

# The Systematic Study of the Family Sphaeromatidae (Crustacea, Isopoda, Flabellifera) from Korea

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## The Systematic Study of the Family Sphaeromatidae (Crustacea, Isopoda, Flabellifera) from Korea

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Previously ten species under seven genera of sphaeromatid isopods were recorded from Korea (Richardson, 1909; Kim and Choe, 1981; Choe and Kwon, 1982; Kim and Kwon, 1982, 1983; Yun, 1982): *Gnorimosphaeroma ovatum* (Gurjanova), *G. rayi* Hoestlandt, *G. latum* Nishimura, *Leptosphaeroma gottschei* Hilgendorf, *Dynamenella nipponica* (Nishimura), *Holotelson tuberculatus* Richardson, *Cymodoce japonica* Richardson, *C. acuta* Richardson, *Dynoides dentisinus* Shen and *Sphaeroma sieboldii* Dollfus. But they were fragmentary and mostly recorded merely in the collecting lists of local faunistic works.

In the course of the systematic studies on the Korean isopod crustaceans, we examined the sphaeromatid isopod specimens collected from 34 localities (Fig. 1) largely by ourselves during the period from 1968 to 1983, and deposited at the Department of Zoology, Seoul National University (SNU). Twelve species under six genera were identified and classified. Included are a new species, *Gnorimosphaeroma hoestlandti*, and two unrecorded species from Korea, *Gnorimosphaeroma chinense* (Tattersall) and *Dynoides brevispina* Bruce. Type specimens and the other specimens examined are deposited at the Department of Zoology, SUN.

Illustrations were prepared using a camera lucida or a drawing tube. Body measurements given are of the greatest length, exclusive of antennae and uropods, and the greatest width. Systematics were followed Iverson (1982) at subfamilial category.

### SYSTEMATIC ACCOUNT

Order Isopoda

Suborder Flabellifera

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\*\*\* 이 논문은 1982년도 한국과학재단의 연구비 지원에 의한 "韓國産 甲殼類의 系統分類學의 研究. I. 蔓脚類, 等脚類, 十脚類"의 연구 결과의 일부임.

