

propodus a little longer than carpus with 2 setae on inner margin and seta on outer margin ; dactylus bifid.

Pereopod 5 (Fig.9L). Basis relatively short, 3.5 times as long as wide ; ischium a little shorter than basis ; merus about 60% as long as basis ; carpus a little shorter than merus, with 2 setae on outer margin and 2 setae on inner margin ; propodus a little shorter than ischium with 3 setae on its distal margin ; dactylus bifid.

Pereopod 6 (Fig.9M) a little longer than the fifth pereopod. Basis 4 times as long as wide ; ischium $2/3$ length of basis ; merus half the length of ischium with a stout setae on inner margin ; carpus as long as merus, with 3 setae on inner margin and a seta on outer margin ; propodus somewhat long with 2 setae on inner margin and a seta at outer distal area ; dactylus bifid.

Pereopod 7 (Fig.9N) is a little longer than the preceding ones. Basis longer, 6 times as long wide ; ischium $3/4$ as long as basis ; merus half the length of basis, with a seta on inner distal corner and a seta at outer distal corner ; carpus as long as merus, with 3 setae on inner distal corner and 5 setae on outer distal corner ; merus a little longer and a seta on middle part and distal end respectively and 2 setae at outer-distal corner ; dactylus bifid.

Pleopod 1 (Fig.9O). Basis with 4teeth ; endopod with 15 setae ; exopod with more than 50 setae.

Pleopod 2 (Fig.9P). Basis with 3 ; endopod with 20 setae ; exopod with more than 40 setae.

Pleopod 3 (Fig.9Q). Basis with 2 coupling hooks, endopod outer-distal corner with 40 setae.

Pleopod 4 (Fig.9R). Basis ; endopod with 3 setae ; exopod with 13 setae.

Pleopod 5 (Fig.9S) slender. basis short ; endopod with two bosses on its tip and inner side, with 13 ~ 19 short setae ; exopod small with 6 ~ 8 short setae.

Uropod (Fig.9T) basis square ; endopod 1.3 times as long as exopod.

Remarks : The original description of this species (Gurjanova, 1933) was very short and inadequately figured. Recently, Yun (1982), redescribed this species based on the full grown male specimens (9.3 mm) from South Korea. And Kim and Kwon (1985) also redescribed this species based upon the specimens from south Korea. The present specimens from Rishiri differs from Kim and Kwon's redescription : the former show some differences from the latter in the following features : (1) longer setae on the inner distal corner of basis of pereopod 1, (2) more numerous flagellum of antennule, (3) less numerous flagellum of antenna, (4) more numerous setae on maxilla (5) relatively longer exopod of uropod.

Material examined : 6 ♀♀, Senhousi, Rishiri Island, Hokkaido, coll. Noboru Nunomura, May 10, 1995 ; 28 exs, Nozuka, Rishiro Islands, Hokkaido, coll. Masahiko Sato, July 8, 1995 ; 33 exs, Porofunde, Rishiri Islands, Hokkaido, coll. Noboru Nunomura ; July 8, 1955 ; 5 exs, Cape Sukoton, Rebun Islands, coll. Noboru Nunomura, July 10, 1955 ; 25 exs, Rangohsi, Rishiri Island, Noboru Nunomura July 11, 1955 ; 17 exs, Sasitaji, Rebun Island, Hokkaido, coll. Noboru Nunomura, July 9, 1995 ; 28 exs. Rebun Island, Hokkaido, coll. Noboru Nunomura, July 10, 1995 ; 16 exs, Fujimi, Wakkanai City, Hokkaido, coll. Noboru Nunomura July 6, 1995 ; 5 ♀♀ Siretoko, Rebun Island, Hokkaido, coll. Noboru Nunomura, July 9, 1995 ; 1 ex, Kotto, Chikiura-cho, Chiba, coll. Noboru Nunomura, Sep. 4, 1997 ; 1 ♂ (10.8 mm in body length) and 3 ♀♀ (up to 10.8 mm in body length), Usujiri, Minamikayabe, Hokkaido, coll. Wataru Nunomura, May 3, 1980.

Gnorimosphaeroma chinense (Tattersall, 1921)

(Sina-kotsubumushi, new)

(Fig.10)

Exosphaeroma chinense Tattersall 1921

Gnorimosphaeroma chinense (Tattersall 1921)

For further synonymy, see. Kwon (1990)

Description of specimens from Hokkaido : Body 1.8 times as long as wide. Color dull yellow to grayish brown. Body surface Clypeus and Frontal (Fig.10D) lamina pentagonal. Eyes mediocre in size, each eyes composed

of 30~35 ommatidia. Pleonal somite 2 with 2 suture lines anterior one longer than the posterior one.

