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NEW CUMACEA (CRUSTACEA: PERACARIDA) FROM SHALLOW WATERS OF INDONESIA

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Key words: Crustacea, Cumacea, Bodotriidae, Nannastacidae, Diastylidae, Indonesia

ABSTRACT

Six new species of Cumacea from Indonesia are described: *Campylaspis calmani* n.sp., *Cumella alinae* n.sp., *C.bunakenensis* n.sp, *Nannastacus antipai* n.sp., *N. mitreae* n.sp. and *Paradiastylis bunakenensis* n.sp. The description of *Iphinoe insolita* Petrescu,1992 is completed. All these Indonesian species are related with Japanese and Australian species.

INTRODUCTION

The "Grigore Antipa" Museum of Natural History at Bucharest, Romania, organized a scientific expedition in Indonesia in 1991. Marine fauna was collected from shallow waters (1-8 m depth, among corals) at several islands: Kalimantan, Sulawesi, Bunaken, Pari and Bali (Fig.1).

Cumacea were among the most abundant groups of Peracarida, especially Amphipoda, in that material. Seven new species were identified. This is the third contribution to the knowledge of the Indonesian Cumacea, focussed on the poorly known shallow-water fauna. The previous two (Calman,1905, based on Siboga expedition material, and Jones,1969) were dedicated to deep sea Cumacea. However, all these studies covered only a small part of the huge and very interesting fauna of this archipelago.

The type material is deposited in the collections of the "Grigore Antipa" Museum of Natural History (GAMNH), of the Research and Development Centre for Biology, Dept. of Zoology at Bogor, Indonesia (RDCCB) and of the Zoological Museum, Dept. of Crustacea, of the University of Amsterdam, the Netherlands (ZMA).

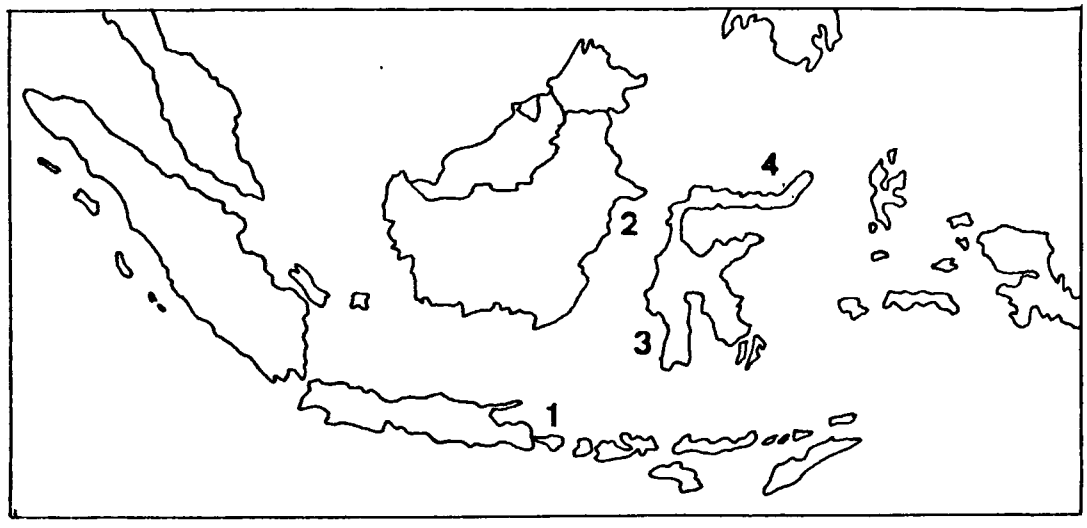

Fig. 1. Map of Indonesia showing collecting localities: 1. Bali, 2. Bontang (Kalimantan), 3. Baru (Sulawesi), 4. Bunaken Isl. (Sulawesi).

SYSTEMATIC DESCRIPTIONS

Family Bodotriidae

Iphinoe insolita Petrescu, 1992 (Figs. 2-5).

MATERIAL

Holotype: male, GAMNH CUM 372; allotype: female, GAMNH CUM 373;
paratypes: 2 ♀♀ (Bunaken stat.9) GAMNH CUM 374; 1♂ (Bunaken stat. 25) GAMNH CUM 375; 3 ♀♀, 1♂ (Bunaken stat. 28) RDCBB; 5 ♀♀, 12♂ (Bunaken stat.30) GAMNH CUM 376; 14 ♀♀, 8 ♂♂, 13 juv. (Bunaken stat. 31) GAMNH 377; 14 ♀♀ , 8 ♂♂ (Bunaken stat.31) ZMA Cu.201.673; 1 ♀, 2 ♂♂ (Bunaken stat.13) GAMNH CUM 378; 12 ♀♀ , 10 ♂♂ (Bunaken stat.21) RDCBB; 4 ♀♀ , 4 ♂♂, 7 juv. (Bunaken stat.18) RDCBB.

TYPE LOCALITY

Bunaken Island, stat. 9, North of Sulawesi, Indonesia, shallow water, 1-5 m, sand among corals, 13.IV.1991.

DESCRIPTION

Male (Figs. 2-3): Body elongated with scaled integument. Length: 3.5 mm (Fig. 2A). Carapace with 4-5 dorsal denticles on the eyelobe (Fig. 2A), 1/5 of the body length; length : height ratio = 1.4 : 1 (without pseudorostrum). Eyelobe with 7 marginal lenses and 4 smaller ones in the middle of the pigmented area. Accessory flagellum of antennule with 1 article, smaller than the first article of the main flagellum. Main flagellum has 2 basal well-developed articles and few more distal ones (9 in the holotype); 2nd basal article bearing aesthetascs. Antenna (Fig. 2C-D) with 3rd article of peduncle much longer than the others; main flagellum with 16 articles; each article with a groove and a pair of spines on its edges (absent on the last 2 articles); many setae on the inner margin, not exceeding the 4th pereonite in length. Mandible with 12 sensory spines and well-developed pars molaris, equally developed for both sexes. Maxilliped 1 (Fig. 2E) with 2 parallel rows of denticles on outer margin of carpus. Maxilliped 3 (Fig. 2G) with basis longer than half of the maxilliped and with a distal process bearing 2 long feathered setae; dactyl with subequal claw. Pereopod 1 (Fig. 2H) with

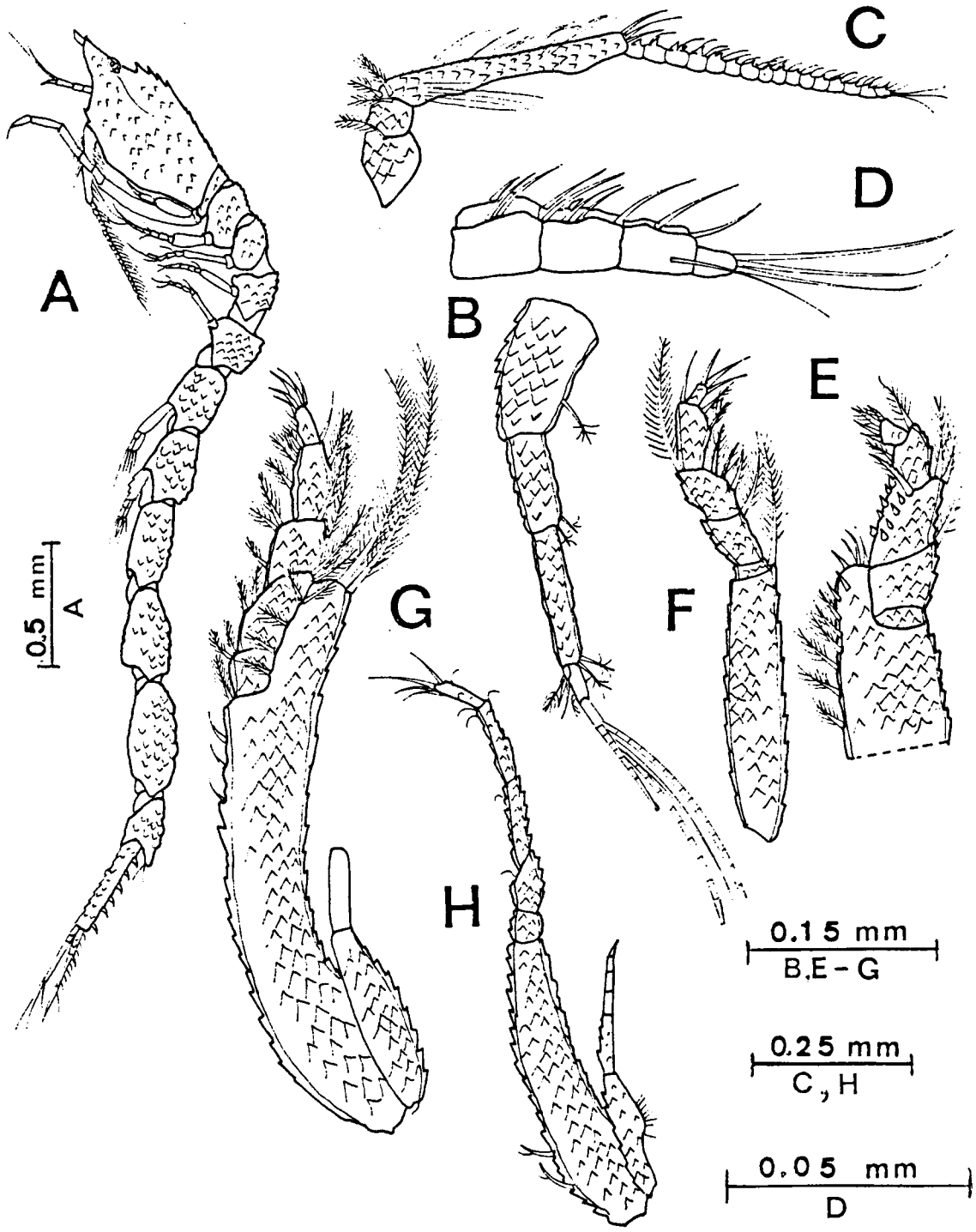

Fig. 2. *Iphinoe insolita* Petrescu, 1992, holotype male, A. body, lateral view; B. antennule; C. antenna; D. tip of antenna, enlarged; E. maxilliped 1; F. maxilliped 2; G. maxilliped 3; H. pereopod 1.