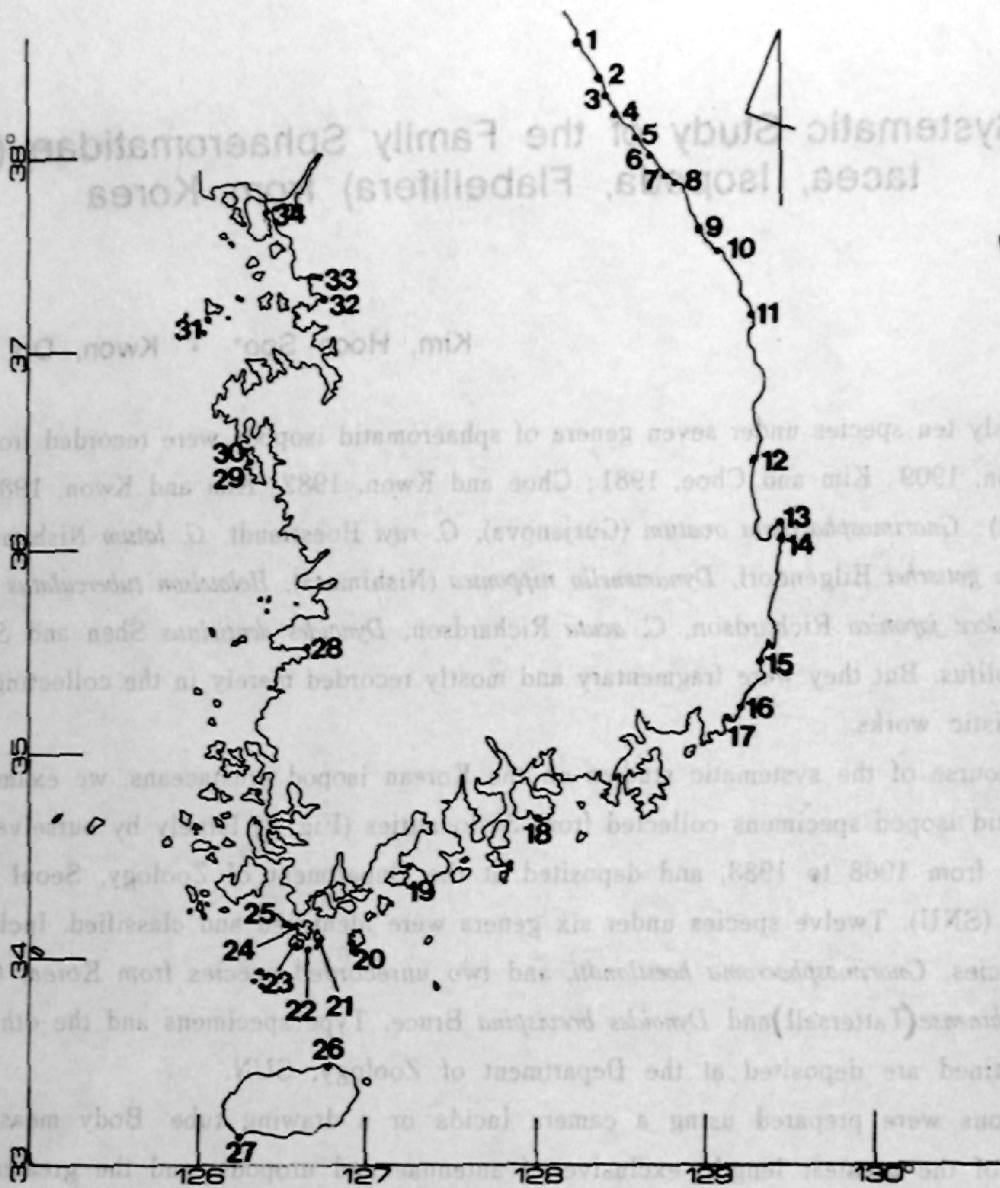


Fig. 1. A map showing the localities where the material was collected.

1. Kōjin (巨津) 2. Ayajin (我也津) 3. Sokch'o (束草) 4. Yangyang (襄陽) 5. Namae(南涯) 6. Chumunjin (注文津) 7. Kangnūng (江陵) 8. Aninjin (安仁津) 9. Mukho (墨湖) 10. Changho (莊湖)
11. Chukpyōn (竹邊) 12. Kanggu (江口) 13. Kuman (九萬) 14. Kuryongp'o (九龍浦) 15. Naa-ri, Wōlsōng-gun (月城郡 羅兒里) 16. Kijang, Yangsan-gun (陽山郡 機張) 17. Pusan (釜山) 18. Sangju-ri, Namhaedo I. (南海島 尙州里) 19. Noktong (鹿洞) 20. Ch'ōngsando I. (青山島) 21. Soando I. (所安島) 22. Chajido I. (者只島) 23. Pogildo I. (甫吉島) 24. Maando I. (馬鞍島) 25. Nōpto I. (柘島)
26. Hamdōk, Cheju I. (濟州島 咸德) 27. Mosūlp'o, Cheju I. (濟州島 慕瑟浦) 28. Komso (吾土) 29. Pangp'o, Anmyōndo I. (安眠島 傍浦) 30. Ch'anggi-ri, Anmyōndo I. (安眠島 倉基里) 31. Mungap-to I. (文甲島) 32. Panwōl (半月) 33. Sorae (蘇來) 34. Sinjōng-ri, Kanghwado I. (江華島 神井里)