Antennule (Fig.10B). Peduncle 2-segmented. Flagellum seven-9 segmented. Antenna (Fig.10C), Peduncle 5-segmented. Flagellum 10~11 segmented

Right mandible. Pars incisiva 3-headed ; lacinia mobilis single-headed but not chitinized ; 2~3 setae behind lacinia mobilis ; processus molaris wide. Palpal segment 2 with 6 setae ; segment 3 with 10 setae. Left mandible (Fig.10E). Pars incisiva 3~6-headed ; lacinia mobilis 3-headed but not chitinized ; processus molaris wide, Palpal segment 2 with 4 setae ; segment 1 with 3 setae at distal part. Maxillula (Fig.10F) with endopod bearing 3 pectinated setae. Exopod bearing 8~9 setae. Maxilla (Fig.10G) with endopod bearing 4 plumose setae ; exopod bearing 3~4 curved spines on inner lobe and 2~3 curved spines. Maxilliped (Fig.10H) Endite with a coupling hook. Palpal segment 1 small ; segments 2 with 4 setae on inner margin ; segment 3 with 4 setae on inner margin ; segment 4 with 7~8 setae at the outer distal margin ; segment 5 with 9 setae around the margin.

Pereopod 1 (Fig.10I). Basis rectangular, 3 times as long as wide with a seta at outer distal corner ; ischium a little shorter than basis ; merus a long seta on outer margin, a seta at the inner distal corner, and a series of many short setae on inner margin ; carpus triangular with 3 setae on inner margin ; propodus 3 or more setae on inner margin. ; dactylus bifid.

Pereopod 2 (Fig.10J). Basis rectangular, 3 times as long as wide with a seta at inner distal corner ; ischium a little shorter than basis, densely pubescent along inner margin ; merus 2 long setae on outer margin, and a series of many short setae on inner margin ; carpus triangular with 2 setae on inner margin ; propodus 2 longer and many short setae on inner margin and many short setae on outer margin ; dactylus bifid.

Pereopod 3 (Fig.10K). Basis oblong, 4.5 times as long as wide ; ischium $2/3$ time as long as basis, with pubescent inner margin ; merus almost half the length of ischium with 2 long setae on inner margin and 2 setae at outer distal corner ; carpus a little shorter than merus and with pubescent inner margin ; propodus with several setae on inner margin ; dactylus bifid.

Pereopod 4 (Fig.10L). Basis relatively short 3.7 times as long as wide with 2 setae at inner distal corner ; ischium a little shorter than basis, with sparse short setae on inner margin ; merus a little shorter than ischium with pubescent inner margin and 3 setae at outer distal corner ; carpus as long as merus with pubescent inner margin and 2 setae at outer distal corner ; propodus with 7~8 setae on inner margin ; dactylus bifid.

Pereopod 5 (Fig.10M). Basis rectangular, 4 times as long as wide with a long seta at inner distal corner ; ischium $3/5$ time as long as basis ; merus $2/3$ time shorter than ischium, with 3 setae at outer distal corner ; merus half the length of ischium with 3 setae on outer distal corner ; carpus as long as merus with 2 setae at outer distal corner ; propodus rectangular with 5~6 setae on inner margin and 5~7 setae on outer margin ; dactylus bifid.

Pereopod 6 (Fig.10N). Basis rectangular with a long seta at inner distal corner ; ischium as long as basis ; merus a little shorter than ischium ; carpus as long as merus with 2 setae at outer distal corner ; propodus rectangular with 5~6 setae on inner margin and 5~7 setae on outer margin ; dactylus bifid.

Pereopod 7 (Fig.10O). Basis oblong, 4.5 times as long as wide ; ischium 55% as long as basis, with a seta near inner-distal corner ; merus 55% as long as ischium with 2~3 setae on inner margin and 2 setae at outer-distal corner ; carpus a little longer than merus with 6 setae on distal margin ; propodus as long as carpus with 2 setae on inner margin and a seta at outer-distal corner ; dactylus bifid.

Penes (Fig.10P) club-shaped. and apart from each other.

Pleopod 1 (Fig.10Q). Basis with 3 coupling hooks ; endopod with about 25 setae ; exopod with about 35 setae around the margin.

Pleopod 2 (Fig.10R). Basis with 2 coupling hooks ; endopod triangular with 11~14 plumose setae around the margin ; stylus club-shaped ; exopod rectangular with 24~27 plumose setae around the margin.

