

## Taxonomic Note on *Nannastacus nyctagineus* (Crustacea: Cumacea: Nannastacidae) from Korean Waters

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### ABSTRACT

Korean nannastacids have recorded only eight species belonging to genera *Campylaspis* and *Cumella*. In this paper, *Nannastacus nyctagineus* Gamô, 1962, is redescribed and illustrated as a new species of Korean fauna in this study for the first time. Korean female specimens of *Nannastacus nyctagineus* correspond well with the original description by Gamô, 1962 based on only female specimens. Gamô has described that new species, *Nannastacus pruinosus* could be distinguished from *N. nyctagineus* based on only male specimens. The Korean male specimens of *N. nyctagineus* undoubtedly match well with the description of *N. pruinosus* with the following common features: the surface of the carapace is covered with numerous granules; pereonites and pleonites have similar patterns of the teeth on dorsal surface; the proportion and armature of the dactylus of pereopod 2 is similar; the number and pattern arrangement of the setae on the surface in antenna 1, pereopod 1, and uropod are the all most same. *Nannastacus pruinosus* Gamô, 1962 is proposed as a synonym of *N. nyctagineus* described in this study. This represents the first record on the genus *Nannastacus* from Korea.

**Keywords:** taxonomy, Cumacea, *Nannastacus*, synonym, new record, Korea

### INTRODUCTION

Family Nannastacidae Bate, 1866 has 25 genera with approximately 430 species worldwide (Gerken, 2012). Among the 25 genera, *Campylaspis* Sars, 1865, *Cumella* Sars, 1865, and *Nannastacus* Bate, 1865 are the main ones in this family. However, Korean nannastacids have only recorded eight species belonging to genera *Campylaspis* and *Cumella* (Lee and Lee, 1999, 2001, 2012, Lee et al., 2012). In this paper, *Nannastacus nyctagineus* Gamô, 1962, is described and illustrated as new to Korean fauna. The specimens were collected mainly using a light-trap (Holmes and O'Connor, 1988; Kim, 1992) in shallow Korean waters, from 1993 to 2004. Body length was measured from the anterior tip of the carapace to the posterior end of the pleonite 6. The lengths of the appendages were measured along the mid-line of each appendage and excluded the inflated outer angle. The mate-

rials are deposited at the Department of Life Sciences, Dankook University, Cheonan, Korea.

### SYSTEMATIC ACCOUNTS

Order Cumacea Kröyer, 1846

Family Nannastacidae Bate, 1866

<sup>1</sup>\*Genus *Nannastacus* Bate, 1865

<sup>2</sup>\**Nannastacus nyctagineus* Gamô, 1962 (Figs. 1-3)

*Nannastacus nyctagineus* Gamô, 1962: 178, figs. 18, 19; 1967, 250; Băcescu, 1992: 241; Petrescu, 2003: 104, fig. 5.  
*Nannastacus pruinosus* Gamô, 1962: 171, figs. 12, 13; 1967, 249; Băcescu, 1992: 242.