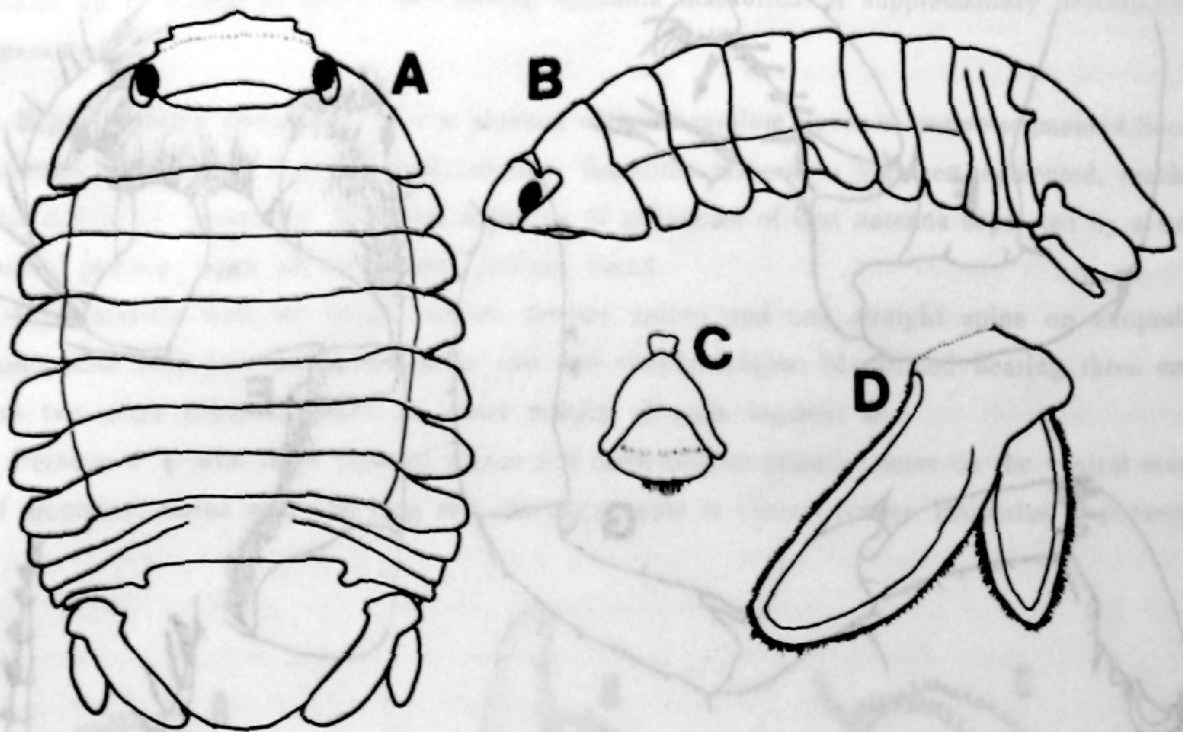


Fig. 2. *Gnorimosphaeroma ovatum* (Gurjanova), ♂: A, dorsal view; B, lateral view; C, epistome and upper lip; D, uropod. (A, B, X11; C, X29.4; D, X27.6)

Family SPHAEROMATIDAE

Subfamily CASSIDININAE

Genus *Gnorimosphaeroma* Menzies, 1954

*Gnorimosphaeroma ovatum* (Gurjanova, 1933)

(Figs. 2-4)

*Exosphaeroma ovata* Gurjanova, 1933, pp. 99-100, fig. 28; Shiino, 1957, pp. 178-182, figs. 10-11.

*Exosphaeroma oregonensis*: Tattersall, 1921, pp. 421-422, pl. 16, figs. 1-5; Shiino, 1944, pp. 12-15, figs. 10-11. (*non* Dana).

*Gnorimosphaeroma ovata*: Menzies, 1954, p. 7.

*Gnorimosphaeroma ovatum*: Kussakin, 1974, pp. 230-233, fig. 5; 1979, pp. 410-414, figs. 265-266; Kim and Kwon, 1983, p. 326, fig. 2a.

**Material examined:** 1 ♂, Osipch'on Stream, Kanggu, Aug. 13, 1982, D.H. Kwon; 1 ♂, Ch'anggi-ri, Anmyōndo I., May 22, 1982, D.H. Kwon; 53 ♂♂, 42 ♀♀, Sinjōng-ri, Kanghwado I., May 6, 1982, D.H. Kwon.

The original description of this species (Gurjanova, 1933) is short and inadequately figured. Shiino(1957) redescribed this species in detail with fine illustrations, but his material was based on immature specimens (5.3mm×3.5mm) not having appendix masculina. Nevertheless, most of