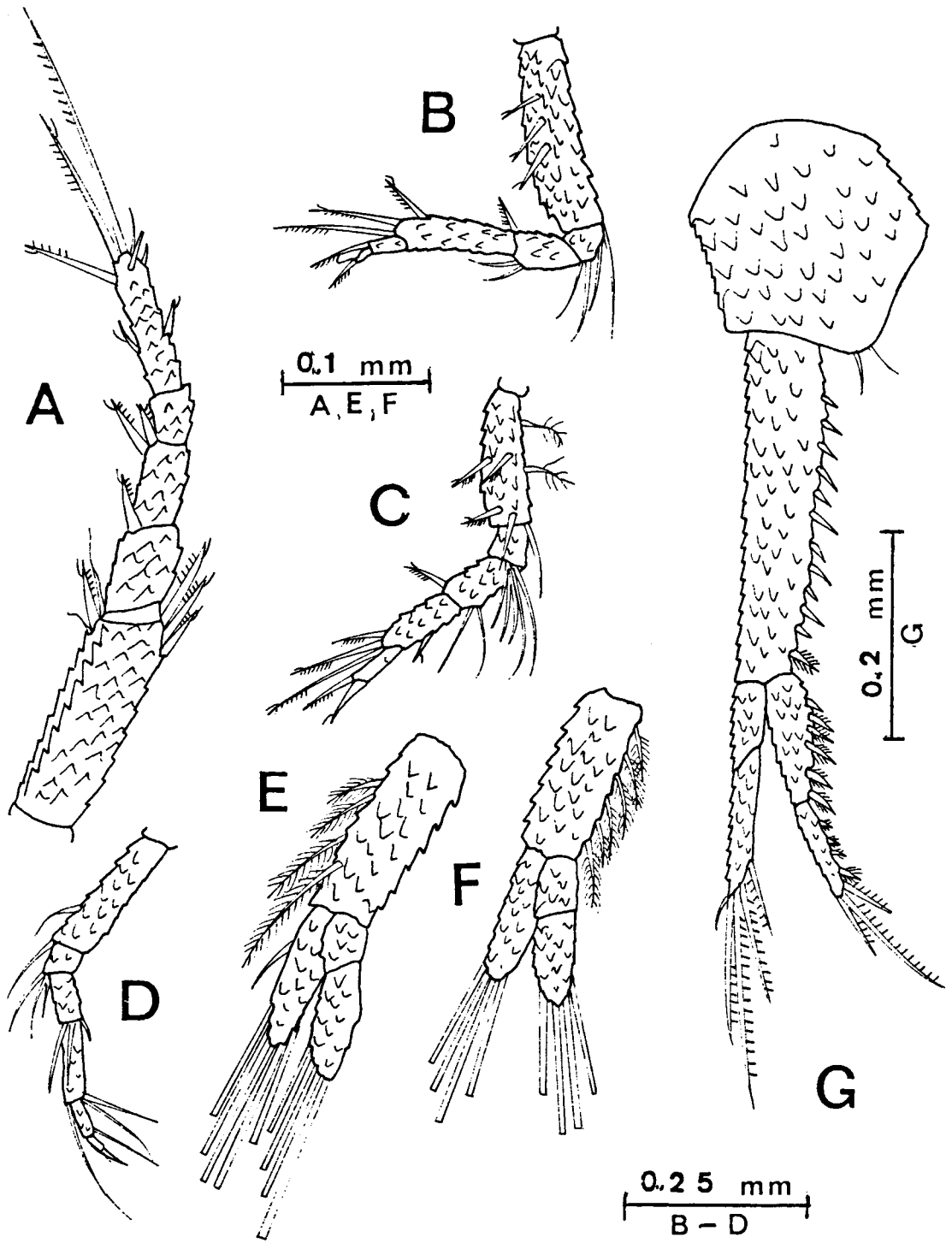

Fig. 3. *Iphinoe insolita* Petrescu,1992, holotype male, A. pereopod 2; B. pereopod 3; C. pereopod 4; D. pereopod 5; E. pleopod 1; F. pleopod 2; G. left uropod.

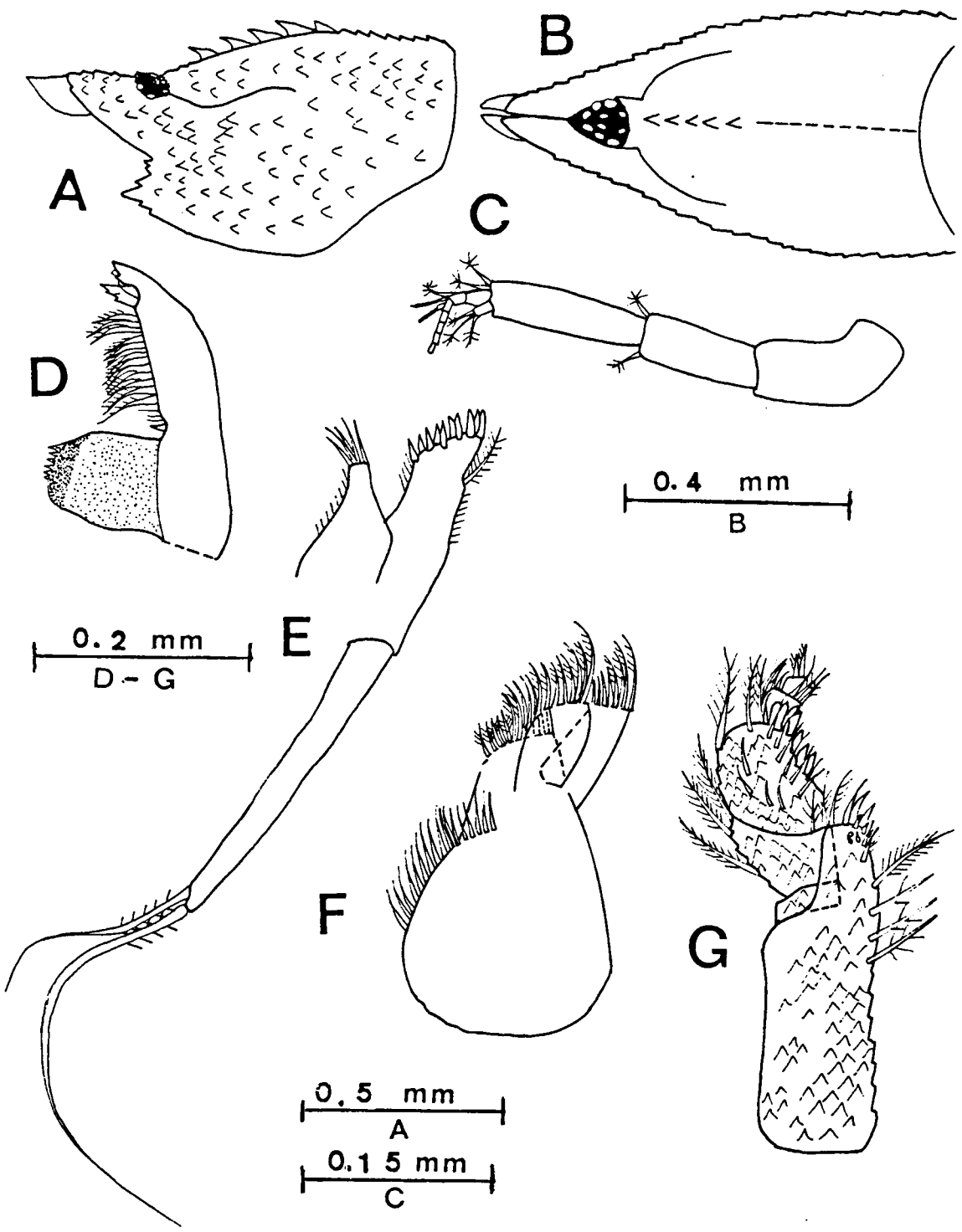

Fig. 4. *Iphinoe insolita* Petrescu,1992, allotype female, A. carapace, lateral view; B. carapace, dorsal view; C. antennule; D mandible; E. maxilla 1; F. maxilla 2; G. maxilliped 1.

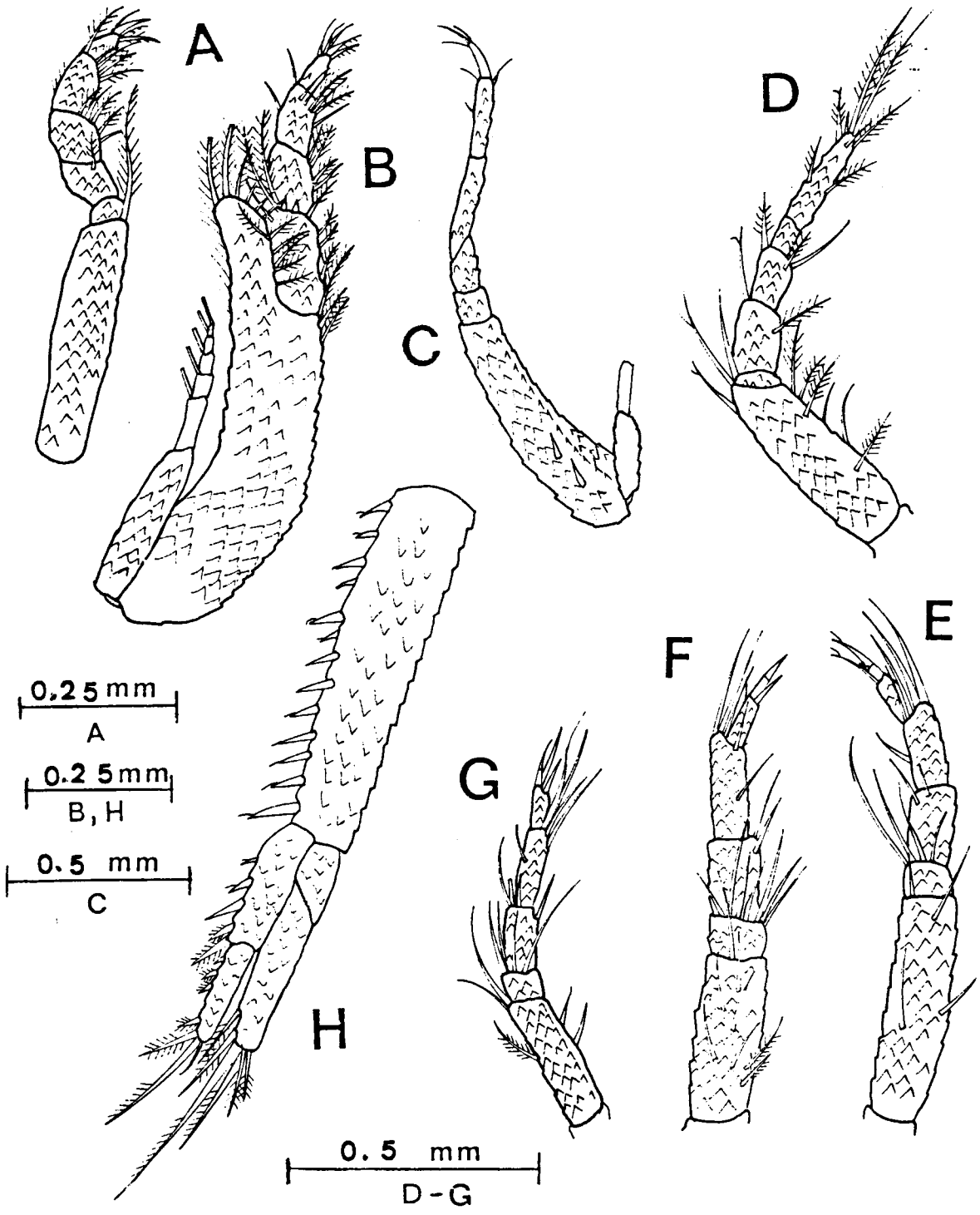

Fig. 5. *Iphinoe insolita* Petrescu, 1992, allotype female, A. maxilliped 2; B. maxilliped 3; C. pereopod 1; D. pereopod 2; E. pereopod 3; F. pereopod 4; G. pereopod 5; H. right uropod.

basis equal to half of total length of leg; 2 spines on its outer margin; carpus and propodus equal in length; short dactylar claw. Pereopod 2 (Fig. 3A) with basis shorter than half of the total length leg, with 2 sensory short spines on the outer distal corner and 1 on the inner one; ischium with only 1 inner spine; merus with outer spine; carpus with 2 unequal spines no longer than propodus; dactyl with 2 long subterminal spines flanking terminal seta (seta longer than dactyl) and with a pair of lateral spines; no exopod. Pereopod 3 (Fig. 3B) with 3 spines on the basis. Pereopod 4 (Fig. 3C) with 4 spines on basis. Pereopod 5 (Fig. 3D) without spines. Pleopods 1 and 2 (Fig. 3 E-F) fully developed with scaly integument. Uropod (Fig. 3G) with peduncle longer than the last pleonite (ratio = 1.4 : 1) and its rami (ratio = 1.57 : 1); 12 short spines on its inner margin; exopod shorter than endopod; it bears 4 serrated terminal setae; endopod with almost equal articles; proximal article with 6 spines on the inner margin and with an inflated basis; distal article narrower than proximal one, with 5 spines, a longer subterminal spine and a seta on the inner margin, and a terminal spine shorter than the seta of the exopod.