Pleopod 3. Basis with 2 coupling hooks ; endopod with 20 setae near the apical end ; exopod with 30 short

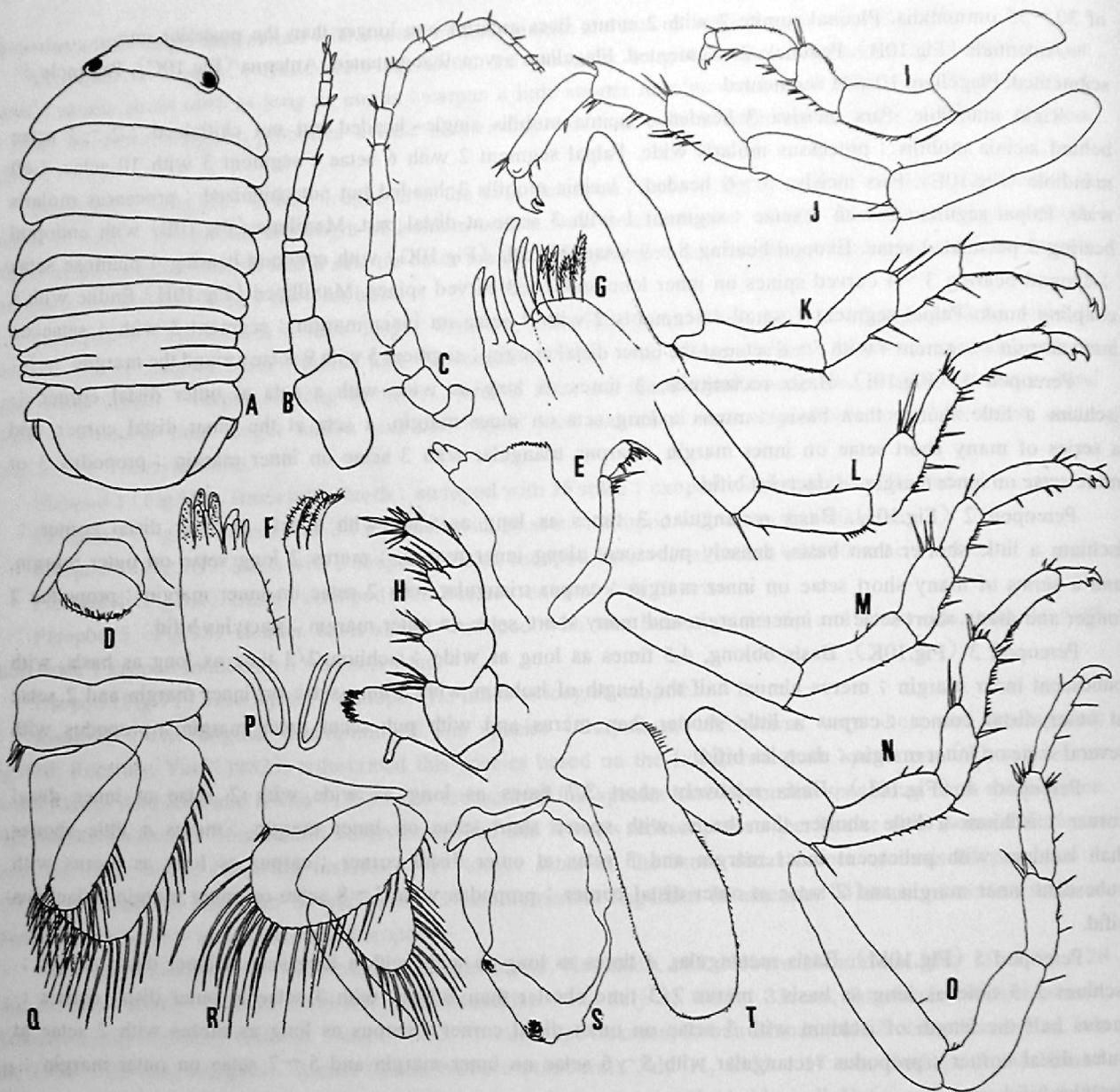


Fig.10. *Gnorimosphaeroma chinesisense* (Tattersall, 1921)

A. Dorsal view ; B. Antennule ; C. Antenna ; D. Clypeus and frontal lamina ; E. Left Mandible ; F. Maxillula ; G. Maxilla ; H. Maxilliped ; I-O. Pereopods 1-7 ; P. Penes ; Q-R. Pleopods 1-2 ; S. Pleopod 5 ; T. Uropods (All : Male from Shubuto River, Hokkaido).

setae.