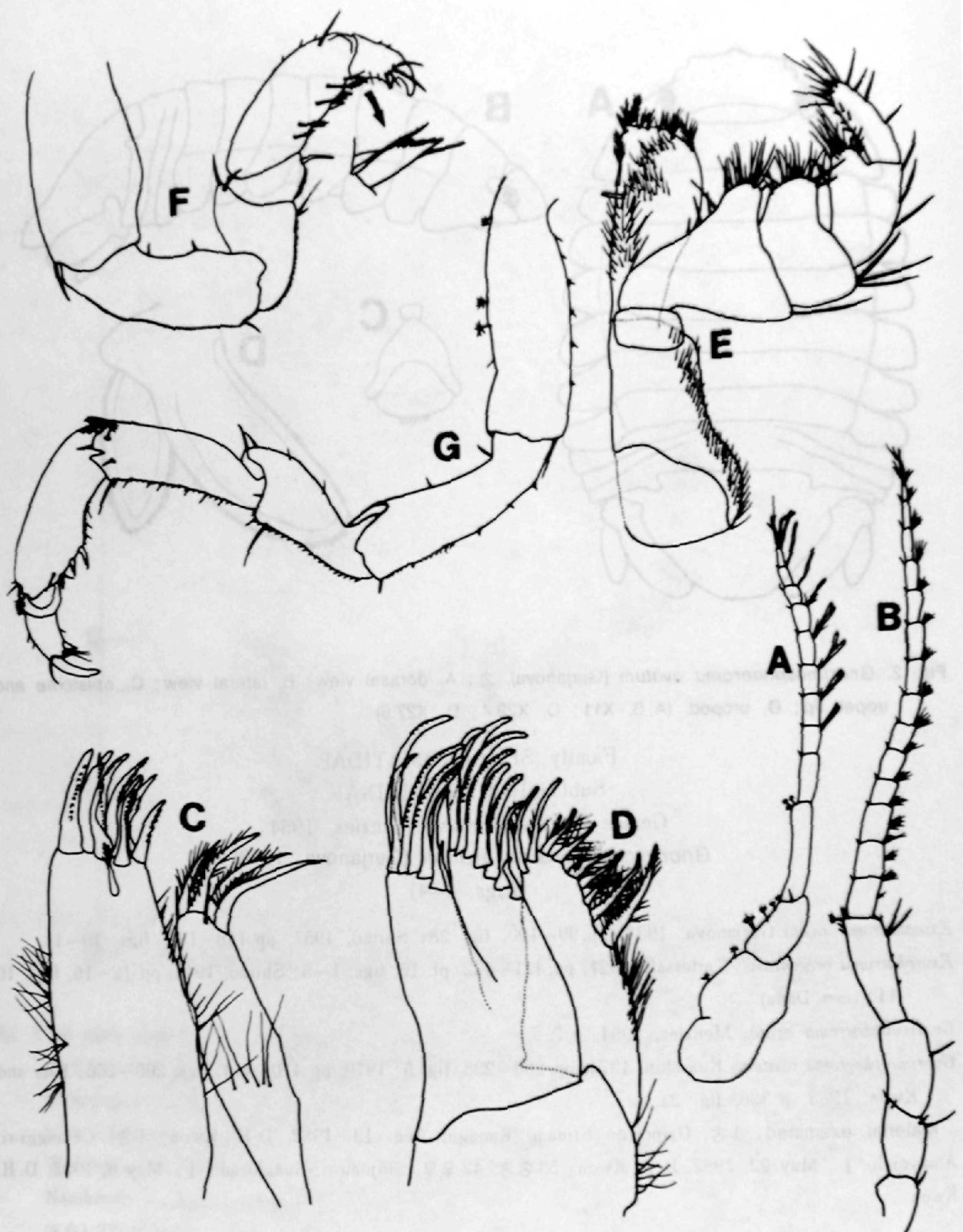


Fig. 3. *Gnorimosphaeroma ovatum* (Gurjanova), ♂ : A, first antenna; B, second antenna; C, first maxilla; D, second maxilla; E, maxilliped; F, peraeopod I; G, peraeopod II. (A, B, X37.8; C, D, X154; E, X86.3; F, G, X54)

II swollen in mature male and bearing three spines on ventral margin. Carpus and merus with one long seta each at ventral corner.

Appendix masculina of male pleopod 2 much longer than the endopod. Exopods of pleopods 3-5 partially or completely segmented; exopod of pleopod 3 inwardly produced. Exopod of uropod two thirds the length of endopod; exopod not reaching the hind margin of pleotelson. Margins of both rami dense with minute setae.

Female much smaller than the male, but sexual dimorphism not significant.

**Remarks:** *Gnorimosphaeroma ovatum* was sometimes synonymized with *G. rayi* Hoestlandt, 1969 (Kussakin, 1979; Yun, 1982). But *G. rayi* is more convex than *G. ovatum* and the former has truncated uropodal endopod. *G. ovatum* can tolerate extremely wide range of salinity from freshwater swamps or river (Shiino, 1957) to seashore (Gurjanova, 1933), while *G. rayi* lives only in sea water.

Tattersall (1921), with some doubt, referred his specimens from Whangpoo River (Huangpu River) and Tai Hu Lake, China, to *Exosphaeroma oregonensis*. Later Menzies (1954), in his revision of the genus *Exosphaeroma*, stated that *E. oregonensis* of Tattersall probably represented a new species of *Gnorimosphaeroma*. The length of mature male specimens (6mm) and the shape of whole animal and pleopods, together with the freshwater habitat, reveals that Tattersall's specimens might be referred to *G. ovatum*. Yun (1982) recorded *G. ovatum* from the south coast of Korea, but his description and figures represent the characteristic features of *G. rayi*.

Material was collected under stones from freshwater (Osipch'ön Stream), brackish water (Sinjöng-ri, Kanghwado I.) and sea water (Ch'anggi-ri, Anmyöndo I.)

**Distribution:** China, Korea, Japan and USSR.

#### *Gnorimosphaeroma rayi* Hoestlandt, 1969

(Fig. 5)

*Gnorimosphaeroma rayi*: Hoestlandt, 1973, pp. 380-390, figs. 20-26; 1975, pp. 31-45, figs. 1, 6-8, 10B (in part, Group I); Nunomura and Nishimura, 1976, pp. 23-24; Kim and Kwon, 1983, p. 326, fig. 2b.

*Gnorimosphaeroma ovatum*: Yun, 1982, pp. 17-21, figs. 10-11. (*non* Gurjanova).

?*Exosphaeroma oregonensis*: Thielemann, 1910, pp. 51-53, figs. 41-47. (*non* Dana).

**Material examined:** 1 ♂, 18(17 ovi.) ♀♀, Kōjin, May 19, 1980, D.H. Kwon; 1 ♀, Ayajin, June 2, 1981, D.H. Kwon; 9 ♂♂, 49 ♀♀, Aninjin, May 18, 1980, D.H. Kwon; 3 ♂♂, 22(ovi.) ♀♀, Mukho, May 20, 1980, D.H. Kwon; 6 ♀♀, Naa-ri, Wölsöng-gun, Nov. 4, 1979, D.H. Kwon; 1 ♂, 18 ♀♀, Hamdök, Cheju I., July 18, 1979, D.H. Kwon; 2(ovi.) ♀♀, Pangp'o, Anmyöndo I., May 21, 1982, D.H. Kwon; 1(ovi.) ♀, Ch'anggi-ri, Anmyöndo I., May 22, 1982, D.H. Kwon.