**Material examind.** Korea: 31 ♂♂, Chungcheongnam-do:

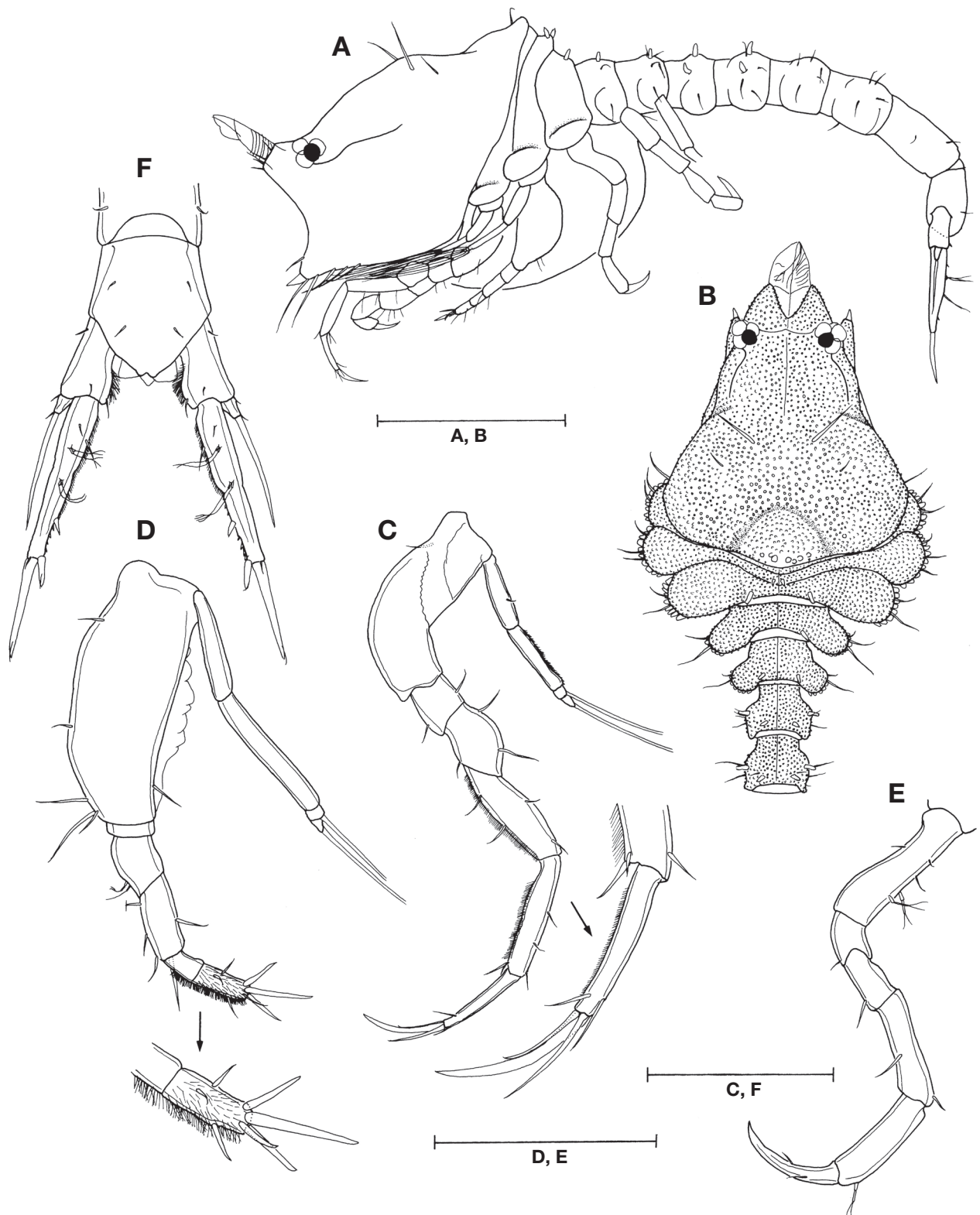
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**Fig. 1.** *Nannastacus nyctagineus* Gamô, adult female: A, Habitus, lateral view; B, Cephalothorax and pleonites, dorsal view; C, Pereopod 1; D, Pereopod 2; E, Pereopod 3; F, Pleonite 6 and uropods. Scale bars: A, B=0.4 mm, C-F=0.2 mm.

Tae-an-gun, Anmyeondo Island, 13 Sep 1996, Lee CM; 2♂♂, 1♀, Boryung-si, Hyojado Island, 30 May 1997, Lee CM; 4♂♂, Boryung-si, Daechon Port, 4 Jul 1997, Lee CM; 63♂♂, Seocheon-gun, Hongwon Port, 20 Jun 1998, Kim YH; 5♂♂, Boryung-si, Daechon Port, 9 Sep 1999, Kim YH; 21♂♂, Jeollabuk-do: Buan-gun, Gyeokpo Port, 21 Jun 1993, Kang BJ; 27♂♂, Jeollanam-do: Wando-gun, Namchang Port, 20 May 1998, Lee CM; 208♂♂, Wando-gun, Cheongsando Island, 20–23 May 1998, Lee KS; 47♂♂, 3♀♀, Goheung-gun, Sinyang Port, 10 Aug 1998, Kim YH; 1♂, Yeosu-si, Ando Island, 1 Aug 2000, Kim YH; 1♂, 1♀, Yeosu-si, Anpo Port, 20 Mar 2004, Kim YH; 8♂♂, Gyeong-sangnam-do: Tongyeong-si, Chubongdo Island, 10 Jul 1998, Lee CM; 12♂♂, Namhae-gun, Pyeongsan Port, 14 Jul 1999, Kim YH; 6♂♂, 2♀♀, 1 Juv., Geoje-si, Daepo Port, 18 Jul 1999, Kim YH; 196♂♂, 18♀♀, Tongyeong-si, Maemuldo Island, 28 Jun 2002, Kim YH; 1♂, Tongyeong-si, Tongyeong Port, 6 Aug 2003, Eun Y; 67♂♂, Busan-si, Dadaepo Port, 14 Mar 1993, Kang BJ; 2♀♀, Busan-si, Dadaepo Port, 28 Jul 2000, Kim YH; 140♂♂, Busan-si, Gadeokdo Island, 30 Jul 2000, Kim YH.

