 24 μm), bearing small pore at distal apex, armed with 6 setae; lateral seta (seta II) positioning at midlength of ramus; lateral and dorsal setae (setae II and VII) naked, other setae pinnate; 2 mid-terminal setae (setae IV and V) flattened, tape-like along proximal two-thirds (Fig. 9B).

Rostrum (Fig. 9D) narrow, tapering, slightly longer than wide, with blunt distal apex. Antennule (Fig. 9E) 255 μm long, 7-segmented; armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; all setae thin and naked; aesthetascs setiform. Antenna (Fig. 9F) 4-segmented, consisting of coxobasis and 3-segmented endopod; armature formula 1, 1, 2 + claw, and 5 + 2 claws; claws thin, setiform, geniculate in middle; first and third endopodal segments ornamented with minute spinules along outer margin; third endopodal segment 3.4 times

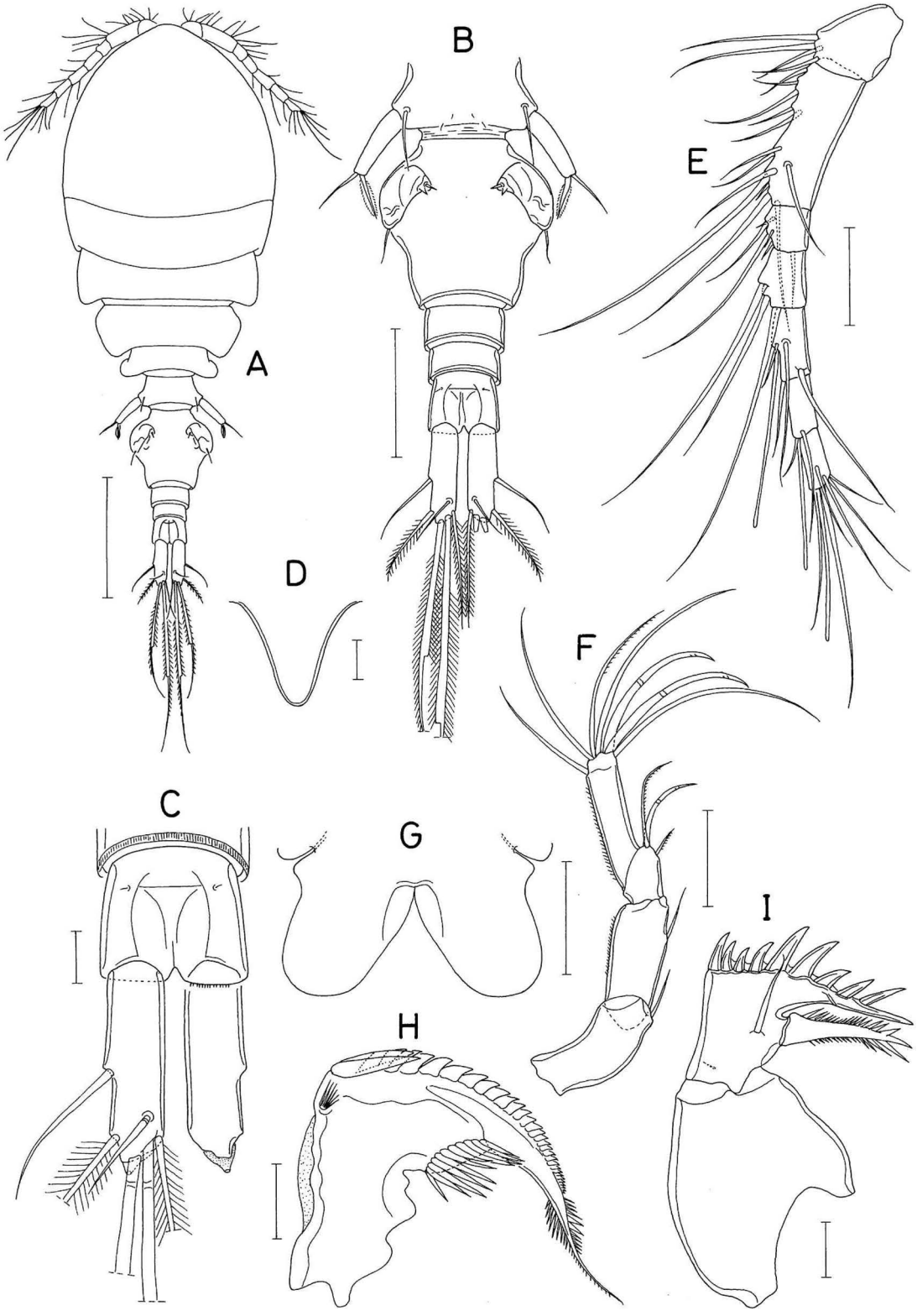

Fig. 9. *Kelleria phuketensis* n. sp., female. A, habitus, dorsal; B, urosome, dorsal; C, anal somite and caudal rami, dorsal; D, rostrum; E, antennule; F, antenna; G, labrum; H, mandible; I, maxilla. Scale bars: A, 0.2 mm; B, 0.1 mm; C, D, H, I, 0.02 mm; E–G, 0.05 mm.