**Remarks:** *G. rayi* closely resembles *G. ovatum*, but is easily distinguished from the latter in the following features: (1) body more convex and larger (males up to 11mm in length), (2) first antenna with flagellum twelve to fourteen-segmented, second antenna with flagellum fourteen-segmented, (3) maxillipedal palp segments 2-4 with two, three and two setae respectively at

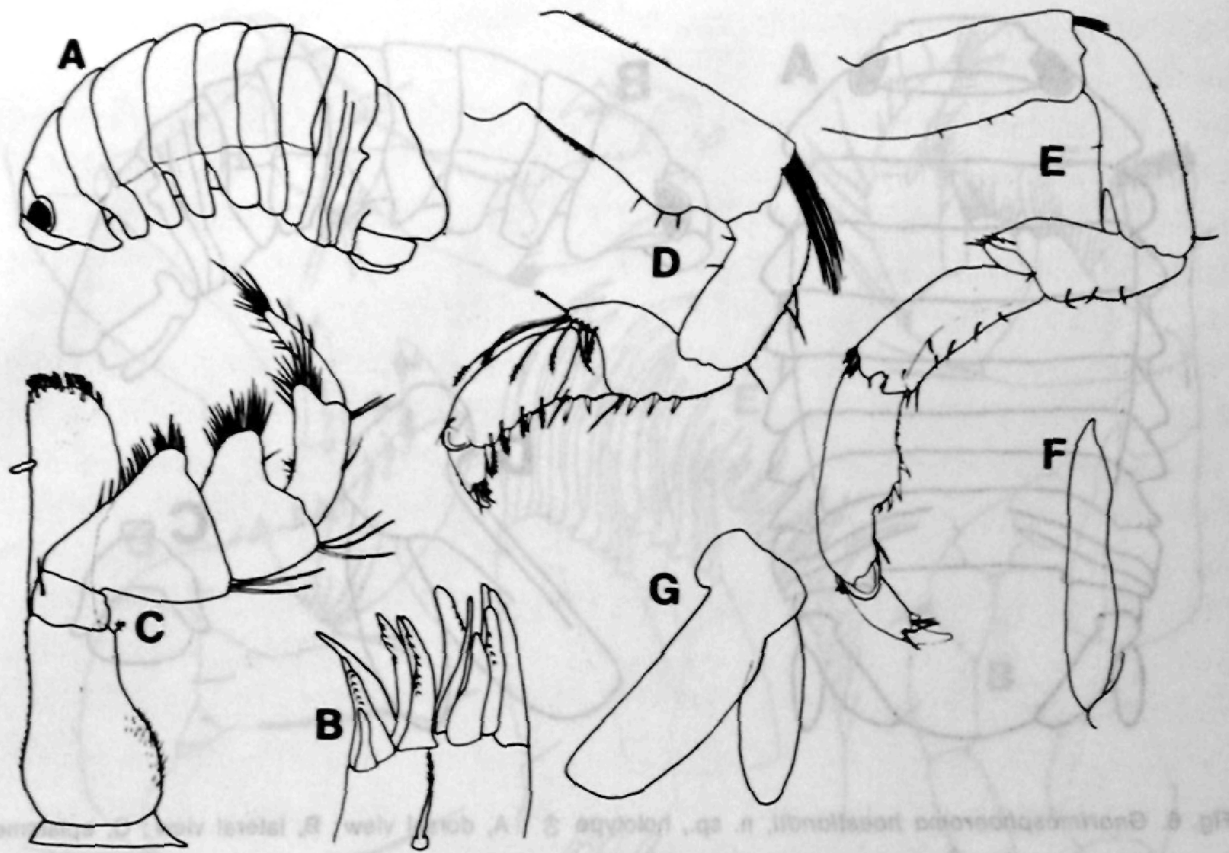


Fig. 5. *Gnorimosphaeroma rayi* Hoestlandt, ♂ : A, dorsolateral view; B, exopodite of first maxilla; C, maxilliped; D, peraeopod I; E, peraeopod II; F, appendix masculina; G, uropod. (A, X5; B, X167; C, X51.9; D, E, X32.4; F, X22.7; G, X13.9)

outer-distal corner, (4) peraeopod I with basis bearing six to eight setae at ventral corner; merus bearing four spines and one setae on ventral margin and about eight plumose setae at dorsal corner, (5) peraeopod II with swollen propodus bearing four spines on ventral margin; merus bearing five short setae at dorsal corner and (6) uropodal exopod three fourths the length of endopod; apex of endopod truncate; margins of both rami rarely setose.