**Description.** Adult female (cat no. DKUCUM 201601): body (Fig. 1A) about 1.7 mm long, excluding uropods; surface (Fig. 1A, B) covered with numerous minute granules and several simple setae. Carapace (Fig. 1A, B) subequal to 1/3 of body length, 1.15 times as long as width, 1.55 times as long as depth; width 1.35 times as long as depth; subtriangular in dorsal view, swollen near both branchial regions, raised at median-rear portion. Antennal notch (Fig. 1A, B) deeply concave; antero-lateral margin subrectangular, serrate, with 1 strong tooth and 6 simple setae. Pseudorostral lobes (Fig. 1A, B) short, directed slightly upward, with several serrations on terminal margin. Ocular lobe (Fig. 1A, B) very broad, composed of 2 eyes having 3 lenses.

Thorax (Fig. 1A, B) almost half length of carapace, slightly shorter than 1/5 of body; lateral margins strongly serrated. Pereonite 1 very short, concealed in lateral view; pereonites 2–5 with 1 pair of obtuse teeth dorsodistally, respectively. Abdomen (Fig. 1A, B) subequal in length to cephalothorax; pleonites 1–2 with 2 pairs of obtuse teeth on dorsal and lateral surfaces, respectively; pleonite 6 with 2 pairs of simple setae on dorsal surface.

Pereopod 1 (Fig. 1C): basis 0.45 times as long as remaining articles combined, with 1 row of serrations and 1 simple proximal seta medially. Ischium with 2 simple setae. Merus with 3 simple setae. Dactylus 0.70 times as long as propodus, with 2 simple and 1 long stout setae terminally.

Pereopod 2 (Fig. 1D): basis 1.15 times as long as remaining articles combined, with 1 row of hyaline flattened teeth, outer margin with 1 simple seta distally, inner margin with 5 simple setae. Dactylus 1.65 times as long as propodus, with

numerous hairs, 1 medial, 2 lateral, and 4 terminal setae.

Pereopod 3 (Fig. 1E): basis 0.40 times as long as remaining articles combined, inner margin with 1 simple seta, outer margin with 2 simple setae and 2 complex pedunculate setae.

Uropod (Fig. 1F): peduncle short, subequal in length to half of pleonite 6, inner margin with numerous hairs. Endopod not articulated, 2.40 times as long as peduncle, inner margin serrated, with 1 short simple, 2 complex pedunculate, and 1 small stout setae; terminal margin with 1 small simple and 1 long stout setae. Exopod not articulated, very short, subequal to 1/9 length of endopod, with 1 short and 1 long stout setae (reaching to about 5/6 point of endopod) terminally.