Pleopod 4. Basis with 2 coupling hooks ; endopod with 2 setae near the apical end ; exopod with 30 short setae.

Pleopod 5 (Fig.10S). Both rami quite devoid of setae.

Uropod (Fig.10T). Basis endopod rectangular, exopod small 47% as long as endopod

Material examined : 7 ♂♂ (up to 5.1 mm in body length) and 3 ♀♀ (up to 4.8 in body length) Mouth of Shubuto River (Salinity in 2 ‰), Suttu, Hokkaido. coll. Noboru Nunomura, July 2, 1996.

Remarks : The specimens from Shubuto River, Hokkaido agrees the original description from Whanpoo River near Shanghai but the original description of this species (Tattersall 1921) short. Later Kim and Kwon (1985) redescribed this species based on the specimens from Kanghwado, South Korea. The present specimens from Hokkaido shows some differences from the Kim and Kwon's redescription : (1) less numerous teeth on maxilla, (2) smaller exopod of uropod, (3) less numerous setae on the margin of pereopod 1.

Gnorimosphaeroma anchialos Jang and Kwon, 1993

(Jap.name : Migiwa-kotubumushi, new)

(Fig.11)

Gnorimosphaeroma anchialos Jang and Kwon, 1993.

Description : Body ovate, 1.9 times as long as wide. Lateral margins subparallel, dorsal surface smooth with scattered chromatophore. Eyes relatively small, each eye composed 60~75 of ommatidia. Frontal lamina and clypeus pentagonal. Pereonite I produces anteriorly, covering the lateral margin of cephalon. Pleonite 2 with two pairs complete suture line, anterior one shorter than the posterior one.

Antennule (Fig.11B) Peduncle composed of 3 segments. Flagellum with 8~9 segments.

Antenna (Fig.11C) Peduncle composed of 5 segment and Flagellum composed of 13~14 segments.

Right mandible (Fig.11E) pars incisiva 3~4 headed ; lacinia mobilis 2-headed but not chitinized ; 6 setae behind lacinia molaris ; processus molaris wide. Palpal segment 2 with 8~9 setae ; palpal segment 3 with 8~13 segments. Left mandible pars incisiva 3-4 headed ; lacinia mobilis 2~3 headed and chitinized ; about 10 setae behind lacinia molaris ; processus molaris Palpal segment 2 with 8~12 setae ; segment 3 with 11~13 setae. Maxillula (Fig.11F) with endopod bearing 4 pectinated setae ; exopod with 11 plumose setae ; Maxilla (Fig.11F) with endopod bearing 9~11 plumose setae ; Exopod bearing 10~12 curved spines on inner lobe and 12 curved spines on outer lobe. Maxilliped. (Fig.11G) Endite with 2 coupling hooks ; palpal segment 1 bearing a seta at inner distal corner ; segment 2 bearing 2 setae at outer distal corner and 15 setae on inner margin ; segment 3 with 3 setae at outer distal corner and 9~10 setae on inner margin ; segment 4 with 6 setae on inner margin and 7 setae on inner margin ; terminal segment rectangular 6~7 setae around the margin.

Pereopod 1 (Fig.11I) Basis rectangular with a relatively long seta at inner distal corner and 3 setae on outer margin ; ischium rectangular with a series of short hair on inner margin ; merus with 4 setae at outer distal corner and a long seta and a series of fine setae on inner margin ; carpus triangular with a seta near the distal end of inner margin ; propodus with 3 stout setae and 4 narrower setae on inner margin and 3 setae on outer margin ; dactylus bifid.

Pereopod 2 (Fig.11J) Basis relatively short, 1.6 times as long as wide, with a long setae at inner distal corner ; ischium with many fine setae on inner margin ; merus densely pubescent along inner margin, with 3 setae ; carpus as long as merus with 2 setae ; propodus with 2 setae and dorsal area swollen ; dactylus bifid.

Pereopod 3 (Fig.11K) basis 3 times as long as with a seta at inner-distal corner ; ischium a little shorter than basis with 4~5 short setae on both margins ; merus with a long seta on inner margin and a seta on outer margin, densely pubescent along inner margin ; carpus 1.2 times as long as merus, inner margin densely pubescent along inner margin and 3 setae at outer-distal corner ; propodus as long as carpus, densely pubescent along inner margin and 2 setae near the inner-distal corner ; dactylus bifid.