*G. rayi* commonly occurs under stones from shallow waters in Korea. *G. rayi* from California was supposed to introduced from the Northwest Pacific, presumably from Japan along with the implantation of Japanese oyster (*Crassostrea gigas* Thunberg) in the Tomales Bay (Hoestlandt, 1975).

**Distribution:** Korea, Japan and Tomales Bay, California.

*Gnorimosphaeroma hoestlandti*, nov. sp.

(Figs. 6–8)

*Gnorimosphaeroma rayi*: Hoestlandt, 1975, pp. 39–43, fig. 9. (in part, Group II).

**Holotype:** 1 ♂, Mukho, May 20, 1980, D.H. Kwon.

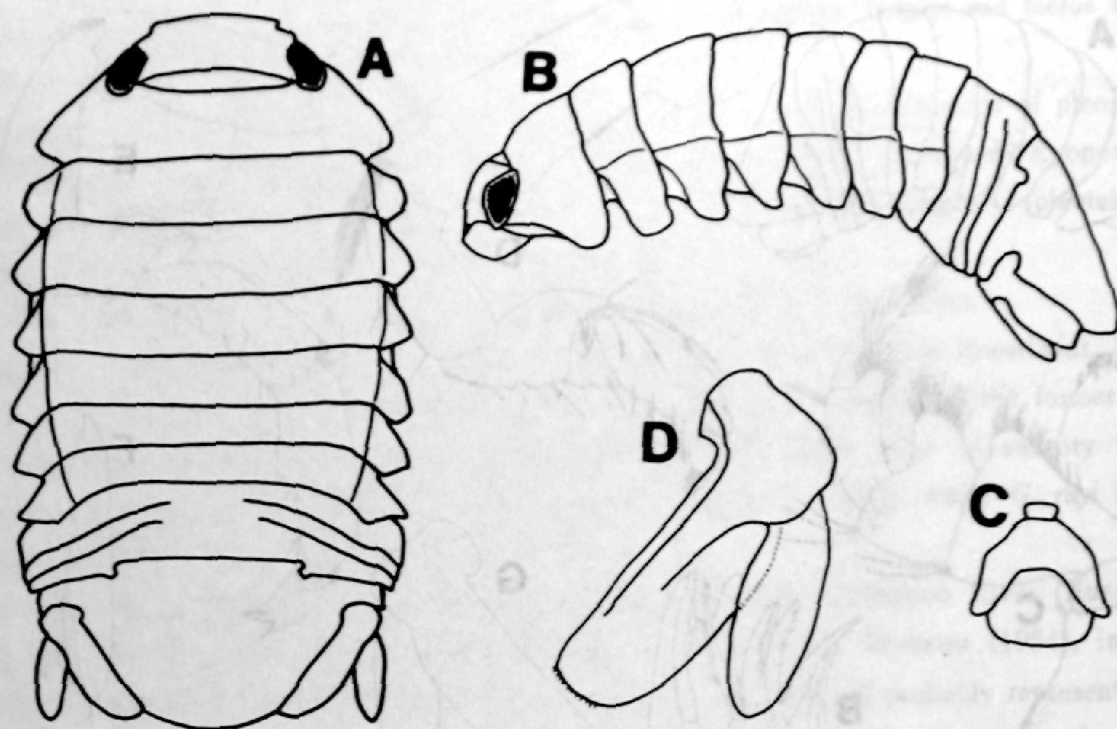


Fig. 6. *Gnorimosphaeroma hoestlandti*, n. sp., holotype ♂ : A, dorsal view; B, lateral view; C, epistome and upper lip; D, uropod. (A, B, X11; C, X29; D, X32)

**Paratypes:** 15 ♂♂, 41(31 ovi.) ♀♀, collected with the holotype; 51 ♂♂, 50 ♀♀, Ayajin, June 11, 1981, D.H. Kwon; 1 ♂, Changsa-dong, Sokch'o, Aug. 10, 1981, D.H. Kwon; 3 ♂♂, 11 ♀♀, Tongmyöng-dong, Sokch'o, May 19, 1980, D.H. Kwon; 73 specimens, Yangyang, Aug. 4, 1979, D.H. Kwon; 3 ♂♂, 9 ♀♀, Mukho, Sep. 29, 1981, H.S. Kim; 4 ♀♀, Naa-ri, Wölsöng-gun, Nov. 4, 1979, D.H. Kwon; 1 juvenile, Mungapto I., Aug. 4, 1982, D.H. Kwon.

**Measurements:** Holotype male, body length 7.6mm, width 4.2mm.

**Description of holotype male:** Body ovate; lateral margins subparallel, dorsal surface smooth. Coxal plates distinct on pereonites II-V; coxal plates on pereonites III and IV tapering laterally, while in *G. rayi* only the coxal plate on pereonite IV more or less tapering. Two pairs of incomplete suture lines on pleon with anterior one more approximating the midline.