Female (Figs. 4-5): Body length: 3.7 mm. Carapace (Fig. 4 A-B) with 5 mid-dorsal teeth, stronger than in male. Mandible and maxillae (Fig. 4D-F) similar in both sexes. Maxilliped 1 (Fig. 4G) with 3 strong spines, 2 shorter ones and 2 short and curved spines on the outer distal process of basis; carpus with 6 spatulate spines. Maxilliped 3 (Fig. 5B) with 2 short spines on merus. Pereopod 2 (Fig. 5D) with pectinated spine on outer corner of carpus; dactyl with terminal seta not longer than itself. Pereopods 3 and 4 without spines and pereopods 2-5 without exopods. Uropod (Fig. 5H) with the spine on peduncle longer than in male; rami subequal and similar to male rami.

ETYMOLOGY

The name of this species refers to the shape of the antenna and to the reduced number of pleopods in the male, which is uncommon for the genus (from the Latin *insolita,-a,-um* = unusual).

REMARKS

Iphinoe insolita Petrescu differs from the other species of *Iphinoe* from South-East Asia and Australia with dorsal teeth on the carapace (*I. calmani* Fage, 1945; *I. ischnura* Zimmer, 1952; *I. sagamiensis* Gamo,1958 and *I. tenera* Lomakina, 1960) by: stronger dorsal teeth on the carapace, fewer than in *I. calmani, I. ischnura* and *I. tenera,* but more than in *I. sagamiensis;* proximal article of uropodal endopod longer, with fewer setae and spines on the uropodal rami. The male of *I. insolita* has two features uncommon for *Iphinoe* but more related to other genera: antenna more adapted for grasping the female, like in the genera *Spilocuma (Mancocuminae), Heterocuma* (Vaunthompsoniinae) and *Coricuma* (Bodotriinae together with *Iphinoe*). The reduced number of pleopods is also similar to that seen in *Spilocuma, Heterocuma* and *Coricuma.*

Family Nannastacidae

Campylaspis calmani n.sp. (Figs. 6-7)

MATERIAL

Holotype: female GAMNH CUM 379; allotype: male GAMNH CUM 380; 1 ♀ (Bunaken stat .6) GAMNH CUM 381; 1♂ (Bontang, Kalimantan stat. 6) GAMNH CUM 382; 1♂ (Bontang, Kalimantan stat. 6) ZMA Cu.201570; 3 ♀♀, 1♂ (Bontang stat.8) GAMNH CUM 383; 3 ♀♀ (Bontang stat. 8) ZMA Cu 201571; 2 ♀♀, 1♂ (Bontang stat. 10) RDCBB; 1 ♀ (Bontang stat. 12) GAMNH CUM 384; 1 ♀ (Bontang stat. 4) GAMNH CUM 385.

TYPE LOCALITY

Bontang, East of Kalimantan, Indonesia, shallow waters, 4 m depth, sand and algae, between living corals.

DESCRIPTION

Female (Fig.6): Body slightly elongated, with strong calcified integument. Length: 1.7 mm. Carapace (Fig. 6 A-B) approximately half of total

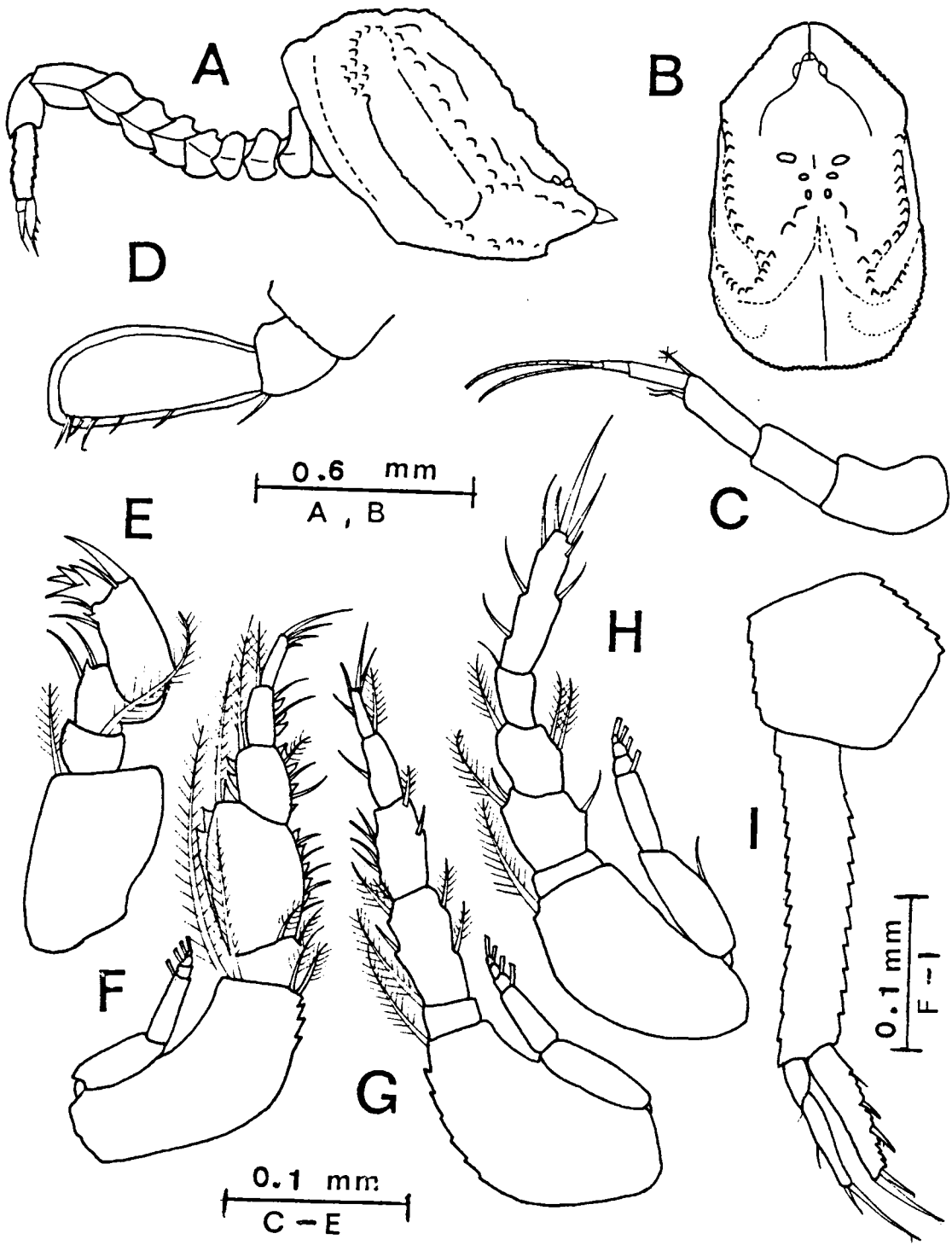

Fig. 6. *Campylaspis calmani* n.sp., holotype, female, A. body, lateral view; B. carapace, dorsal view; C. antennule; D. maxilliped 1; E. maxilliped 2; F. maxilliped 3; G. pereopod 1; H. pereopod 2; I. left uropod.

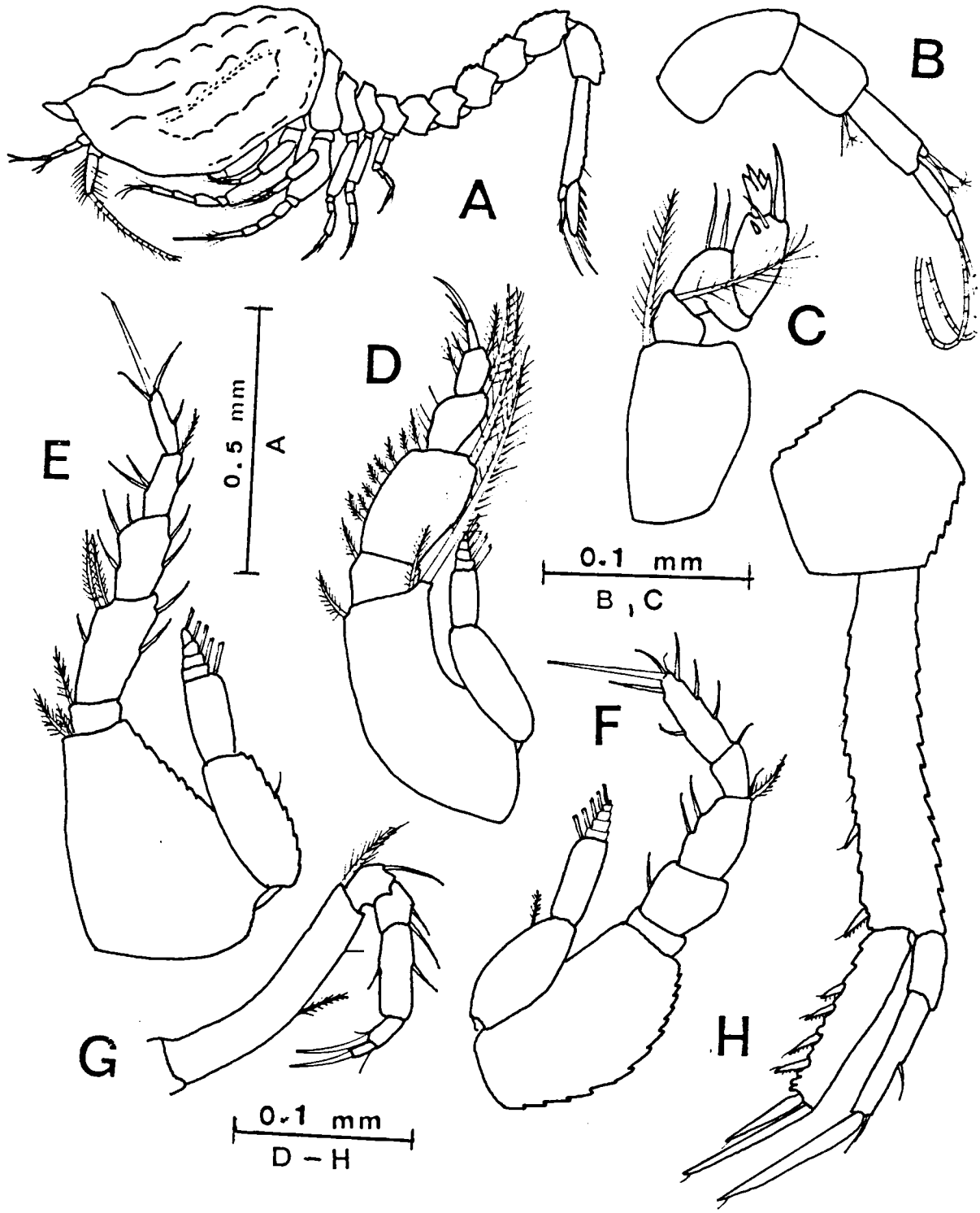

Fig. 7. *Campylaspis calmani* n.sp., allotype, male, A. body, lateral view; B. antennule; C. maxilliped 2; D. maxilliped 3; E pereopod 1; F. pereopod 2; G. pereopod 5; H. right uropod.