Pereopod 4. Basis oblong, 3.1 times as long as wide ; ischium with 3 setae on inner margin ; merus with 3 setae at outer-distal corner ; carpus with 2 setae at outer-distal corner ; propodus rectangular with swollen area on inner margin. ; dactylus bifid.

Pereopod 5 (Fig.11L) basis long, 4 times as long as wide ; ischium 3/4 times as long as basis ; merus half length of ischium with 5 long seta in the outer distal area and a seta near the inner-distal corner carpus as long as merus, with a long seta at inner-distal corner, seta densely pubescent along inner margin, propodus 1.2 times as long as carps ; dactylus bifid.

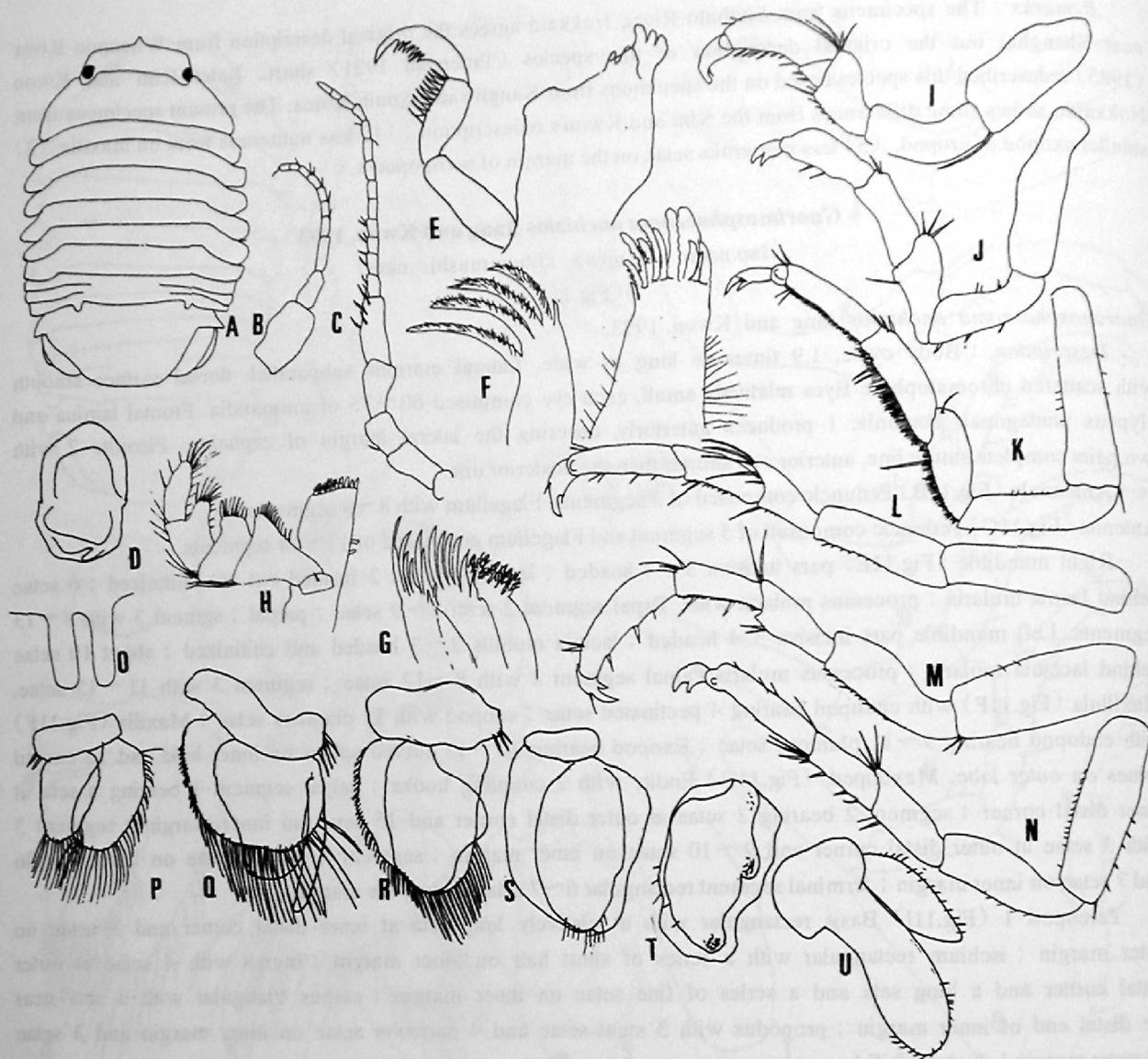


Fig.11. *Gnorimosphaeroma anchialos* Jang and Kwon, 1993

A. Dorsal view ; B. Antennule ; C. Antenna ; D. Clypeus and frontal lamina ; E. Right mandible ; F. Maxillula ; G. Mmaxilla ; H. Maxilliped ; I-K, Pereopod 1-3 ; L-N. Pereopods 4-7 ; O. Penes ; P-T. Pleopods 1-5, U. Uropod (All : male from Yura, Wakayama).