First antenna with flagellum thirteen-segmented, reaching the hind margin of pereonite I. Second antenna with flagellum twelve-segmented, exceeding a little beyond the hind margin of pereonite II.

Mandibular palp three-segmented; segment 1 setose, segment 2 bearing fifteen plumose setae and segment 3 bearing twenty plumose setae. First maxilla with thirteen spines, several of which are dentate, and an accessory plumose seta on exopodite; endopodite with four pectinated



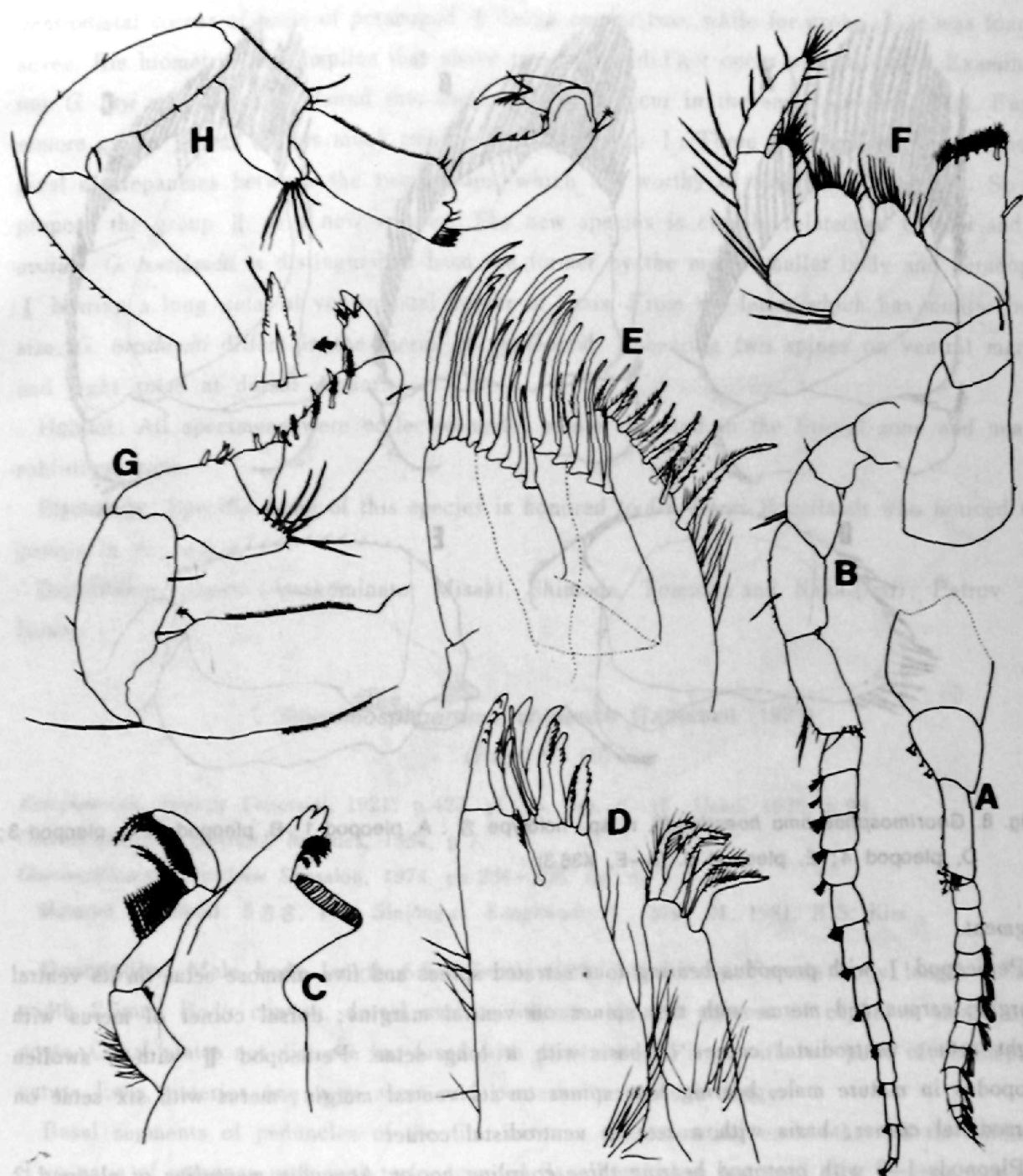


Fig. 7. *Gnorimosphaeroma hoestlandti*, n. sp., holotype ♂ : A, first antenna; B, second antenna; C, mandible; D, first maxilla; E, second maxilla; F, maxilliped; G, pereopod I; H, pereopod II. (A, B, X41.5; C, X59.2; D, E, X167; F, X74; G, H, X51.9)

and two simple setae. Second maxilla with exopodite bearing eleven curved spines on outer lobe and ten curved spines on inner lobe; endopodite with fifteen setae, eleven of which are setulose. Maxilliped with a coupling hook; palp segments 2 and 3 with two setae on outer-distal corner of each segment, segments 4 and 5 with four setae on outer margin of each