body length; 2 median dorsal well-developed prominences; 3 pairs of lateral ones and 2 rows of tubercles delimiting a sulcus on each side of carapace; upper row of tubercles delimits also a dorsal plateau; 3 pairs of translucent areas on the plateau. Eyelobe with 4 lenses. Maxilliped 3 (Fig. 6F), basis shorter than 1/2 of total length, without distal process; 2 plumose long setae on the distal inner corner; merus (the most developed article excepting the basis) with 6 denticles and hairs on the outer margin and a serrated inner margin with 3 teeth; carpus with 4 teeth on the outer margin and 2 on the inner one; propodus shorter than carpus, bearing 3 teeth on the outer margin. Pereopod 1 (Fig. 6G) with massive basis shorter than half of the total length; merus longer than carpus; carpus longer than propodus; propodus longer than dactyl; dactyl bears seta longer than itself. Pereopod (Fig. 6 H) with broadened articles; basis the longest of them, but shorter than half of the leg, with only simple and feathered setae; carpus with a feathered seta longer than propodus; dactyl 2 x longer than propodus. Uropod (Fig. 6I) has peduncle almost 2 x longer than the last pleonite and its rami (ratio = 1.8 :1); rami subequal; exopod with one seta and a terminal spine longer than spine of endopod; endopod with a serrated inner margin (like peduncle), bearing 3 spines with a longer terminal one.

Male (Fig. 7): Antenna has the typical shape for an adult male with a developed flagellum (14 articles) somewhat exceeding the length of carapace. Maxilliped 2 (Fig. 7C) with simple and feathered setae instead of spines on merus, carpus and propodus. Pereopod 1 (Fig. 7E) with basis stronger than in female. Pereopod 2 with less feathered setae. Pereopods 3 - 5 without exopods (Fig. 7A) like in female, which is unusual for an adult male as the antenna suggests. Uropod (Fig. 7H) with 2 spines on the inner margin of peduncle; exopod with a sensory spine stronger than in female; endopod bearing 4 spines on the inner margin as well as a subterminal one and a longer yet terminal spine.

ETYMOLOGY

The new species is dedicated to the memory of the renowned British specialist W.T. Calman, who was the first to study the cumaceans from Indonesia.

REMARKS

Campylaspis calmani n.sp. is closely related to *C. sinuosa* Gamo, 1960 from Japan in terms of the form of the carapace and maxilliped 3, but it differs with regard to the maxilliped 1 in having a very small distal article, pereopods 1 and 2 equal in length, carpus of pereopod 2 short and broad, dactyl without feathered setae, equal uropodal rami, and more spines on endopod. The male of *C. calmani* n.sp. is similar to *C. minor* Hale,1945 and *C. triplicata* Hale,1945 with regard to the shape of some appendages, but differs from *C. minor* in the tubercles of the carapace, and from *C. triplicata* in the form of the pereopod 2 and uropod.

Cumella alinae n.sp. (Figs. 8-9)

MATERIAL

Holotype: female GAMNH CUM 386; paratypes: 5 ♀♀ (Baru stat. 3) GAMNH CUM 387; 5 ♀♀ (Baru stat. 3) ZMA Cu. 201.572; 4 ♀♀ (Baru stat. 5) RDCBB.

TYPE LOCALITY

Baru, Western Sulawesi, Indonesia, 4 m depth, sand, 20.IV.1991.

DESCRIPTION

Glabrous integument. Body length:1.2 mm. Carapace (Fig. 8A-C) represents 1/3 of body length; length : height ratio = 1.3 : 1. It bears a dorsal keel formed by 33-35 denticles, which ends on the eyelobe; small denticles on the margins of pseudorostrum; eyelobe with 3 lenses (2 lateral pigmented lenses and a frontal one); carapace strongly laterally compressed. Antennule (Fig. 8D) with accessory flagellum smaller than

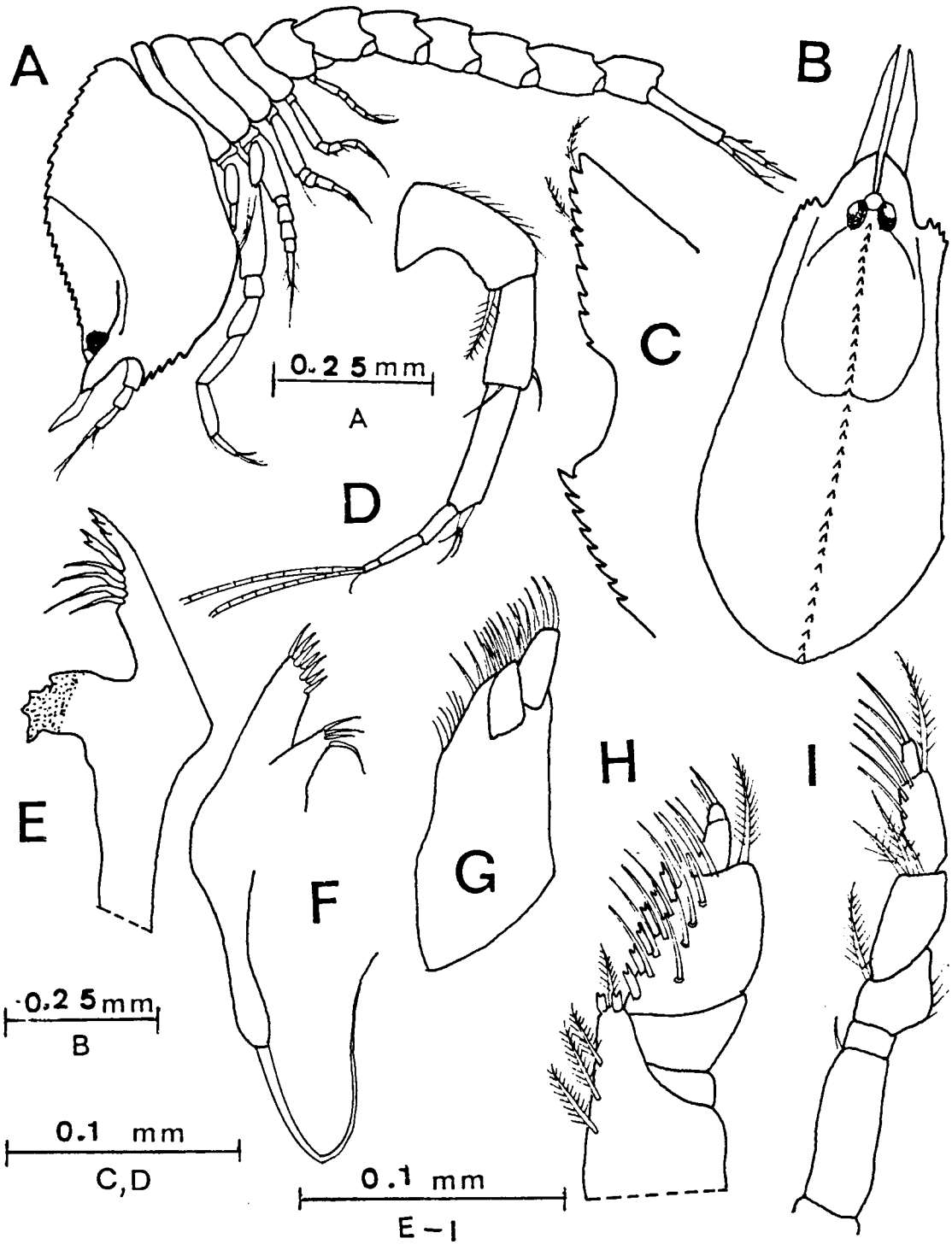

Fig. 8. *Cumella alinae* n.sp., holotype, female, A. body, lateral view; B. carapace, dorsal view; C. anterior margin of cara pace; D. antennule; E. mandible; F. maxilla 1; G. maxilla 2; H. maxilliped 1; I. maxilliped 2.