Pereopod 6 (Fig.11M) Basis 2.5 times as long as wide, with 2 short setae at inner-distal corner ; ischium 0.7 time as long as wide ; merus half length of ischium with 2 long seta at outer-distal corner and 2 setae at inner-distal corner ; carpus densely pubescent along inner margin ; propodus with 2 stout setae on inner margin ; propodus bifid.

Pereopod 7 (Fig.11N) basis 3 times as long as wide with short setae with 5 setae on inner margin and fine setae on outer margin ; ischium ; merus a little shorter than ischium with 2 setae at inner distal corner and 3-4 long setae at outer distal corner ; carpus as long as merus with 3 short setae on inner margin and 5~6

setae on distal margin ; propodus long ; dactylus bifid.

Penes (Fig.11O) straight. Each penis 3 times as long as wide.

Pleopod 1 (Fig.11P) basis with 2 coupling hooks ; endopod with 27~30 plumose setae ; exopod with 23~26 plumose setae.

Pleopod 2 (Fig.11Q) Basis rectangular with 3 coupling hooks ; endopod lanceolate with about 20 plumose setae, stylus club-shaped slightly tapering toward the tip ; exopod semicircular with about 50 plumose setae.

Pleopod 3 (Fig.11R). Basis with 3 coupling hooks ; endopod with protruded area on inner margin and about 20 plumose setae endopod exopod with 33~34 plumose setae.

Pleopod 4 (Fig.11S). Endopod with 3 setae ; exopod with 5~6 setae.

Pleopod 5 (Fig.11T). Endopod with 2 bossed on inner margin and apical area ; exopod lanceolate.

Uropod (Fig.11U). Endopod long, 3 times as long as wide ; Exopod elliptical, 0.7 time as long as endopod.

Remarks : These specimens form *Yura* agrees with the original description from., but there are some differences (1)less numerous coupling hooks, (2) less numerous setae of maxilla, (3)straight penes.

Material examined ; 2 ♂♂ (6.1~6.5 mm in length) and 5 ♀♀ (3.7~4.8 mm in length), Mouth of Yura River, Yura-cho, Wakayama, Prefecture, coll. Motoshige Yoshida June 5, 1993.

Gnorimosphaeroma naktongense Kwon and Kim, 1987

(Jap. Name : Chousen-kotusbumushi)

(Fig.12)

Gnorimosphaeroma naktongense Kwon et Kim, 1987

Description of male collected from Murakami, Niigata ; Body lanceolate, 2.0 times as long as wide. Lateral margins subparallel ; Dorsal surface smooth, with minute granules. Color of dorsal surface grayish brown. Eyes mediocre in size, each eye composed of about 50 ommatida, frontal lamina and clypeus pentagonal (Fig.12D) Pleonal somite 2 with 2 suture lines anterior one a little longer than the posterior one.

Antennule (Fig.12B), reaching pereonal somite. Peduncle 3-segmented. Flagellum composed of 10~11 segments Antenna (Fig.12C), reaching pereonal somite. Peduncle 5-segmented. Flagellum composed of 14 segments.

Right mandible pars incisiva 4-headed ; lacinia mobilis 3-headed but not chitinized ; 8~9 setae behind the lacinia mobilis ; processus molaris wide. Palpal segment 2 with 3 setae ; segment 3 with 15 setae. Left mandible (Fig.12E). Pars incisiva 4-headed ; lacinia mobilis 4-headed and chitinized ; 4 setae behind lacinia mobilis, processus molaris wide. Palpal segment 2 with 13 setae ; segment 3 with 15 setae. Maxillula (Fig.12F). Endopod bears 4 pectinated setae. Exopod with 8~9 spines, 6 of which are dentate, and a simple seta with an accessory setae. Maxilla (Fig.12G). Endopod with 2 plumose setae ; exopod with curved spines on inner lobe and curved spines on outer margin. Maxilliped (Fig.12H). Endite with a coupling hook on lateral margin and 14 plumose setae on distal margin ; palpal segment 1 small, without seta ; segment 2 with 13~15 setae on inner margin and with 2 setae at outer-distal corner ; segment 3 with 16~22 setae on inner margin and with 4 setae at outer-distal corner ; segment 4 with 17 on inner margin and with 4 setae at outer-distal corner ; segment 5 with more than 14 setae around the margin.