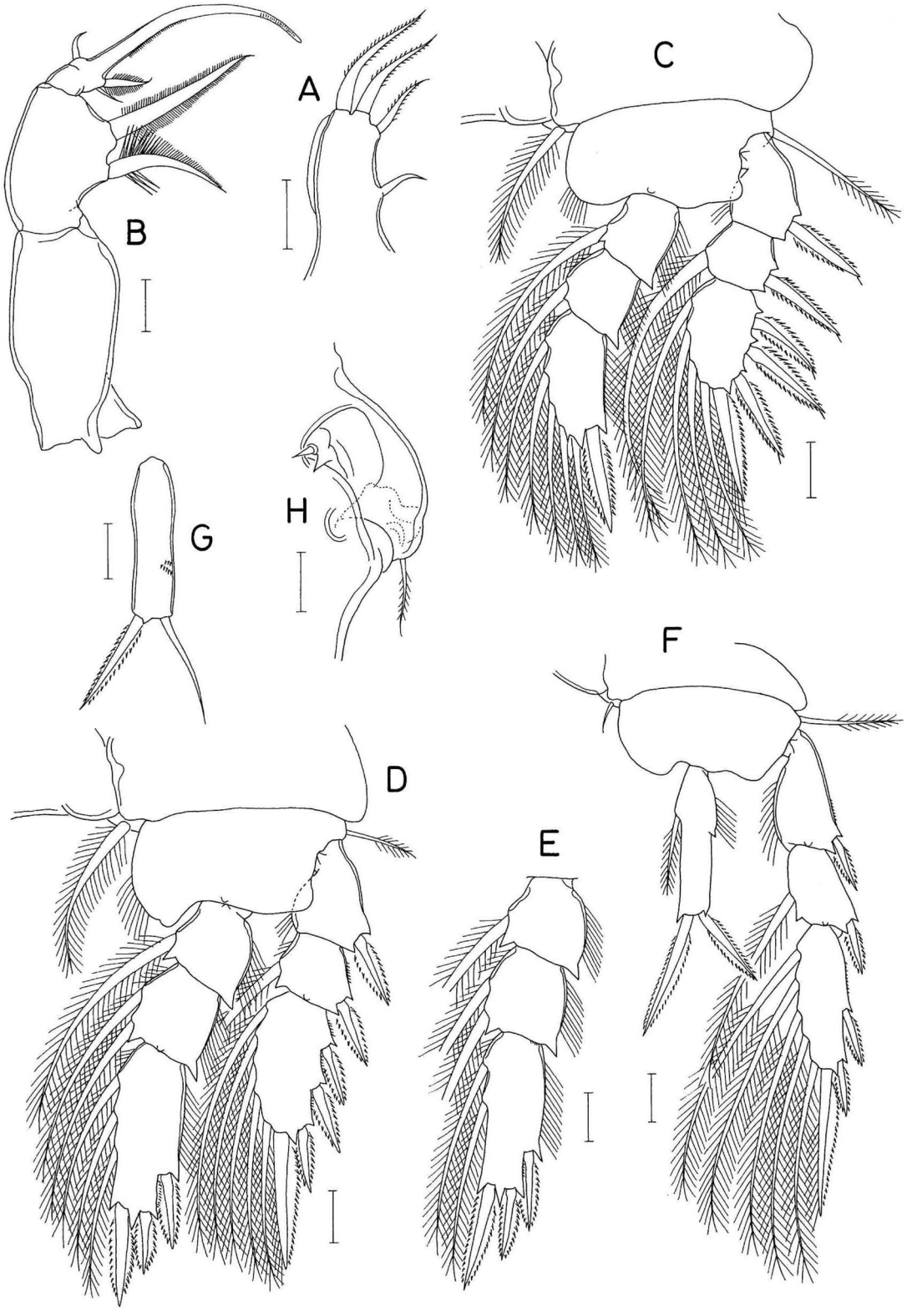

Fig. 10. *Kelleria phuketensis* n. sp., female. A, maxillule; B, maxilliped; C, leg 1; D, leg 2; E, endopod of leg 3; F, leg 4; G, exopod of leg 5; H, right genital aperture, dorsal. Scale bars: 0.02 mm.

longer than wide (61 × 18 μm).

Labrum (Fig. 9G) with deep posteromedian incision and broad posterolateral lobes. Mandible (Fig. 9H) with elongate, spinulose distal lash, 12 or 13 spinules along inner margin, about 30 teeth along convex outer margin, and tuft of 6 minute spinules on outer side near base of gnathobase. Maxillule (Fig. 10A) armed with 2 large distal and 1 subdistal, pinnate setae, 1 small, naked inner margin seta, and membranous flange along outer margin. Maxilla (Fig. 9I) 2-segmented; proximal segment (syncoxa) unarmed; distal segment (basis) with large, spiniform inner seta (seta I) bearing spinules along both margins, simple, slender anterior seta (seta II), vestigial proximal seta (seta III), short, spiniform distal lash, and 9 spines along distal margin; spines arranged as 4 small, 2 large, and 3 small from proximal to distal. Maxilliped (Fig. 10B) 3-segmented; first segment (syncoxa) unarmed; second segment (basis) with 2 large setae, proximal seta bearing 3 spinules at proximal region of proximal margin and row of numerous spinules along distal margin, distal seta distinctly longer than proximal seta, with fine spinules along both margins; third segment (endopod) small, terminating in elongated apical seta, with small, naked outer seta, setule-like inner proximal seta, and pinnate inner distal seta.

Legs 1–3 with 3-segmented rami (Fig. 10C–E). Leg 4 (Fig. 10F) with 3-segmented exopod and 1-segmented endopod; endopodal segment 3.71 times longer than wide (63 × 17 μm), bearing small cusp on outer margin; outer and inner distal spines 36 and 55 μm long, respectively; inner seta not extending to distal margin of endopodal segment. Inner coxal seta of leg 4 rudimentary and naked, all other setae on legs 1–4 pinnate. Armature formula for legs 1–4 as in the type species of the genus, *Kelleria regalis*.

Leg 5 consisting of 1 naked dorsolateral seta on fifth pedigerous somite and free exopod (Fig. 9B); exopodal segment (Fig. 10G) elongate, nearly rectangular, 3.69 times longer than wide (59 × 16 μm), armed distally with 1 spine (39 μm long) and 1 naked setae (41 μm long); small patch of minute spinules present at distal third of outer surface of exopodal segment. Leg 6 (Fig. 10H) represented by 1 small spinule, 1 cusp, and 1 posterolaterally separated pinnate seta in genital aperture.

Male. Unknown.

Etymology. The new species is named after the type locality, Phuket Island, Thailand.