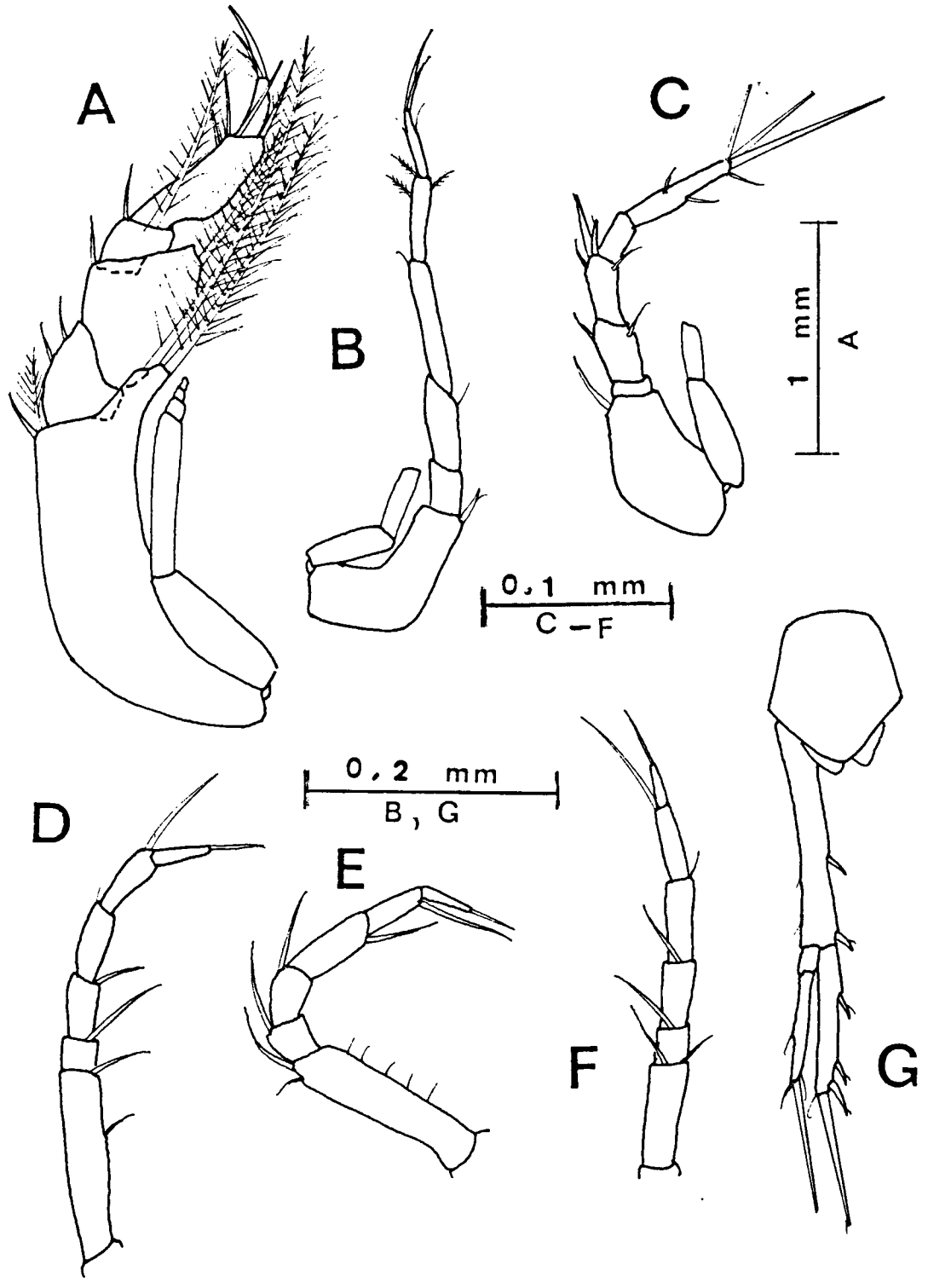

Fig. 9. *Cumella alinae* n.sp., holotype, female, A. maxilliped 3; B. pereopod 1; C. pereopod 2; D. pereopod 3; E. pereopod 4; F. pereopod 5; G. left uropod.

the first article of the main flagellum. Mandible (Fig. 8E) with 4 spines between pars incisiva and pars molaris. Maxilliped 1 (Fig. 8H) with 2 broadened bifid spines on the process of basis and another 6 bifid spines on the outer margin of carpus. Maxilliped 3 (Fig. 9A) with a curved basis, half of total length of maxilliped; distal inner process of basis with 2 long feathered setae; carpus 3 x shorter than merus and 2.5 x shorter than propodus; dactyl as long as its claw. Pereopod 1 (Fig. 9B) with curved basis, shorter than a third of total length of leg; all the articles thin and elongated; carpus longer than propodus; propodus longer than dactyl; dactylar claw a little longer than dactyl. Pereopod 2 (Fig. 9C) with basis longer than a third of total length of leg; 2 sensory spines in the distal corner of carpus, one of them longer than propodus; dactyl 3 x longer than propodus, with simple setae, 3 subterminal and a terminal one longer than dactyl. Pereopods 3-5 (Fig .9D-F) with short articles, without exopods. Pereopod 3 is the longest, pereopod 5 the shortest. Uropod (Fig. 9G) with thin peduncle longer than the last pleonite and its rami (ratio = 1.6 : 1); 2 sensory spines on the inner margin of peduncle; unequal rami; exopod a little shorter than endopod with short subterminal seta and a terminal one as long as exopod; endopod with 3 sensory spines on the inner margin, a short subterminal seta and a terminal sensory spine as long as endopod.

Etymology. — The new species is dedicated to the memory of the wife of Grigore Antipa, Alina Antipa, on the occasion of the 50th commemoration of her death (March 1944).

Remarks. — *Cumella alinae* n sp. is related to 2 species from the Japanese waters: *C. rigida* Gamo,1963 and *C. sadoensis* Gamo,1967 regarding the form of the carapace (especially to *C. rigida*). It differs in the glabrous integument, serrated antero-ventral margin of the carapace (versus right in *C. rigida*), 3 lenses on the eyelobe 2 of which are pigmented (versus 5 unpigmented ones in *C. rigida*), accessory flagellum of antennule with one article (2 in *C. rigida*), dactyl of maxilliped 3 with a seta instead of a strong claw as in *C. rigida*, pereopods 1 without hyaline teeth on basis, carpus of pereopod 2 with spines (seta in *C. rigida*), peduncle of uropods longer than the last pleonite (short in *C. rigida*), inner margins of uropodal peduncle and rami not serrated as in *C. rigida* and *C. sadoensis*.

Cumella bunakenensis n.sp. (Fig. 10)

MATERIAL

Holotype: female, GAMNH CUM 388.

TYPE LOCALITY

Bunaken Island, stat. 27, North Sulawesi, Indonesia, sand among living corals, 5 m depth, 15.IV.1991.

DESCRIPTION

Elongated body with glabrous integument, body length 1 mm. Carapace (Fig. 10A-C) longer than 1/3 of body length and longer than high (ratio = 1.5: 1), with 2 dorsal protuberances; anterior and antero-ventral margins characteristically serrated (Fig. 10C); fine ventral ridge oriented towards the ventral serration of its margin. Eyelobe with 6 unpigmented lenses (4 lateral and larger ones and 2 central smaller ones) (Fig. 10B). Peduncle of antennule (Fig. 10D) with thin articles, the distal one a little longer and with sensitive hairs on the process of 2nd and 3rd article; accessory flagellum with one article shorter than the first article of the main flagellum. Maxilliped 3 (Fig. 10E) with curved basis; carpus as long as propodus, but shorter than merus with 2 teeth on its inner margin, dactyl with 2 claws. Pereopod 1 (Fig. 10F) with basis longer than half of the total length of leg; with hyaline teeth on the inner margin; carpus as long as propodus; dactyl 2 x shorter than propodus. Pereopod 2 (Fig. 10G) with basis longer than a third of the total length of leg, without hyaline teeth; carpus with 2 setae one of them longer than the propodus; dactyl 2 x longer than propodus, with simple setae; exopod thin and elongated. Pereopods 3-5 with thin and long articles without exopods. Uropod (Fig. 10K) with

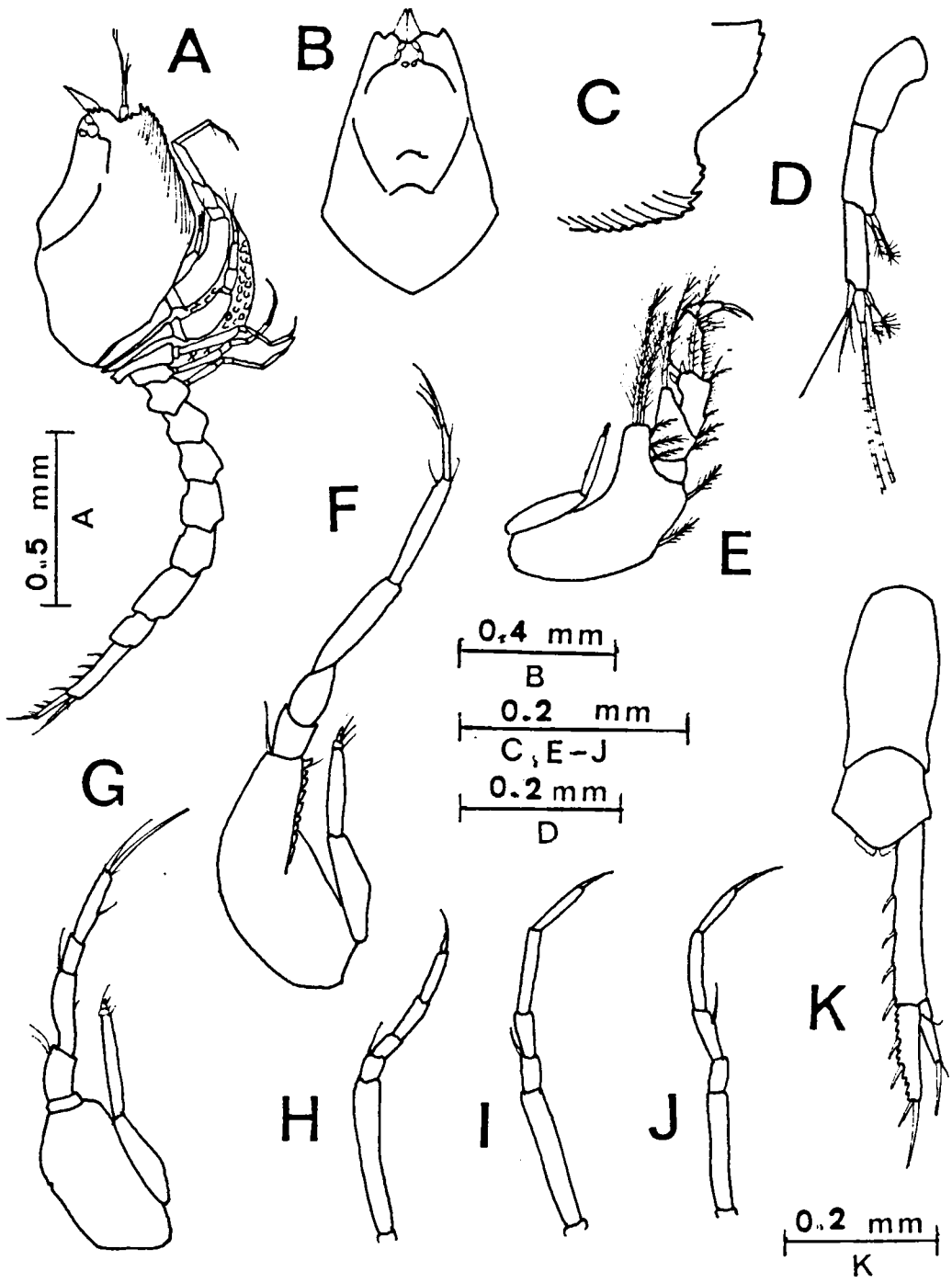

Fig. 10. *Cumella bunakenensis* n.sp., holotype, female, A. body, lateral view; B. carapace, dorsal view; C. antero-ventral margin of carapace; D. antennule; E. maxilliped 3; F. pereopod 1; G. pereopod 2; H. pereopod 3; I. pereopod 4; J. pereopod 5; K. right uropod.

thin peduncle 2 x longer than the last pleonite; with 4 long spines on its inner margin and also longer than rami; 2 x longer than endopod; exopod shorter than endopod; with a short subterminal seta and a long terminal one; endopod with serrated inner margin and 2 long spines, a subterminal and a terminal spine 2 x longer than the others, but shorter than endopod.

ETYMOLOGY

The species bears the name of the type locality - Bunaken Island, Indonesia.

REMARKS

This species is closely related to *C. sadoensis* Gamo (more closely related than to *C. alinae* n.sp.), especially regarding the form of the carapace, maxilliped 3, pereopod 2 and uropod. It differs in the form of the antero-ventral margin of the carapace, carpus of pereopod 2 as long as propodus (longer than propodus in *C. sadoensis*), pereopods 3-5 with thin articles and less hairs.

