On the Genus *Gnorimosphaeroma* (Crustacea, Isopoda, Sphaeromatidae) in Japan with Descriptions of Six New Species

Noboru Nunomura
Toyama Science Museum

日本列島のイソコツブムシ属（甲殻綱，等脚目，コツブムシ科）

布村　昇
富山市科学文化センター

Reprinted from
Bulletin of the Toyama Science Museum No.21
30 March 1998

Bulletin of the Toyama Science Museum No.21, pp.23–54 (1998)

On the Genus *Gnorimosphaeroma* (Crustacea, Isopoda, Sphaeromatidae) in Japan with Descriptions of Six New Species*

Noboru Nunomura
Toyama Science Museum
Nishinakano-machi, Toyama-shi, 939-8084 JAPAN

日本列島のイソコツブムシ属（甲殻綱，等脚目，コツブムシ科）

布村　昇
富山市科学文化センター
〒939-8084　富山市西中野町1-8-31

日本列島には海水域や汽水域のみならず，日本海側の地域や北海道を中心にして，純淡水を含めた多様な水域から，多数の個体群の存在が知られている。そこで日本列島各地に生息するイソコツブムシ属（甲殻綱，等脚目，コツブムシ科）の標本を収集し，次の口器，ほかの付属肢の形態，剛毛の生え方の状況などを比較し，６新種を含む次の12種の生息を確認した。

ヒメコツブムシ（新称）*Gnorimosphaeroma pulchellum* n. sp.
サイゴクコツブムシ（新称）*Gnorimosphaeroma iriei* n. sp.
レブンコツブムシ（新称）*Gnorimosphaeroma rebunense* n. sp.
ホクリクコツブムシ（新称）*Gnorimosphaeroma hokurikuense* n. sp.
アカンコツブムシ（新称）*Gnorimosphaeroma akanense* n. sp.
ツシマコツブムシ（新称）*Gnorimosphaeroma tsushimaense* n. sp.
イソコツブムシ *Gnorimosphaeroma rayi*, Hoestlandt, 1969
フタゲイソコツブムシ（新称）*Gnorimosphaeroma hoestlandti* Kim and Kwon, 1985
マルコツブムシ *Gnorimosphaeroma ovatum*（Gurjanova, 1933）
シナコツブムシ（新称）*Gnorimosphaeroma chinesnse*（Tattersall, 1921）
ミギワコツブムシ（新称）*Gnorimosphaeroma anchialos* Jang and Kwon, 1993
チョウセンコツブムシ *Gnorimosphaeroma naktongense* Kwon and Kim, 1987

キーワード：イソコツブムシ，コツブムシ科，等脚目，淡水産，汽水産，海産分類

In Japan, the genus *Gnorimosphaeroma* occurs often abundantly, not oniy from sea water but also from freshwater and they show complicated morphological variations and the taxonomy of this group has been much confused. So, I examined more than 800 specimens from 45 localities and I confirmed 12 species including new species; *Gnorimosphaeroma oligostrigosum. Gnorimosphaeroma iriei, Gnorimosphaeroma rebunense, Gnorimosphaeroma Hokurikuense, Gnorimosphaeroma akanense* and *Gnorimosphaeroma tsushimaense.*

Key words：Gnorimosphaeroma, Sphaeromatidae, Isopoda, Freshwater, Brackish, Marine.

Hitherto, only four species of the genus *Gnorimosphaeroma* have been recorded in Japan：*G. ovatum, Grayi, G. hoestlandti* and *G. nacktongense*. As the result of my survey of more than 800 specimens collected more than 45 areas, I found 12 species including 6 new ones.

The holotype and a part of paratypes deposited at the Toyama Scicence Museum. Other paratypes are depostied at Osaka Maueum of Natural History, the Natural History Museum and Institute, Chiba, and the Department of Zoology, Rishiri Town Museum.