Remarks. In seven species of *Kelleria* the exopodal segment of female leg 5 has a smooth inner margin without any process and in ten species of the genus the exopod of female leg 5 is armed distally with one spine and one seta (rather than two setae). Both of these features are possessed in common by *Kelleria phuketensis* n. sp. and its four congeners, *Kelleria portiviva* Kim, 2006, *Kelleria undecidentata* Kim, 2006, *Kelleria vaga*, and *Kelleria latipes* n. sp. The latter four species can be differentiated from *Kelleria phuketensis* n. sp. by different features of the female, which are not applicable to the new species, as follows:

In *Kelleria undecidentata* the genital double somite is distinctly longer than wide, 148 × 121 μm (Kim, 2006), the rostrum is angular at apex, the basis of the maxilla bears 11 spines along its distal margin, and the exopodal segment of leg 5 is 4.66 times longer than wide (79 × 17 μm) (Kim, 2006).

In *Kelleria vaga* the caudal ramus is 4.76 times longer than wide (100 × 17 μm), the exopodal segment of leg 4 is 3.3 times longer than wide (50 × 15 μm) with its distal spine and seta of unequal lengths, 31 and 45 μm, respectively, and the mandibular gnathobase has a row of spinules (rather than a tuft of spinules, as in *Kelleria phuketensis* n. sp.) on the outer side (Kim, 2000).

In *Kelleria latipes* n. sp. the exopodal segment of leg 5 is lamellate, broad, 1.88 times longer than wide, the proximal seta on the second segment (basis) of the maxilliped is naked along its proximal margin, and the mandibular gnathobase has a row of about 10 long spinules on the outer side.

Kelleria phuketensis n. sp. is very similar to *Kelleria portiviva*. Major differences are exhibited in the proportional lengths of the genital double-somite, caudal ramus, and setal elements on leg 5, as shown in Table 1.

Table 1. Differences between *Kelleria portiviva* Kim, 2006 and *K. phuketensis* n. sp.

Characters in female	*Kelleria portiviva* Kim, 2006	*Kelleria phuketensis* n. sp.
Body length	1.23 mm	0.95 mm
Genital double-somite, L/W	175 × 158 μm (1.11 : 1)	134 × 136 μm (1 : 1.01)
Caudal ramus, L/W	120 × 29 μm (4.14 : 1)	77 × 24 μm (3.21 : 1)
Spines on distal margin of maxillary endopod	10	9
Leg 5 exopod, L/W	79 × 17 μm (4.64 : 1)	59 × 16 μm (3.69 : 1)
Lengths of spine and seta of leg 5 exopod	31 & 54 μm	39 & 41 μm
Distributions & references	Korea (Kim, 2006)	Thailand (this paper)

***Kelleria robusta* n. sp. (Figs. 11, 12)**

Material examined. One female (holotype, MABIK CR00247453) from invertebrate washings, SCUBA depth 15–30 m, Bohol, Philippines, 4 April 2014, Jimin Lee. Holotype (dissected and mounted on a slide) has been deposited in the Marine Biodiversity Institute of Korea (MABIK), Seocheon, Korea.

Female. Body (Fig. 11A) robust, relatively large. Body length 2.16 mm. Prosome expanded, 1.42 mm long, occupying 66% of body length. Cephalothorax globular, much wider than long (864 × 1,236 μm), with weak dorsal suture line delimiting cephalosome and first pedigerous somite. Second pedigerous somite with pointed posterolateral corners. Urosome (Fig. 11B) 5-segmented. Fifth pedigerous somite 414 μm wide, distinctly wider than genital double-somite. Genital double-somite wider than long (255 × 335 μm), with broader anterior part and narrower, tapering posterior part; genital apertures positioning at anterior third. Three free abdominal somites 80 × 189, 51 × 182, and 113 × 195 μm, respectively. Caudal ramus (Fig. 11C) short, 1.72 times longer than wide (136 × 79 μm), slightly longer than anal somite, with strongly tapering distal margin bearing minute pore at distal apex, armed with 6 setae; outer seta (seta II) positioning at midlength of ramus; this and dorsal seta (seta VII) naked, other setae pinnate.

Rostrum (Fig. 11D) slightly wider than long, nearly semi-circular, but with weakly angular distal apex. Antennule (Fig. 11E) 523 μm long, 7-segmented; armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; all setae naked, except 2 feebly pinnate larger setae on first segment. Antenna (Fig. 11F) consisting of coxobasis and 3-segmented endopod; armature formula 1, 1, 2 + claw, and 5 + 2 claws; terminal segment 2.62 times longer than wide (131 × 50 μm), gradually narrowing distally, its 2 distal claws strong, shorter than segment, 109 and 95 μm long, respectively.

Labrum (Fig. 11G) with divergent posterolateral lobes and broad posteromedian incision. Mandible (Fig. 11H) bearing short distal lash; gnathobase with group of 5 spinules of unequal lengths proximally on convex side, about 15 teeth along convex margin, about 15 spinules of various sizes along concave margin. Maxillule (Fig. 11I) as elongate lobe bearing 3 distal setae of unequal lengths and 1 short setiform process on inner margin. Maxilla (Fig. 11J) 2-segmented; proximal segment (syncoxa) large but unarmed; distal segment (basis) with spiniform inner seta (seta I) bearing 3–5 spinules along both margins, naked anterior seta (seta II), rudimentary proximal seta (seta III), short spiniform distal lash, 6 spines along distal margin arranged as 1 large, 2 small, 1 large, 1 small, and 1 large ones from proximal to distal. Maxilliped (Fig. 12A) 3-segmented; first segment (syncoxa) elongate, unarmed; second segment (basis) with 2 spiniform setae, proximal one naked, distal one shorter but thicker than proximal one, finely spinulose along both margins; third segment (basis) small, terminating in spiniform process, with 2 short spiniform setae and 1 minute setule.