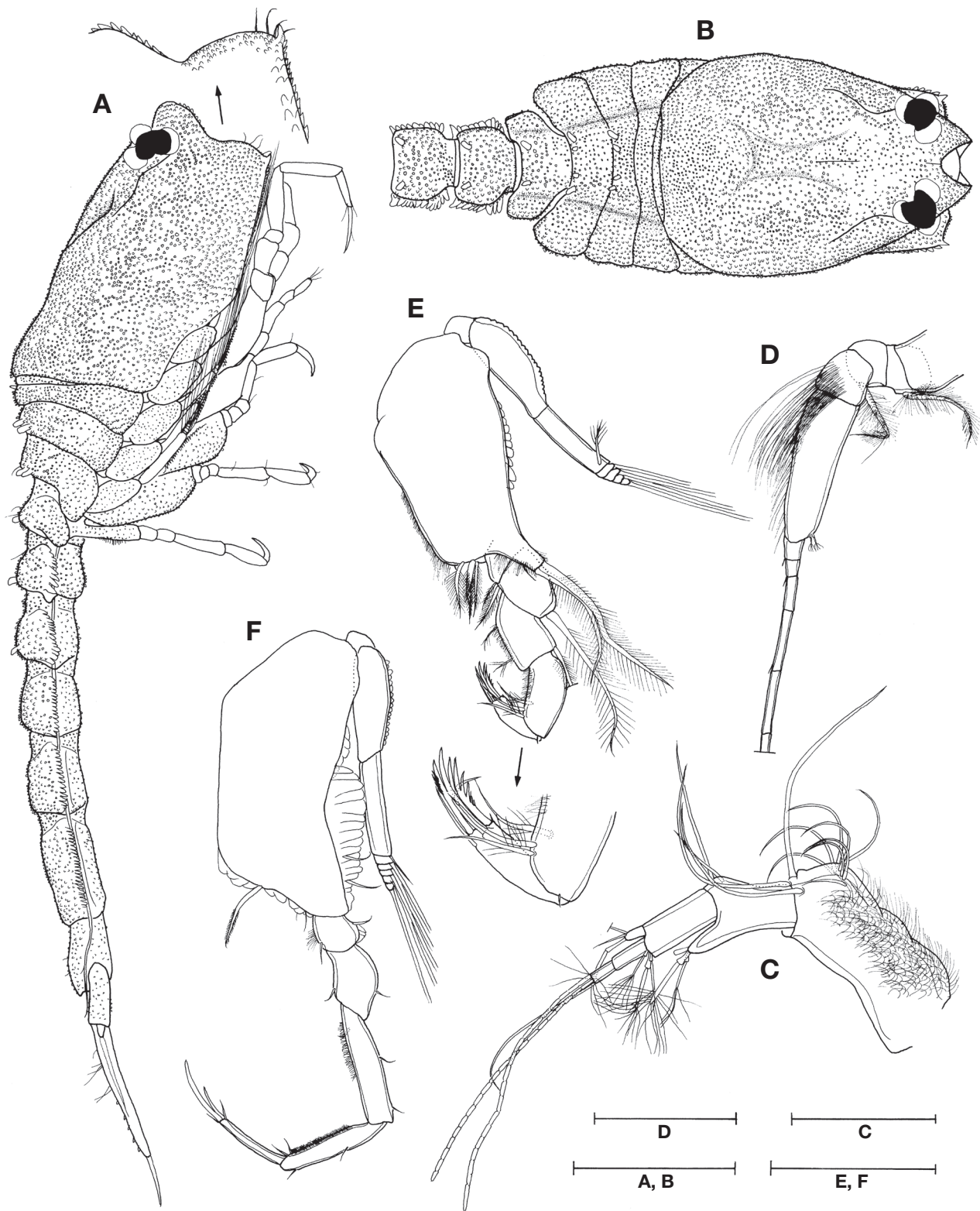
Adult male (cat no. DKUCUM 201602): body (Fig. 2A) about 2.4 mm long, excluding uropods; surface (Fig. 2A, B) same as in female. Carapace (Fig. 2A, B) subequal to 1/3 length of body, 1.40 times as long as width, 1.80 times as long as depth; width 1.25 times as long as depth; subrectangular in dorsal view, swollen near both branchial regions. Antennal notch (Fig. 2A, B) shallowly concave; antero-lateral margin subrectangular, serrate, with 1 strong tooth and 4 simple setae. Pseudorostral lobes (Fig. 2A, B) and ocular lobe (Fig. 2B) same as in female.

Thorax (Fig. 2A, B) almost half length of carapace, 1/5 length of body. Pereonite 1 very short, concealed in lateral view; pereonite 2 with 1 pair of dorsal teeth; pereonites 3–4 with 2 pairs of obtuse teeth dorsodistally, respectively; pereonite 5 long, with 1 pair obtuse teeth dorsodistally, respectively. Abdomen (Fig. 2A, B) subequal in length to cephalothorax; pleonites 1–2 with 1 pair of obtuse teeth dorsodistally, respectively; pleonite 6 with 2 pairs of simple setae dorsodistally and 2 pairs of small setae terminally, respectively; pleonites 1–6 with lateral serrated grooves.