Pereopod 1 (Fig.12I). Basis 2.3 times as long as wide with a seta at inner-distal corner ; ischium with a both margins pubescent respectively ; merus 0.8 time as long as ischium, densely pubescent along the inner margin, with a serrated spines at inner-distal corner ; carpus short, densely pubescent along the inner margin, ; propodus with 7 spines in the inner margin, ; dactylus bifid.

Pereopod 2. (Fig.12J) Basis 2.8 times as long as wide, with 2~4 short setae on both margins, and a plumose seta at inner-distal corner ; ischium with a short seta at inner-distal corner ; merus as long as ischium, with 2 setae on inner margin and 3 setae at outer-distal corner ; carpus as long as merus with 2 outer-distal corner ; propodus swollen in basal half of inner margin, with 5 spines on inner margin and 2 setae at outer-distal corner. ; dactylus bifid.

Pereopod 3. Basis 3.2 times as long as wide ; ischium $3/5$ time as long as basis ; merus a little shorter than ischium, densely pubescent along the inner margin with a seta at inner-distal corner ; carpus as long as merus, densely pubescent along the inner margin and a seta at outer-distal corner ; propodus densely pubescent

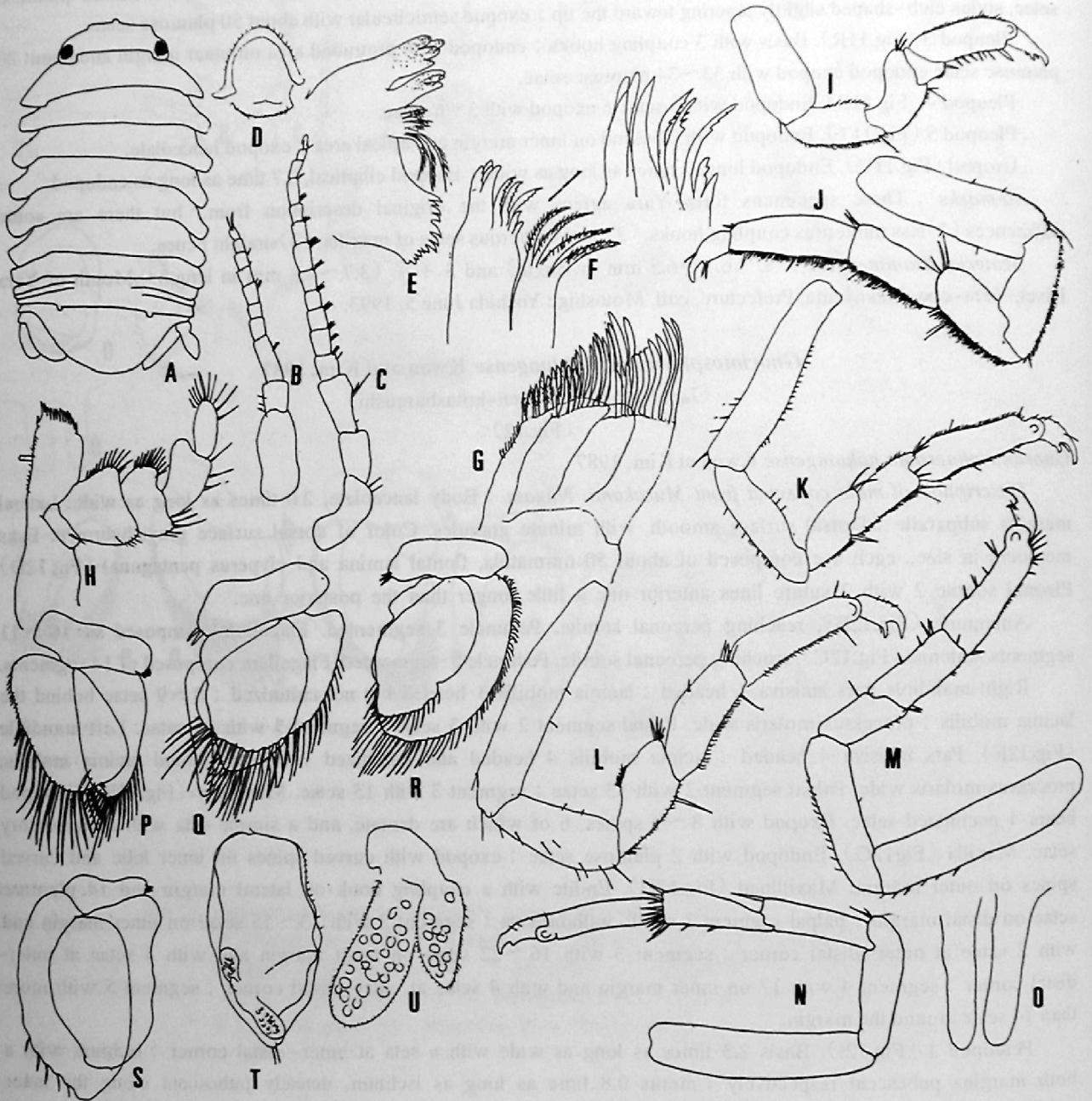


Fig.12. *Gnorimosphaeroma naktongense* Kwon and Kim, 1987

A. Dorsal view ; B. Antennule ; C. Antenna ; D. Clypeus and Frontal lamina ; E. Left mandible ; F. Maxillula ; G. maxilla ; H. Maxilliped ; I-J. Pereopods 1-2 ; K-N. Pereopods 4-7 ; O. Penes ; P-T. Pleopods 1-5 ; U. Uropod (All : Male specimen from Murakami, Niigata).

along the inner margin, ; dactylus bifid.

Pereopod 4 (Fig.12K). Basis 3.7 times as long as wide with a seta at inner distal corner ; ischium half length as long as basis ; merus 2/3 time as long as ischium ; carpus as long as merus ; propodus as long as ischium, ; dactylus bifid.

Pereopod 5 (Fig.12L). Basis 3.5 times as long as wide ; ischium 3.5 times as long as basis ; merus 3/4 times as long as ischium, densely pubescent along the inner margin and with a seta at outer- distal corner ; carpus 0.7 time as long as merus densely pubescent along the inner margin ; propodus 1.5 times as long as carpus and densely pubescent along the inner margin ; dactylus bifid.