Legs 1–4 (Fig. 12B–E) biramous. Legs 1–3 with 3-segmented rami. Leg 4 with 3-segmented exopod and 1-segmented endopod. Outer seta on basis pinnate in legs 1 and 4, but naked in legs 2 and 3. Inner coxal seta well-developed, pinnate in legs 1-3, but minute, naked in leg 4. Endopodal segment of leg 4 2.83 times longer than wide (130 × 46 μm) bearing 1 cusp on outer margin; 2 distal spines 115 (inner) and 52 μm (outer), respectively; inner seta not extending to distal margin of segment. Armature formula for legs 1–4 as in type species.

Leg 5 (Fig. 11B) consisting of 1 small pinnate dorsolateral seta on fifth pedigerous somite and free exopod; exopodal segment (Fig. 12F) 2.90 times longer than wide (142 × 49 μm), slightly broadened in proximal half, armed with 2 naked setae distally, ornamented with several minute spinules in distal half; 2 distal setae 150 and 100 μm long, respectively. Leg 6 (Fig. 12G) represented by 1 cusp, 1 small setae, and 1 lateral seta tipped on process in genital aperture.

Male. Unknown.

Etymology. The name of the new species refers to its robust form of the body.

Remarks. As diagnostic features in the female of *Kelleria robusta* n. sp., (1) the genital double-somite is wider than long (this feature is shared with four congeners); (2) the caudal ramus is less than twice as long as wide (shared with three congeners); (3) the proximal seta on the basis (second segment) of the maxilliped bears unornamented (naked) proximal margin (shared with five congeners); (4) the same seta bears unornamented distal margin (this is a unique feature of the new species); (5) the exopodal segment of leg 5 lacks any process or denticle on its inner margin (shared with eight congeners); and (6) the exopodal segment of leg 5 is armed with 2 setae, without spine (shared with about nine congeners).

Kelleria robusta n. sp. most closely resembles *Kelleria multiovigera* Kim, 2009 known from Madagascar (Kim, 2009) in the respect that the two species share five (1, 2, 3, 5, and 6) of the above six features, the greatest degree of sharing. Their caudal rami, antennae, labrum, and mandibles are very alike in form, as well. Nevertheless, they cannot be treated as conspecific due to two significant differences. Firstly, the proximal four spines on the distal margin of the maxillary endopod are subequal in size in *Kelleria multiovigera*, whereas those of *Kelleria robusta* n. sp. are very unequal. Secondly, the distal element (lash) on the endopod (third segment) of the female maxilliped of *Kelleria multiovigera* is setiform, elongate, much longer than the second segment (basis), whereas the same element of *Kelleria robusta* n. sp. is spiniform and distinctly

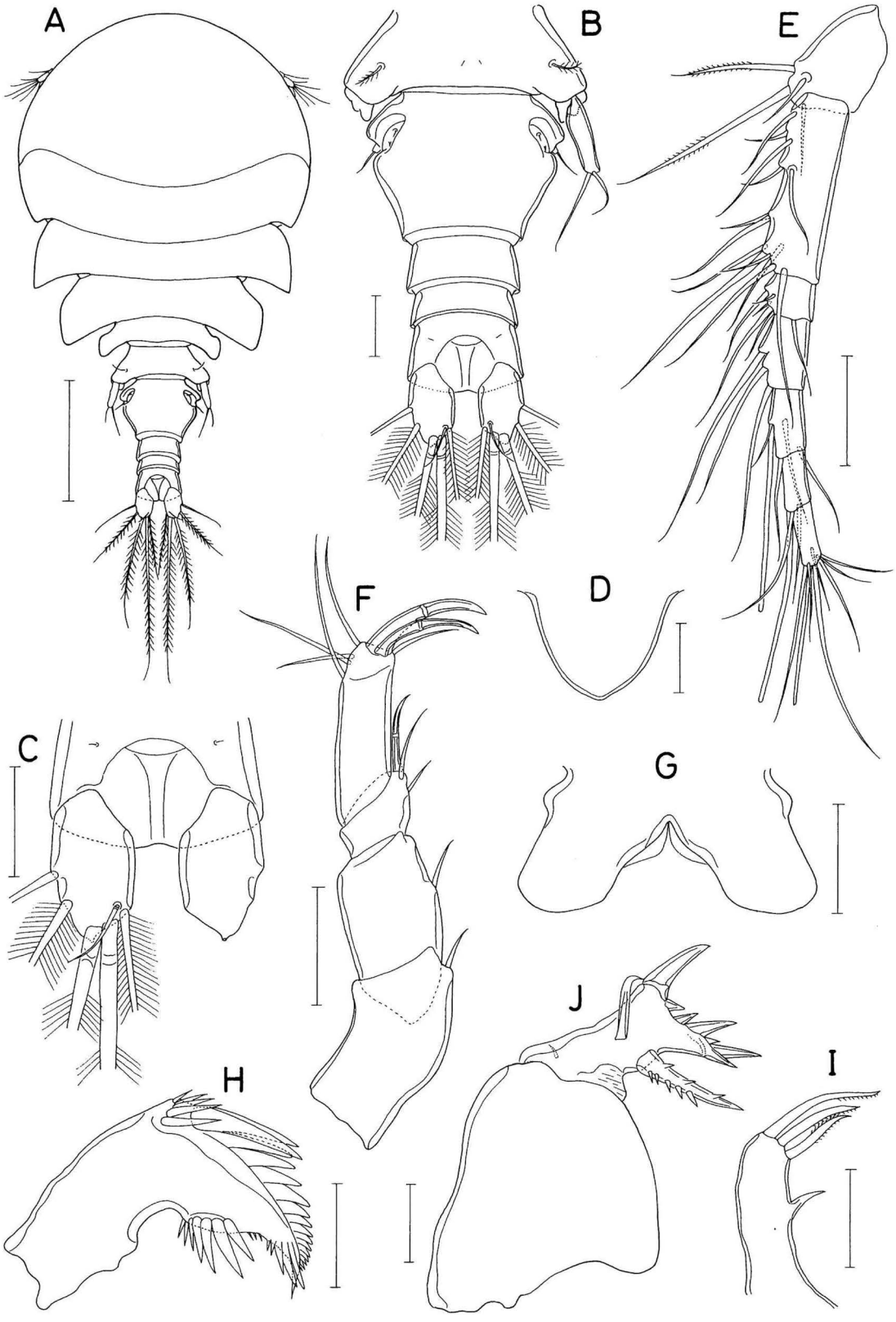

Fig. 11. *Kelleria robusta* n. sp., female. A, habitus, dorsal; B, urosome, dorsal; C, caudal rami, dorsal; D, rostrum; E, antennule; F, antenna; G, labrum; H, mandible; I, maxillule; J, maxilla. Scale bars: A, 0.5 mm; B–G, 0.1 mm; H–J, 0.05 mm.