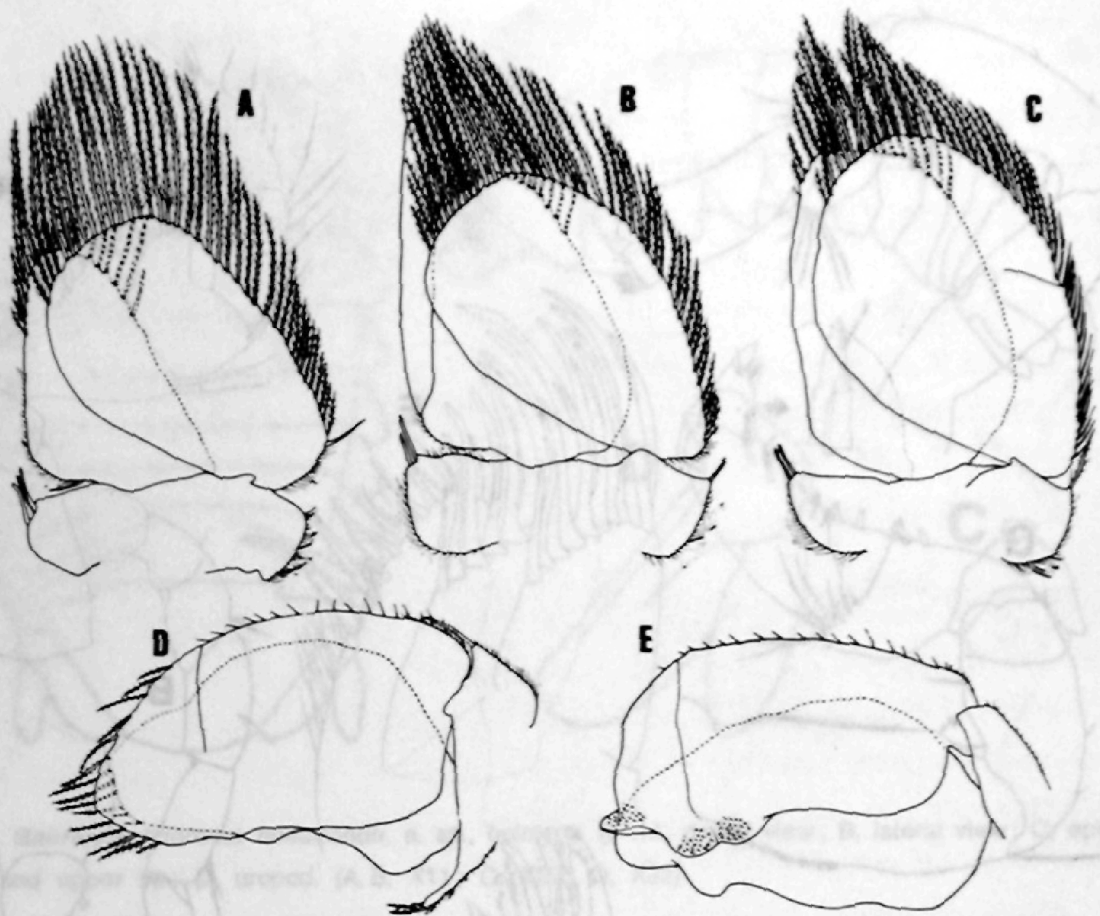


Fig. 8. *Gnorimosphaeroma hoestlandti*, n. sp., holotype ♂ : A, pleopod 1; B, pleopod 2; C, pleopod 3; D, pleopod 4; E, pleopod 5. (A-E, X36.3)

segment.

Peraeopod I with propodus bearing four serrated spines and five plumose setae on its ventral margin; carpus and merus with two spines on ventral margins; dorsal corner of merus with eight setae; ventrodiscal corner of basis with a long setae. Peraeopod II with a swollen propodus in mature male, bearing four spines on its ventral margin; merus with six setae on dorsodistal corner; basis with a seta at ventrodiscal corner.

Pleopods 1-3 with protopod bearing three coupling hooks. Appendix masculina of pleopod 2 elongate, much longer than the endopod; distal half covered with numerous minute spinules. Pleopods 3-5 with exopod partially or completely segmented. Exopod of pleopod 3 slightly produced inwardly. Uropod with exopod three fourths the length of endopod; posterior apex of endopod truncate, not reaching the hind margin of pleotelson.

**Remarks:** Hoestlandt (1975) divided *Gnorimosphaeroma rayi* into two groups, group I and group II. His group I had the same morphological characters with those originally described from Tomales Bay, California. Group II was characterized by the number of setae at the