Nannastacus antipai n.sp. (Figs. 11-12)

MATERIAL

Holotype: female GAMNH CUM 389; allotype: male GAMNH CUM 390; paratypes: 10 ♀♀ (Bunaken stat. 7) GAMNH CUM 391; 1 ♀ (Bali) GAMNH CUM 392; 1 ♀ (Bontang stat. 1) GAMNH CUM 393; 5 ♀♀ (Bontang stat. 2) GAMNH CUM 394; 8 ♀♀ , 2 ♂♂ (Bunaken stat. 2) GAMNH CUM 395; 3 ♀♀ (Bunaken stat. 3) GAMNH CUM 396; 20 ♀♀ , 7 ♂♂ (Bunaken stat. 22) GAMNH CUM 397; 1 ♀ (Bunaken stat. 23) GAMNH CUM 398; 5 ♀ ♀ (Bunaken stat. 27) GAMNH CUM 399; 1 ♀ (Bunaken stat. 28) GAMNH CUM 400; 36 ♀♀, 2 ♂♂ (Bunaken stat. 29) GAMNH CUM 401; 1 ♀, 1♂ (Bunaken stat. 10) GAMNH CUM 402; 2 ♂♂ (Bunaken stat. 12) GAMNH CUM 403; 22 ♀♀, 8 ♂♂ (Bunaken stat. 31) GAMNH CUM 404; 24 ♀♀ (Bunaken stat. 32) GAMNH CUM 405; 9 ♀♀, 8 ♂♂ (Bunaken stat. 13) GAMNH CUM 406; 1 ♀ (Bunaken stat. 16) GAMNH CUM 407; 5 ♀♀, 3 ♂♂ (Bunaken stat. 25) RDCBB; 19 ♀♀, 7 ♂♂ (Bunaken stat. 17) GAMNH CUM 408; 20 ♀♀, 10 ♂♂ (Bunaken stat. 17) ZMA Cu. 201573; 2 ♀♀ (Bunaken stat. 18) GAMNH CUM 409.

TYPE LOCALITY

Bunaken Island, stat. 7, North of Sulawesi, Indonesia, sand among corals, 7 m depth, 13.IV.1991.

DESCRIPTION

Female (Fig. 11): Integument with small tubercles. Body length: 1.71 mm. Carapace (Fig. 11A-C) globular with 2 anterior protuberances and 2 posterior bigger ones; a strongly curved mid-dorsal spine; 3 pairs of spines on the posterior end of carapace; short and upturned pseudorostrum with serrated margins; anterior margin of carapace with 5 small tubercles and an antero-lateral process with 7 teeth-like tubercles. Eyelobe with a pair of eyes (each of which formed by 3 lenses); carapace is almost half of the total body length and longer than high. Pereon with serrated margins and a strong spine on the first pereonite and a pair of spines on the fifth one. Pleon with a pair of dorsal spines on pleonites 1 and 2 and a pair of denticles on pleonite 5 toward the last pleonite (Fig. 11J). Antennule (Fig. 11D) with first article of peduncle longer than the other two and with 3 long simple setae in the outer distal corner, median article with 3 sensory hairs on its inner process; small accessory flagellum. Maxilliped 3 (Fig. 11E) with propodus a little longer than carpus; dactyl with 2 claws as long as itself. Pereopod 1 (Fig. 11F) with basis longer than 1/3 of the total length of leg; integument with longitudinal rows of small tubercles and a hyaline crest of teeth on the inner margin; carpus as long as propodus; dactyl almost 2 x shorter than propodus; reduced exopod. Pereopod 2 (Fig. 11G) with basis almost half of the total length of pereopod; integument with rows of small tubercles and a hyaline crest of teeth on the inner margin; basis and carpus are the longest articles; carpus with 2 short setae; dactyl 1.5 x longer than propodus, with simple setae; curved exopod. Pereopod 3 with basis shorter

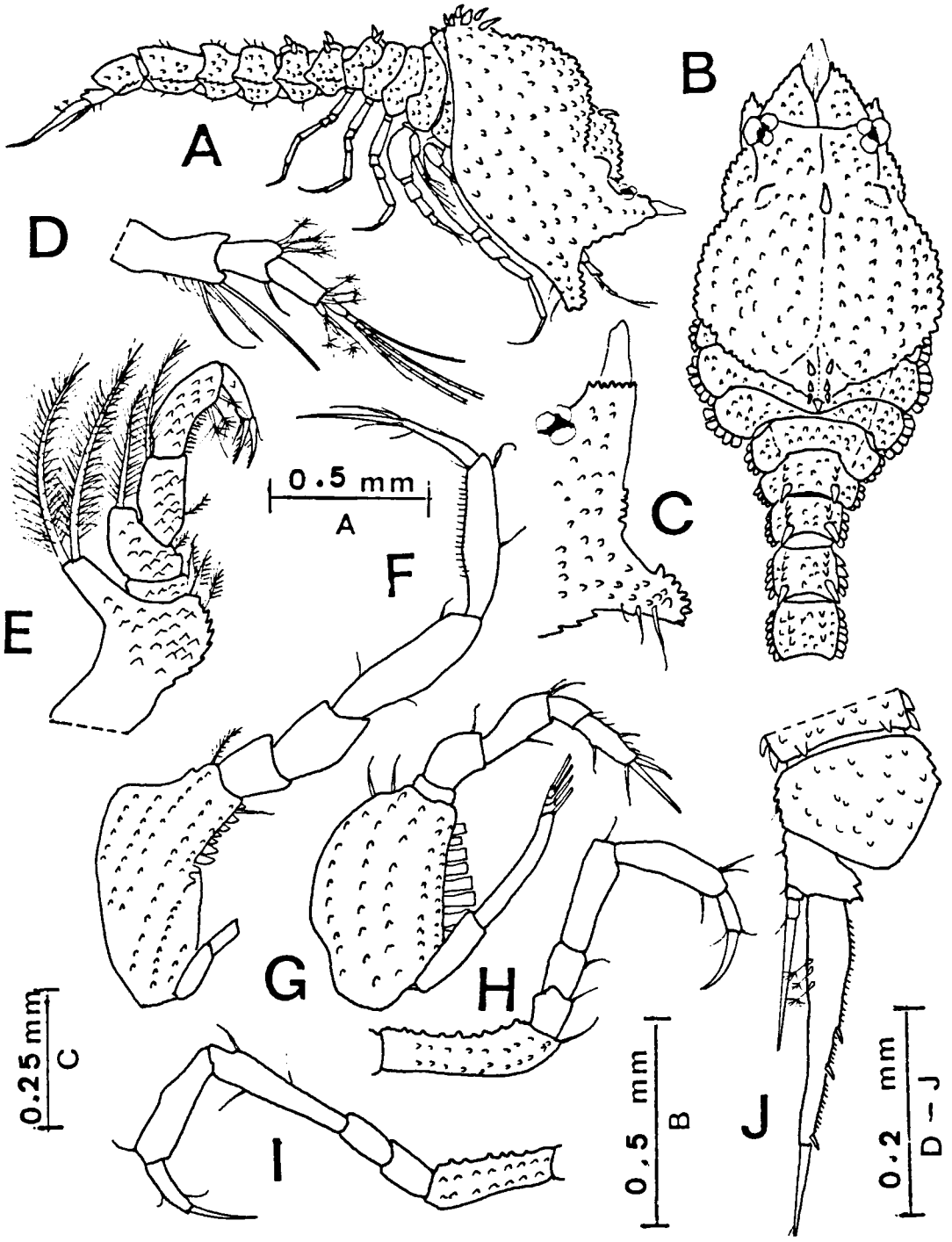

Fig. 11. *Nannastacus antipai* n.sp., holotype, female, A. body, lateral view; B, body, dorsal view; C. carapace, anterior part; D. antennule; E. maxilliped 3; F. pereopod 1; G. pereopod 2; H. pereopod 3; I. pereopod 5; J. left uropod.

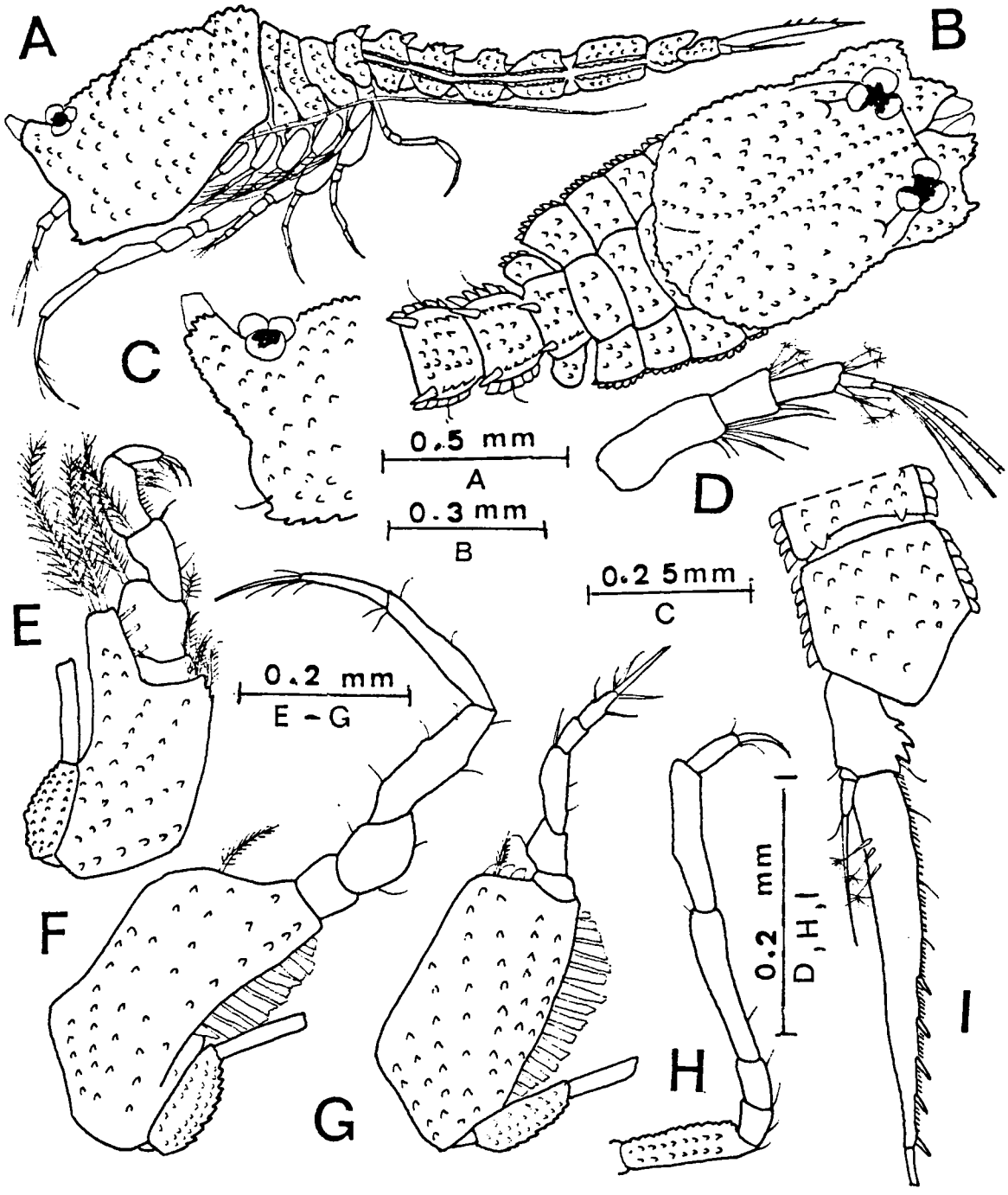

Fig. 12. *Nannastacus antipai* n.sp., allotype, male, A. body, lateral view; B. body, dorsal view; C. carapace, anterior part; D antennule; E. maxilliped 3; F. pereopod 1; G. pereopod 2; H. left uropod.

than 1/3 of the total length of the pereopod, with rows of small tubercles; carpus as long as propodus. Pereopod 5 with rows of tubercles on basis; carpus longer than propodus. Pereopods 3-5 without exopods. Uropod (Fig. 11J) with peduncle shorter than the last pleonite (ratio = 0.6 : 1) with a serrated inner margin and 2 teeth; endopod more than 7 x longer than exopod; exopod with a simple terminal seta; endopod with short hairs and 2 small spines on the inner margin; subterminal spine and a terminal one 2 x longer than endopod; 3 sensory hairs on the outer margin of endopod.