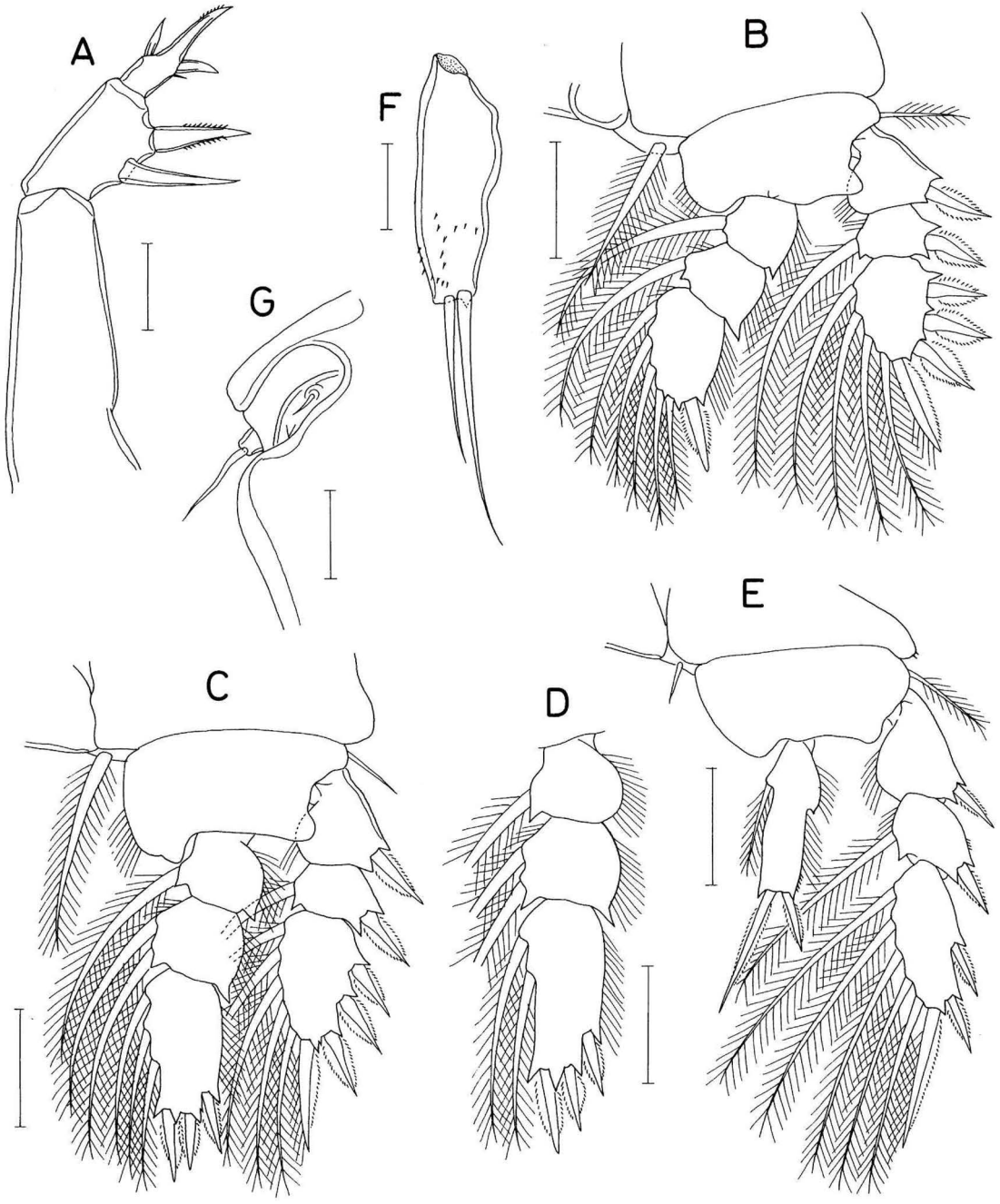

Fig. 12. *Kelleria robusta* n. sp., female. A, maxilliped; B, leg 1; C, leg 2; D, endopod of leg 3; E, leg 4; F, exopod of leg 5; G, genital aperture. Scale bars: A, F, G, 0.05 mm; B–E, 0.1 mm.

shorter than the second segment.

Kelleria robusta n. sp. may be distinguished from other species of *Kelleria* by its outstanding feature (the above feature 4), although two species *Kelleria propinqua* (Scott, 1894) and *Kelleria rubimaculata* Krishnaswamy, 1952 are not known of the ornamentation of the maxilliped setae. The latter two species are, however, not confusable with *Kelleria robusta* n. sp., because they have leg 5 in which the exopodal segment bears 2 distal spines (not setae as in the new species) and one or two cusps or processes on the inner margin (Krishnaswamy, 1952; Scott, 1984).

It is notable that the ornamentation of the setae on the basis of the maxilliped is consistent within a species of *Kelleria*.