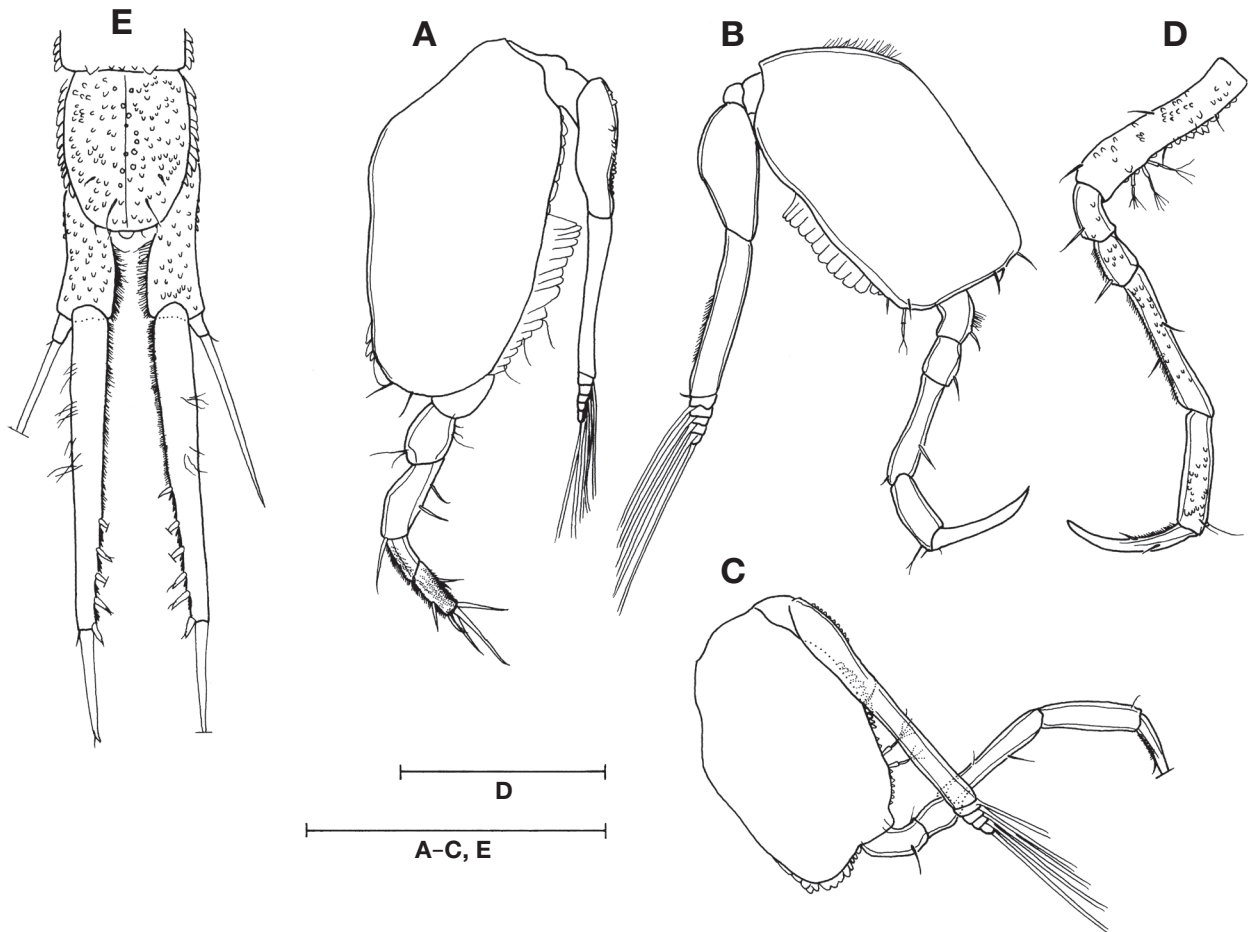
Antenna 1 (Fig. 2C): peduncle composed of 3 articles; first article slightly shorter than remaining articles combined, with numerous hairs, and with 11 simple distal setae in outer margin; second article 0.45 times as long as first one, with 2 simple setae on outer corner; inner corner very inflated, longer than 1/2 length of third article, with 3 complex pedunculate setae distally; third article subequal in length to second one, with 3 complex pedunculate setae on distal margin. Main flagellum composed of 2 articles, slightly longer than last article of peduncle; second article with 1 simple seta and 2 aesthetascs terminally. Accessory flagellum not articulated, with 2 simple and 1 complex pedunculate setae.

Antenna 2 (Fig. 2A, D) slightly extending beyond end of pleonite 6; peduncle 5-articulate, second and third articles with 1 pappose seta.