Pereopod 6 (Fig.12M). Basis. 4 times as long as wide with 3~4 setae on inner margin ; ischium 3/4 time as long as wide with 4 setae on inner margin and 2 setae on outer margin ; merus 2/3 time as long as ischium, densely pubescent along the inner margin and with 2 long setae at outer- distal corner ; carpus as long as merus, densely pubescent along the inner margin ; propodus densely pubescent along the inner margin ; dactylus bifid.

Pereopod 7 (Fig.12N). Basis long, 4.2 times as long as wide ; ischium a little shorter than basis ; merus 4/5 time as long as ischium with a seta at inner- distal corner and 2 setae at outer- distal corner ; carpus as long as merus, with 3 short setae on inner margin and 10 setae on distal margin ; propodus a little longer than carpus ; dactylus bifid.

Penes (Fig.12O) club-shaped and straight. Each penis situated closely.

Pleopod 1 (Fig.12P). Basis with 3 coupling hooks ; endopod triangular with about 20 plumose setae ; exopod with about setae around the margin.

Pleopod 2 (Fig.12Q) lanceolate ; basis with 2~3 coupling hooks ; endopod with 36 plumose setae ; exopod with 18~19 plumose setae.

Pleopod 3 (Fig.12R). Basis with 3 coupling hooks ; endopod with more than 60 setae ; exopod with 17~19 plumose setae.

Pleopod 4 (Fig.12S). Basis with 2 coupling hooks ; endopod without setae ; exopod with 5~6 plumose setae.

Pleopod 5 (Fig.12T). Endopod lanceolate with 2 bosses ; exopod lanceolate.

Uropod (Fig.12U). Endopod 2.5 times as long as wide ; exopod 2/3 time as long as endopod.

Remarks : The present specimens collected from the freshwater of Niigata Prefecture agree with the original description, of which type specimens was collected from the Naktong River, South Korea, but the specimens from Niigata have the following differences from the original descriptions : (1) single coupling hook on endite of maxilliped, (2) less numerous setae on outer distal corner of merus of pereopod 1, and (3) less numerous flagellum of both antenna.

Material examined ; 2♂♂ (up to 7.8 in body length) and 10♀♀ (up to 7.6 in body length), Arakawa River, coll. Motoharu Togashi, Niigata Prefecture, Feb. 18. 1996 ; 5♀♀ (up to 8.6 in body length) Kano River Niigata Prefecture coll. Motoharu Togashi, Feb. 18. 1996.

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