***Kelleriella* n. gen.**

Diagnosis (female). Kelleriidae. Body cyclopiform. Urosome 5-segmented. Caudal ramus with 6 setae. Rostrum distinct. Antennule 7-segmented, with armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc. Antenna 4-segmented; armature formula 1, 1, 3, and 6 + claw; distal claw strong and recurved. Labrum with tapering posterolateral lobes. Mandible slender, with elongate distal lash, spinulose inner margin, denticulate outer margin, and tuft of spinules on proximal convex side of gnathobase. Maxillule lobate, armed with 4 setae. Maxilla consisting of large, unarmed syncoxa and smaller basis; basis with 3 setae including spiniform inner seta, short spiniform distal lash, and few spines along distal margin. Maxilliped 3-segmented; first segment (syncoxa) unarmed; second segment (basis) with 2 spiniform setae; third segment (endopod) small, bearing 1 claw and 2 setiform elements. Legs 1–3 with 3-segmented rami. Leg 4 with 3-segmented exopod and 1-segmented endopod. Armature formula for leg 1–4 as in *Kelleria*, except third exopodal segment of leg 4 bearing 4 spines and 5 setae (formula III, I, 5, instead of II, I, 5 of *Kelleria*). Legs 5 and 6 similar to those of *Kelleria*.

Type species. *Kelleriella quadridens* n. gen. n. sp. by monotypy.

Etymology. The generic name is the combination of *Kelleria*, the type genus of the family, and *-ella*, a Latin diminutive suffix. Gender feminine.

Remarks. *Kelleriella* n. gen. is here treated as a genus of the family Kelleriidae, based on its following features: (1) the mandible has a tuft of thin spinules on the outer side at the base of the gnathobase, as usual for the type genus, *Kelleria*; (2) the genital aperture is large, with a posterolaterally displaced seta; (3) the basis (distal segment) of the maxilla has a short, spiniform distal lash and large spines along distal margin; and (4) the endopod of leg 4 is 1-segmented (as in the families Macrochironidae and Pseudanthessiidae) and bears an inner seta (unlike the latter two families).

The Kelleriidae has been a monotypic family consisting of 21 species of *Kelleria*, all of which have the uniformed antenna and armature formula of leg 4. In the antenna of this genus the second endopodal segment is armed with 1 setiform claw plus 2 setae, and the third endopodal segment with 2 setiform claws plus 5 setae. In leg 4 of *Kelleria* the third exopodal segment is armed with 3 spines plus 5 setae (formula II, I, 5). In contrast, the antenna of *Kelleriella quadridens* n. gen. n. sp. is armed with 3 simple setae on the second endopodal segment and 1 powerful claw plus 6 setae on the third endopodal segment, and its third exopodal segment of leg 4 is armed with 4 spines plus 5 setae (formula III, I, 5). Due to these armature conditions in the antenna and leg 4 exopod, the new species cannot be placed within the genus *Kelleria*. According to Humes & Boxshall (1996), the female maxilliped of the Kelleriidae exhibits a key character of the family, in which the third segment (endopod) bears four discrete setation elements. Thus, the maxilliped of the new genus is unusual for the Kelleriidae in bearing 1 claw plus 2 setiform elements on the third segment (endopod). On the basis of the above characteristic features of *Kelleriella quadridens* n. gen. n. sp. revealed in the antenna, leg 4, and female maxilliped, the new genus *Kelleriella* is established to accommodate the new species.

***Kelleriella quadridens* n. gen. n. sp. (Figs. 13, 14)**

Material examined. 6 ♀♀ from washings of invertebrates collected by SCUBA, Phu Quoc Island, Vietnam, 10°18′10.64″N, 103°51′20.18″E, 13 December 2016, J. Lee. Holotype (♀, MABIK CR00247454) and paratypes (3 ♀♀, MABIK CR00247455) have been deposited in the Marine Biodiversity Institute of Korea (MABIK), Seocheon, Korea. Dissected paratypes (2 ♀♀) are retained in the collection of IHK.

Female. Body (Fig. 13A) moderately broad. Body length 1.08 mm. Prosome fusiform, 754 × 505 μm. Cephalosome and first pedigerous somite divided by faint dorsal suture line. First and second pedigerous somites with angular posterolateral corners. Urosome (Fig. 13B) stout, 5-segmented. Fifth pedigerous somite 149 μm wide, as wide as genital double-somite. Genital double-somite wider than long (123 × 147 μm), with wider proximal half and narrower distal half; genital apertures large, positioning dorsally. Abdomen gradually narrowing distally. Three free abdominal somites 42 × 98, 38 × 89, and 45 × 84 μm, respectively. Caudal ramus (Fig. 13C) 2.0 times longer than wide (68 × 34 μm), with tapering distal margin, armed with 6 setae; outer and dorsal setae (seta II and VII) naked, other setae pinnate; outer seta positioning at 67% region of outer margin length.

Rostrum (Fig. 13D) strongly tapering, wider than long, with round distal apex. Antennule (Fig. 13E) gradually narrowing distally, 7-segmented; armature formula 4, 13, 6, 3, 4 + aesthetasc, 2 + aesthetasc, and 7 + aesthetasc; setae thin and naked; aesthetascs setiform; 4 setae (1 on second, 2 on fourth, and 1 on terminal segments) markedly long. Antenna (Fig. 13F) 4-segmented, consisting of coxobasis and 3-segmented endopod; armature formula 1, 1, 3, and 6 + claw; terminal (third endopodal) segment 2.3 times longer than wide (83 × 36 μm), with convex inner margin, ornamented with patch of spinules on subdistal inner surface; terminal claw (Fig. 13G) strong, recurved, with broadened proximal third; all setae on segments naked.