Maxilliped 3 (Fig. 2E): basis slightly longer than remaining articles combined, outer margin with 1 row of serrations, inner margin with numerous hairs and 3 distal plumose setae;



**Fig. 2.** *Nannastacus nyctagineus* Gamô, adult male: A, Habitus, lateral view; B, Cephalothorax and pleonites, dorsal view; C, Antenna 1; D, Antenna 2; E, Maxilliped 3; F, pereopod 1. Scale bars: A-C, E, F=0.3 mm, D=0.2 mm.



**Fig. 3.** *Nannastacus nyctagineus* Gamô, adult male: A, Pereopod 2; B, Pereopod 3; C, Pereopod 4; D, Pereopod 5; E, Pleonite 6 and uropods. Scale bars: A-E=0.2 mm.

outer corner very inflated, reaching to about 1/2 length of merus, with 2 long plumose setae. Ischium with 1 plumose seta on inner corner. Merus with 1 plumose seta on inner margin and 1 long plumose seta on outer corner. Dactylus with 1 simple, 1 microserrate, 2 long stout, and 1 serrate setae terminally.

Pereopod 1 (Fig. 2F): basis 0.70 times as long as remaining articles combined, with 1 row of serrations, 1 row of hyaline flattened teeth, and 2 distal simple setae on outer margin, 1 microserrate seta and 1 row of serrations near distal margin. Ischium and merus with 2 simple setae. Dactylus 0.70 times as long as propodus, with 3 simple and 1 long stout setae terminally.

Pereopod 2 (Fig. 3A): basis subequal in length to remaining articles combined, with 1 row of serrations, 1 row of hyaline flattened teeth, and 3 distal simple setae on outer margin, 1 row of serrations and 2 simple distal setae near

inner corner. Dactylus 1.55 times as long as propodus, with numerous hairs, 1 medial, 2 lateral, and 4 terminal setae.

Pereopod 3 (Fig. 3B): basis 0.90 times as long as remaining articles combined.

Pereopod 4 (Fig. 3C): basis 0.75 times as long as remaining articles combined.

Pereopod 5 (Fig. 3D): basis 0.45 times as long as remaining articles combined.

Uropod (Fig. 3E): peduncle 0.86 times as long as pleonite 6, with numerous hairs on inner margin. Endopod not articulated, 2.50 times as long as peduncle; inner margin serrated, with 5–6 small stout setae; terminal margin with 1 small simple and 1 long stout setae. Exopod not articulated, very short, subequal to 1/13 length of endopod, with 1 short seta and 1 long stout seta (reaching to about 3/5 point of endopod) terminally.

**Distribution.** Korea (South Sea, Yellow Sea), Japan (Gamô,

1962, 1967), Malaysia (Petrescu, 2003), Madagascar (Petrescu, 2003).

**Remarks.** Korean female specimens of *Nannastacus nyctagineus* correspond well with the original description by Gamô, 1962 based on only female specimens collected from Japanese water (the Tanabe Bay, Kii peninsula). Gamô has described that new species, *Nannastacus pruinosus* could be distinguished from *N. nyctagineus* based on only male specimens collected from the same location (Gamô, 1962). The Korean male specimens of *N. nyctagineus* undoubtedly match well with the description of *N. pruinosus* with the following common features: (1) the surface of the carapace is covered with numerous granules; (2) the pereonites and pleonites have similar patterns of the teeth on dorsal surface; (3) the proportion and armature of the dactylus of pereopod 2 is similar (dactylus almost 1.6 times as long as propodus, with numerous hairs, 1 lateral, 2 medial, and 4 terminal setae on surface in both sex); (4) the number and pattern arrangement of the setae on the surface in antenna 1, pereopod 1, and uropod are the all most same. Therefore, we concluded that *N. pruinosus* should be a synonym of *N. nyctagineus* that is known in Japan, Madagascar, and Malaysia (Petrescu, 2003). There are a few differences in sexual dimorphism between the females and males of *N. nyctagineus*: (1) the shape of the carapace is triangular in dorsal view in female, while it is rectangular in male; (2) the number of teeth on the surface of pleonite 1-2 is different (2 pairs of teeth in female vs. 1 pair of teeth in male). Moreover, uropodal peduncle and endopod of females are shorter than those in males. It is possible that Gamô might have overlooked the sexual dimorphism that is sometimes present in *Nannastacus* species, such as *N. antipai*, *N. mitreai*, and *N. wisseni* (Petrescu, 1995, 1997).

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