Male (Fig. 12): Body length:1.82 mm. Carapace (Fig. 12A-C) more rectangular with smaller dorsal prominences than in female and without dorsal spines. Only pereonite 5 with a pair of spines. Antenna (Fig. 12A) reaches pereonite 5. Pereopod 1 with a bulky basis (Fig. 12F) smaller than half of the total length of pereopod. Pereopod 2 with basis longer than half of the total length of the pereopod (Fig. 12G). Pereopod 5 with a shorter basis than in female.

ETYMOLOGY

The species is dedicated to the great Romanian biologist Grigore Antipa, former director of the museum that bears his name, on the occasion of the 50th commemoration of his death (March 1944).

REMARKS

Nannastacus antipai n. sp. is related to *N. inflatus* Hale,1945 from Australia with regard to the form of the body and the uropod. It differs in the spines of the carapace, pereon and pleon, antero-ventral process of carapace with tubercles, rows of tubercles on basis of all pereopods, the form of pereopod 1 in the female, spines of pereon and pleon, uropod with shorter and serrated peduncle in the male.

Nannastacus mitreae n. sp. (Figs. 13-14)

MATERIAL

Holotype: female GAMNH CUM 410; allotype: male GAMNH CUM 411; paratypes: 1♂ (Bunaken stat. 8) GAMNH CUM 412; 1 ♀ (Bunaken stat. 24) GAMNH CUM 413; 1 ♀ (Bunaken stat. 2) GAMNH CUM 414; 4 ♀♀ (Bunaken stat. 7) GAMNH CUM 415; 15 ♀♀, 2 ♂♂ (Bunaken stat. 20) GAMNH CUM 416; 20 ♀♀, 5 ♂♂ (Bunaken stat. 20) ZMA Cu. 201574; 13 ♀♀, 1♂ (Bunaken stat. 26) RDCBB; 3 ♀♀ (Bunaken stat. 27) GAMNH CUM 417; 3 ♀♀ (Bunaken stat. 30) GAMNH CUM 418; 3 ♀♀ (Bunaken stat. 31) GAMNH CUM 419; 12 ♀♀ (Bunaken stat. 10) GAMNH CUM 420; 2 ♀♀ (Bunaken stat. 13) GAMNH CUM 421; 1 ♀ (Bunaken stat. 15) GAMNH CUM 422; 4 ♀♀ (Bunaken stat.17) GAMNH CUM 423; 3 ♀♀ (Bunaken stat. 18).

TYPE LOCALITY

Bunaken Island, stat. 8, North Sulawesi, Indonesia, sand among living corals, 4 m depth, 14.IV.1991.

DESCRIPTION

Female (Fig.13): Tuberculated integument. Body length: 2.3 mm. Carapace (Fig. 13A-B) a third of the total body length; length : height ratio = 1.25 : 1; a pair of anterior prominences and a bigger one in the posterior half; a strongly curved spine and 2 setae on a small mid-dorsal prominence; pseudorostrum with a pair of spines on its tip, a spine and 3 simple setae in the antero-ventral corner. Eyelobe with 2 eyes (with 3 lenses each). Antennule (Fig. 13C) with the basal article of peduncle the longest of all three; 3 sensory hairs on the process of article 2; accessory flagellum with long sensory hairs. Maxilliped 3 (Fig. 13D) without spines on the basal process; 5 broadened teeth-like spines on the outer margin of carpus. Maxilliped 3 with relatively short basis (Fig. 13F). Pereopod 1 (Fig. 13G) with basis a little shorter than half of the total length of the pereopod and with hyaline teeth; ischium, merus, carpus with serrated inner margin; propodus a little longer than carpus; short dactylar claw; small exopod. Pereopod 2 (Fig.13H) with basis smaller than half of the total length of pereopod, and with hyaline teeth; carpus with 2 unequal setae in the distal corner; dactyl longer than propodus, with 3 subterminal

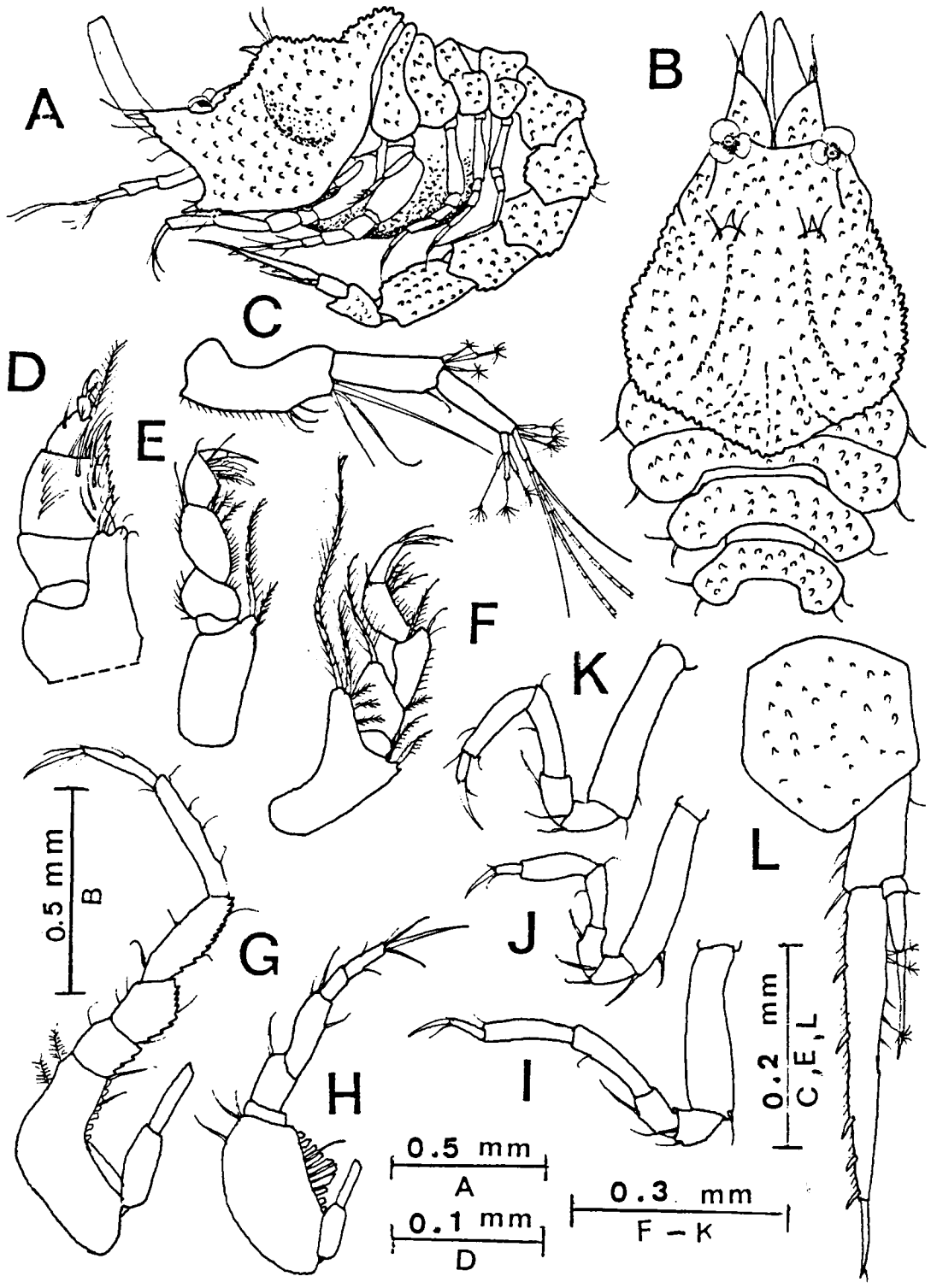

Fig.13. *Nannastacus mitreae* n.sp., holotype, female, A. body, lateral view; B. carapace and pereon, dorsal view; C. antennule; D. maxilliped 1; E. maxilliped 2; F. maxilliped 3; G. pereopod 1; H. pereopod 2; I. pereopod 3; J. pereopod 4; K. pereopod 5; L. right uropod.