Labrum (Fig. 13H) with divergent, tapering posterolateral lobes and deep posteromedian incision. Mandible (Fig. 13I) with slender, elongate, spinulose distal lash,

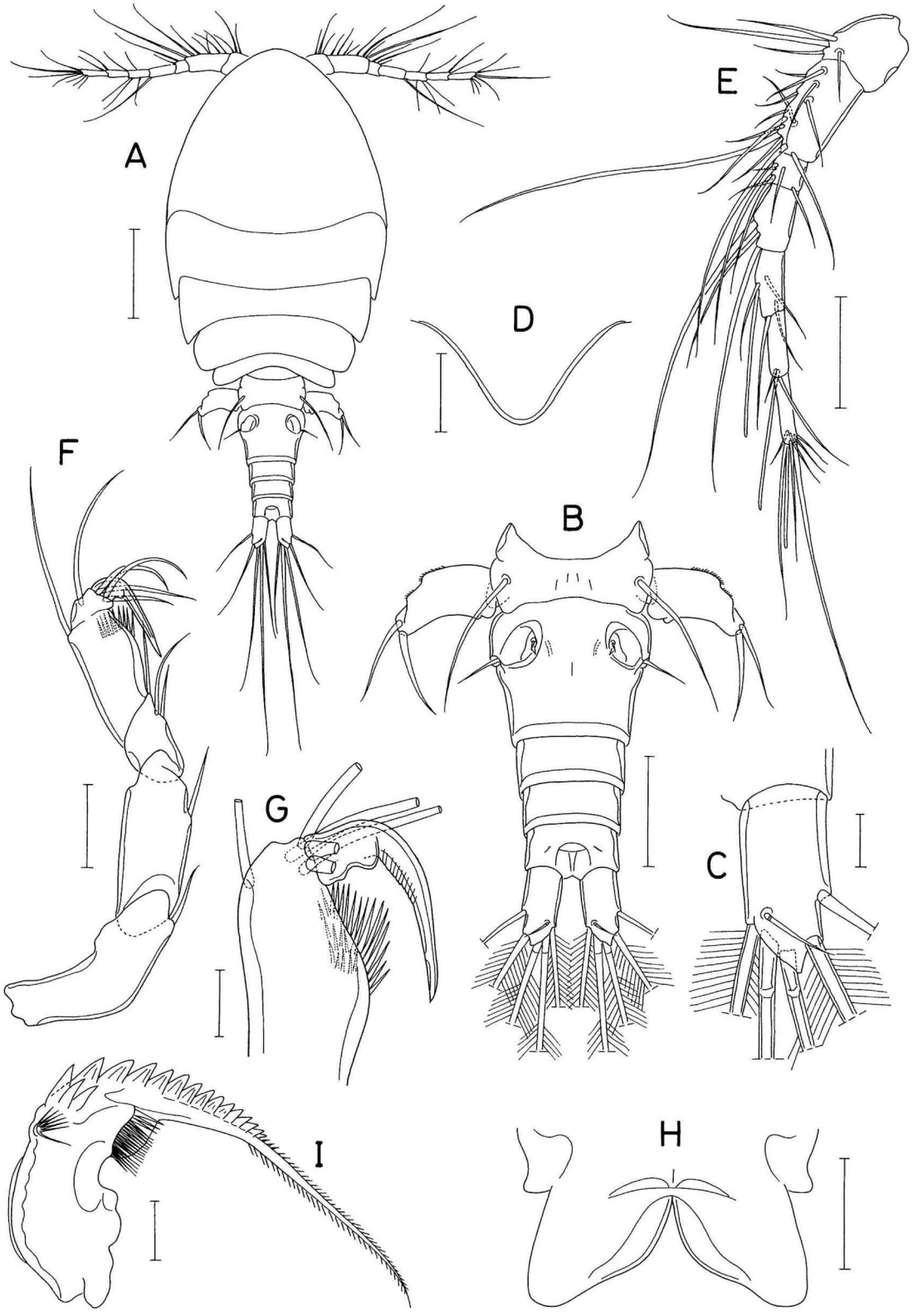

Fig. 13. *Kelleriella quadridens* n. gen. n. sp., female. A, habitus, dorsal; B, urosome, dorsal; C, right caudal ramus, dorsal; D, rostrum; E, antennule; F, antenna; G, distal part of antenna; H, labrum; I, mandible. Scale bars: A, 0.2 mm; B, E, 0.1 mm; C, G, I, 0.02 mm; D, F, H, 0.05 mm.

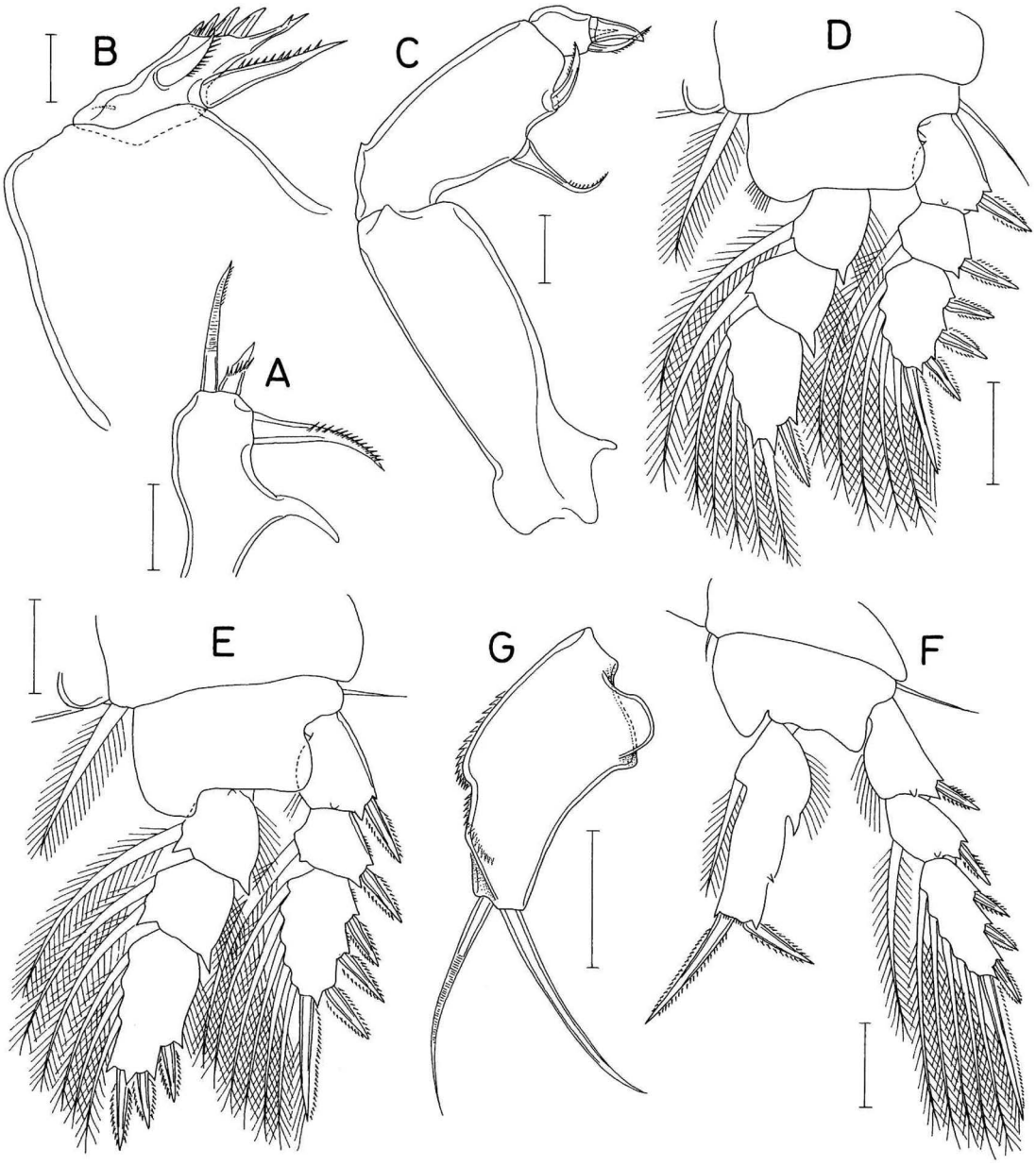

Fig. 14. *Kelleriella quadridens* n. gen. n. sp., female. A, maxillule; B, maxilla; C, maxilliped; D, leg 1; E, leg 2; F, leg 4; G, exopod of leg 5. Scale bars: A–C, 0.02 mm; D–G, 0.05 mm.

thin spinules (distal 3 of them thicker) along inner margin, tuft of 7 needle-like spinules on outer side near base of gnathobase, followed by 3 transversely arranged leaf-like spinules and row of about 13 teeth along outer margin. Maxillule (Fig. 14A) lobate and armed with 4 elements including 2 unequal apical setae (longer outer and shorter, spiniform inner), 1 large inner subdistal spiniform seta, and 1 setiform inner process. Maxilla (Fig. 14B) 2-segmented; proximal segment (syncoxa) large, markedly broadened, but unarmed; distal segment (basis) with short, thin, spiniform distal lash bearing 1 small denticle on its distal margin, 4 spines along distal margin, large spiniform inner seta (seta I) bearing spinules along its distal margin, broad anterior seta (seta II) bearing spinules along its inner margin, and rudimentary proximal seta (seta III). Maxilliped (Fig. 14C) 3-segmented; first segment (syncoxa) elongate, but unarmed; second segment (basis) bearing 2 spiniform setae, longer proximal one of them distally thin, curved; small third segment (endopod) with 1 slender seta, 1 shorter spinule-like seta, and 1 stout, basally articulated claw.

Legs 1–3 with 3-segmented rami (Fig. 14D, E). Leg 3

similar to leg 2, except bearing 3 spines and 2 setae (formula I, II, 2) on third endopodal segment. Leg 4 (Fig. 14F) with 3-segmented exopod and 1-segmented endopod; third exopodal segment armed with 4 spines and 5 setae; endopodal segment 2.62 times longer than wide (118 × 45 μm), bearing 2 cusps on outer margin (large, claw-like proximal and small spinule-like distal ones), armed with 2 distal spines and 1 inner seta; 2 distal spines 47 (outer spine) and 81 μm long (inner one), respectively; inner seta not extending to distal margin of segment. Outer seta on basis of legs 1−4 naked. Inner coxal seta of leg 4 minute, naked. All other seta on legs 1−4 pinnate. Armature formula for legs 1−4 as follows:

	Coxa	Basis	Exopod	Endopod
Leg 1	0-1	1-0	I-0; I-1; III, I, 4	0-1; 0-1; I, 1, 4
Leg 2	0-1	1-0	I-0; I-1; III, I, 5	0-1; 0-2; I, II, 3
Leg 3	0-1	1-0	I-0; I-1; III, I, 5	0-1; 0-2; I, II, 2
Leg 4	0-1	1-0	I-0; I-1; III, I, 5	0, II, 1

Leg 5 (Fig. 13B) consisting of large, naked dorsolateral seta on fifth pedigerous somite and 1-segmented, free exopod; exopodal segment (Fig. 14G) directed laterally, slightly curved, 2.0 times longer than wide (102 × 51 μm), consisting of broader proximal three-fifths and narrower distal two-fifths, armed distally with 2 naked setae, ornamented with spinules along convex outer margin; 2 distal setae comprising spiniform inner one (86 μm long) and wrinkled, setiform outer one (84 μm long). Leg 6 represented by 1 minute seta, 1 minute spinule, and 1 naked laterally displaced seta in genital aperture (Fig. 13B).

Male. Unknown.

Etymology. The specific name is a combination of the Latin words *quadr* (= four) and *dens* (= tooth), alluding to the presence of the four teeth on the distal margin of the maxillary endopod. Gender feminine.

Acknowldgements

We are grateful to Dr. Jimin Lee, Korea Institute of Ocean Science & Technology, for providing us with copepod specimens that she collected in Micronesia and the Philippines. The field work for this study was made possible by support from the Korea Institute of Ocean Science and Technology (KIOST).

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Submitted: June 10, 2021
Revised: August 3, 2021
Accepted: August 3, 2021