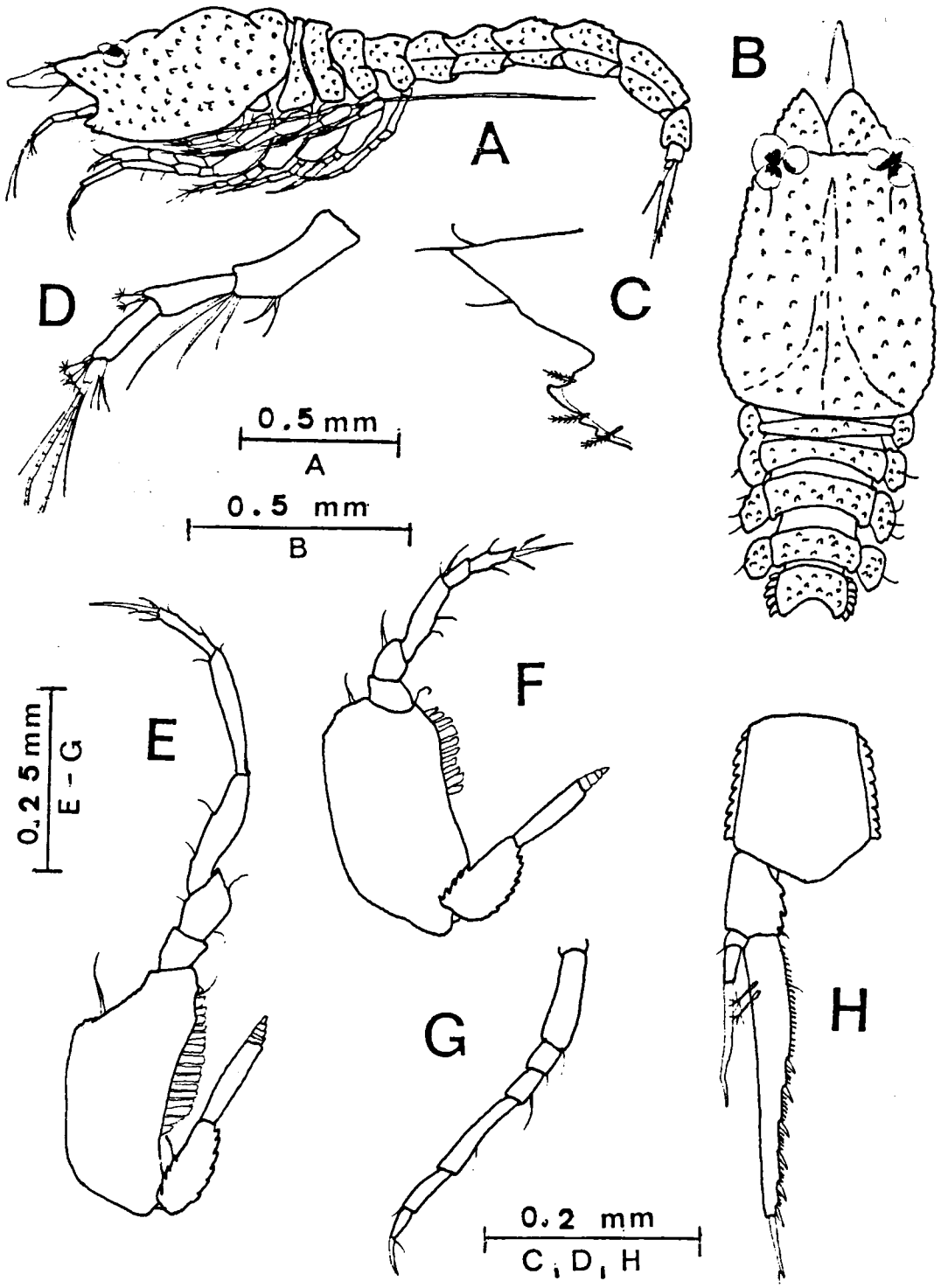

Fig.14. *Nannastacus mitreae* n.sp., allotype, male, A. body, lateral view; B. body, dorsal view; C. anterior margin of carapace; D. antennule; E. pereopod 1; F. pereopod 2; G. pereopod 3; H. pereopod 5; I. left uropod.

and one long terminal spine; small exopod. Pereopods 3-5 (Fig. 13I-K) with carpus and propodus almost equal and also the longest articles (excepting the basis); pereopod 3 as long as pereopod 5, longer than pereopod 4; all of them without exopods. Uropod (Fig. 13L) with peduncle shorter than the last pleonite; with 3 spines on the inner margin; endopod more than 4 x longer than exopod, with short hairs and 4 short spines on the inner margin, a subterminal spine and a terminal longer one, 4 x longer than endopod; short hairs and 3 sensory hairs on the outer margin; exopod with terminal seta longer than itself.

Male (Fig.14): Body length: 1.93 mm. Carapace (Fig. 14A-C) a third of the total body length, longer than high (1.6 : 1), longer than in female; only the posterior prominence is developed; antero-ventral margin with few teeth. Pereopod 1 with a stronger basis, longer hyaline teeth, without serrated margins; propodus a little shorter than carpus. Pereopod 2 (Fig. 14F) with strong basis. Pereopods 3 and 4 with exopods. Uropod (Fig. 14I) with peduncle almost 2 x shorter than the last pleonite; inner margin of peduncle serrated; endopod 5.5 x longer than exopod, with 5 spines on the inner margin; terminal spine longer than in female.

ETYMOLOGY

The species is dedicated to the memory of the Romanian physician Hilarie Mitrea, the first Romanian explorer of Indonesia (at the end of the last century when he served in the Dutch Army), who donated very important zoological and ethnographical collections from Indonesia. He was the most important donator of the "Grigore Antipa" Museum.

REMARKS

The female of this new species is related to *N. johnstoni* Hale,1945 from Australia, with regard to the form of the carapace, maxilliped 3, pereopods and uropods. But it differs in the spines and the fewer hairs on the carapace, and the antennule with elongated articles. The male of *N. mitreae* n.sp. reminds of some Australian species: *N. gibbosus* Calman,1911 (described as *N. nudus* by Gamo,1952), *N. inflatus* Hale, 1945, *N. johnstoni* Hale, 1945 and *N. sauteri* Zimmer, 1952. It differs in the form of the antennule, carapace and uropodal endopod.

Family Diastylidae

Paradiastylis bunakenensis n.sp. (Fig. 15)

MATERIAL

Holotype: female GAMNH CUM 425; paratype: female GAMNH CUM 426.

TYPE LOCALITY

Bunaken Island, stat. 30, North of Sulawesi, Indonesia, 6 m depth, 15.IV.1991.

DESCRIPTION

Integument less calcified; glabrous. Body length: 1.09 mm (without pseudorostrum and telson). Carapace (Fig. 15A) a third of the total length; length : height ratio = 1.37 : 1; pseudorostrum relatively long; siphons less visible. Broadened eyelobe with 2 pairs of lenses. Pereon with pereonites 3 and 4 broadened towards pleon. Antennule (Fig. 15C) long with robust articles; accessory flagellum with 2 articles as long as the first article of the main flagellum. Maxilliped 3 (Fig. 15D) with 3 feathered setae (one broken) on the distal basal process; carpus as long as propodus; reduced exopod. Perepod 1 (Fig. 15E) with curved basis little longer than 1/3 of the total length of the pereopod; propodus longer than carpus; exopod longer than that of maxilliped 3. Pereopod 2 (Fig. 15F) with broadened basis, little longer than half of the total length of the pereopod; merus as long as propodus; carpus a little shorter than both; dactyl longer than all articles excepting basis; short simple seta in the distal outer corner of propodus; dactyl with 3 subterminal, simple setae and a simple terminal one, longer than dactyl; it has the most developed

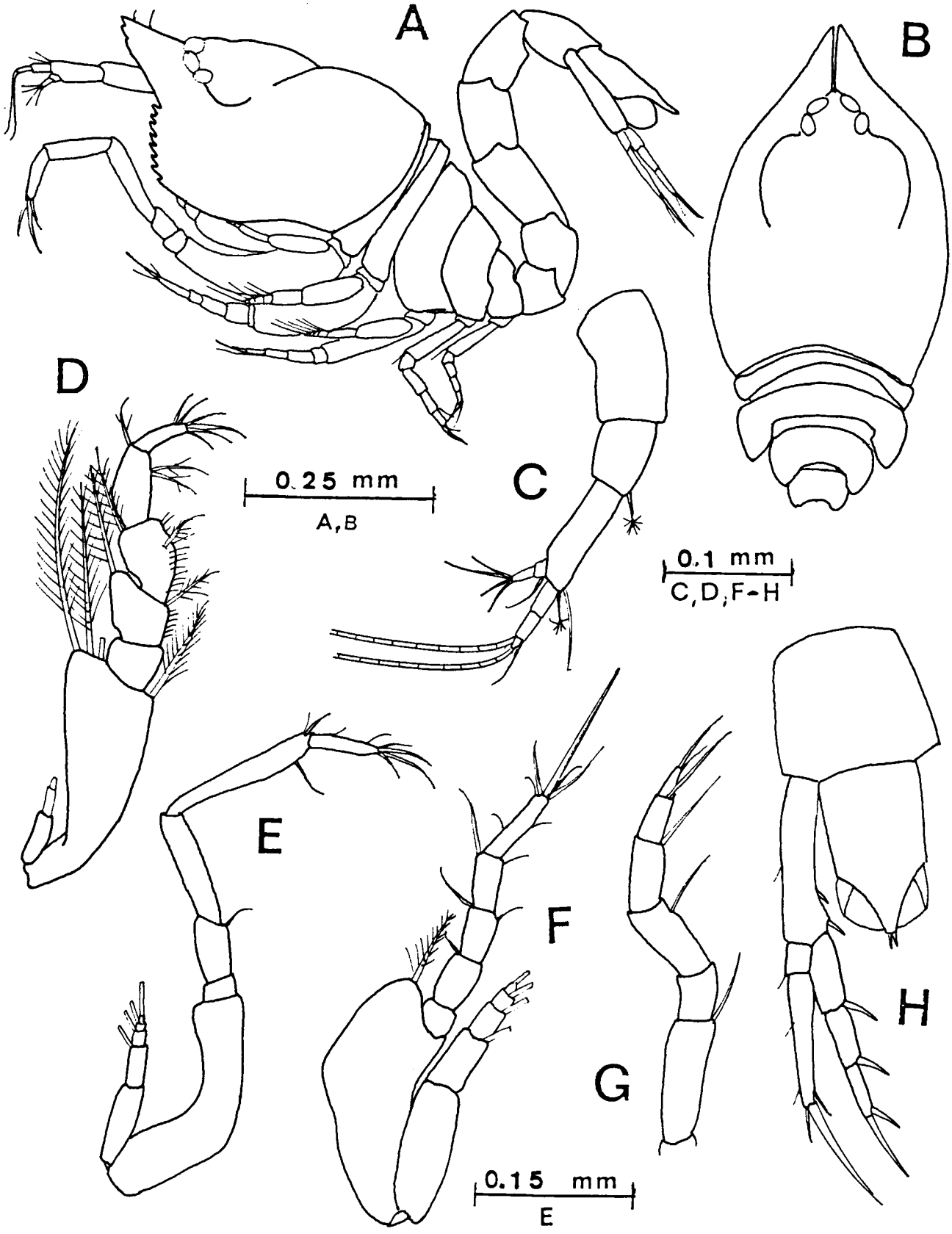

Fig. 15. *Paradiastylis bunakenensis* n.sp., holotype, female, A. body, lateral view, B. carapace and pereon, dorsal view; C antennule; D. maxilliped 3; E. pereopod 1; F. pereopod 2; G. pereopod 5; H. left uropod.

exopod. Pereopods 3-5 with short and thick articles; merus longer than carpus; carpus longer than propodus; all of them without exopods. Uropod (Fig. 15H) with peduncle longer than last pleonite (ratio = 1.14 : 1); 2 short spines on the inner margin; endopod longer than peduncle; exopod shorter than endopod, as long as peduncle, with long terminal seta; each of the 3 articles of endopod with long spine in the distal inner corner and a terminal spine, shorter than seta of exopod. Telson (Fig. 15H) truncated, a little longer than uropodal peduncle, with 2 short terminal spines.

ETYMOLOGY

The species bears the name of the type locality - Bunaken Island, Indonesia.

REMARKS

Paradiastylis bunakenensis n.sp. is more closely related to *P. tumida* Hale, 1937 than to other species of the genus, having a short uropodal peduncle. It differs in the anterior margin of the carapace, the carpus of pereopod 1 shorter than the propodus (equal in *P. tumida*), no hyaline teeth on the basis of pereopod 2, and the glabrous telson a little longer than the uropodal peduncle (shorter in *P. tumida*).

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