* Contribution from the Toyama Science Museum No.193

Keys to the species of the Gnorimosphaeroma in Japan

1 Uropod smaller than half length of endopod. Each ramus of exopod of maxilla with lessthan 4 recurved spines ····· 2

1' Uropod not smaller half lenght of endopod. Each ramus of exopod of maxilla with more than 8 recurved spines ····· 3

2 Stylus of male pleopod 2 completely divided from the endopod ····· *chinense*

2' Stylus of male pleopod 2 not completely divided from the endopod ····· *pulchellum*, n. sp.

3. Pereopod 1 with basis bearing more than six setae at inner distal corner ····· *rayi*

3' Pereopod 1 with basis bearing less three than three setae at inner distal corner ····· 4

4 Pereopod 1 with merus bearing two setae at inner distal corner ····· 5

4' Pereopod 1 with merus bearing three to five setae at inner distalcorner ····· 7

4" Pereopod 1 with merus bearing about eight setae at inner distal corner ····· *hoestlandti*

5 Maxilla with exopod bearing less than ten spines of each ramus. Maxilliped with palpal segment 3 with 3setae ····· *ovatum*

5' 'Maxilla with exopod bearing more than eleven spines of each ramus Maxilliped with palpal segment 3 with 1 or 2 setae ····· 6

6 Maxilliped with palpal segment 3 bearing a setae. Exopod of uropod about 3/4time as long as endopod ····· *akanense*, n. sp.

6' Maxilliped with palpal segment 3 bearing 2 setae. Exopod of uropod about 3/5time as long as endopod ····· *riei*, n. sp.

7 Maxilliped with palpal segment 2 bearing 2 setae. Endopod of maxilla with 11～12 setae ····· 8

7' Maxilliped with palpal segment 2 bearing a seta. Endopod of maxilla with 9 setae ····· *hokurikuense*, n. sp.

7" Maxilliped with palpal segment 2 bearing no seta . Endopod of maxilla with 14 setae ····· *rebunense*, n.sp.

8 Maxilliped with palpal segment 4 bearing 5. setae ····· 9

8' Maxilliped with palpal segment 4 bearing 2 setae ····· *tushimaense*, n.sp.

9 Antenna with flagellum more than more than 17-segmented ····· *naktongnese*

9' Antenna with flagellum less than 13-segmented ····· *anchialos*

***Gnorimosphaeroma pulchellum* n. sp.**

(Jap. name : Hime-kotsubumushi, new)

(Fig.1)

Description : Body ovate 2.0 times as longs as wide. Color dull yellow. Surface smooth. Eyes mediocre in size and each eye composed of about 45～47 ommatidia. Lateral corner subparallel. Pleonite with 2 auture lines anterior line slightly longer then posterior one.

Antennule (Fig.1B), reaching posterior half of first pereonal somite, consists of 3 peduncular segments and 5～11 flagellar segments. Antenna (Fig.1C), reaching the anterior end of second pereonal somite, consists of 5 peduncular segments and 10～11 flagellar segments.

Right mandible (Fig.1D) pars incisiva 3-headed ; lacinia mobilis 3-headed but not chitinized ; 3 setae behind lacinia mabilis ; processus molaris wide Palpal segment with 7 setae ; seqment 3 with setae. Left mandible ; pars incisiva 3-headed ; lacinia mobilis 3-headed but not chitinized ; 3 setae behind laeinia mobilis ; processus molaris wide ; Palpal segment 2 with 4 setae, palpal segment 3 with 7 setae. Maxillula (Fig.1E). with endopod bearing 3 pectinated setae Exopod bearing 8 setae, all are simple type. Maxilla (Fig.1F) with endopod bearing 6 plumose setae ; exopod bearing 3 curved spines on inner lobe and 3 curved spines. Maxilliped (Fig.1G) with a coupling hook. Palpal segment 1 bearing a seta at inner distal corner ; segment 2 with 15 setae on inner margin but no seta on outer margin ; segment 3 with 12 setae on inner margin but no seta on outer margin ; segment 4 with 11～12 setae on inner margin and a seta outer distal corner ; segment 5 with 10 setae

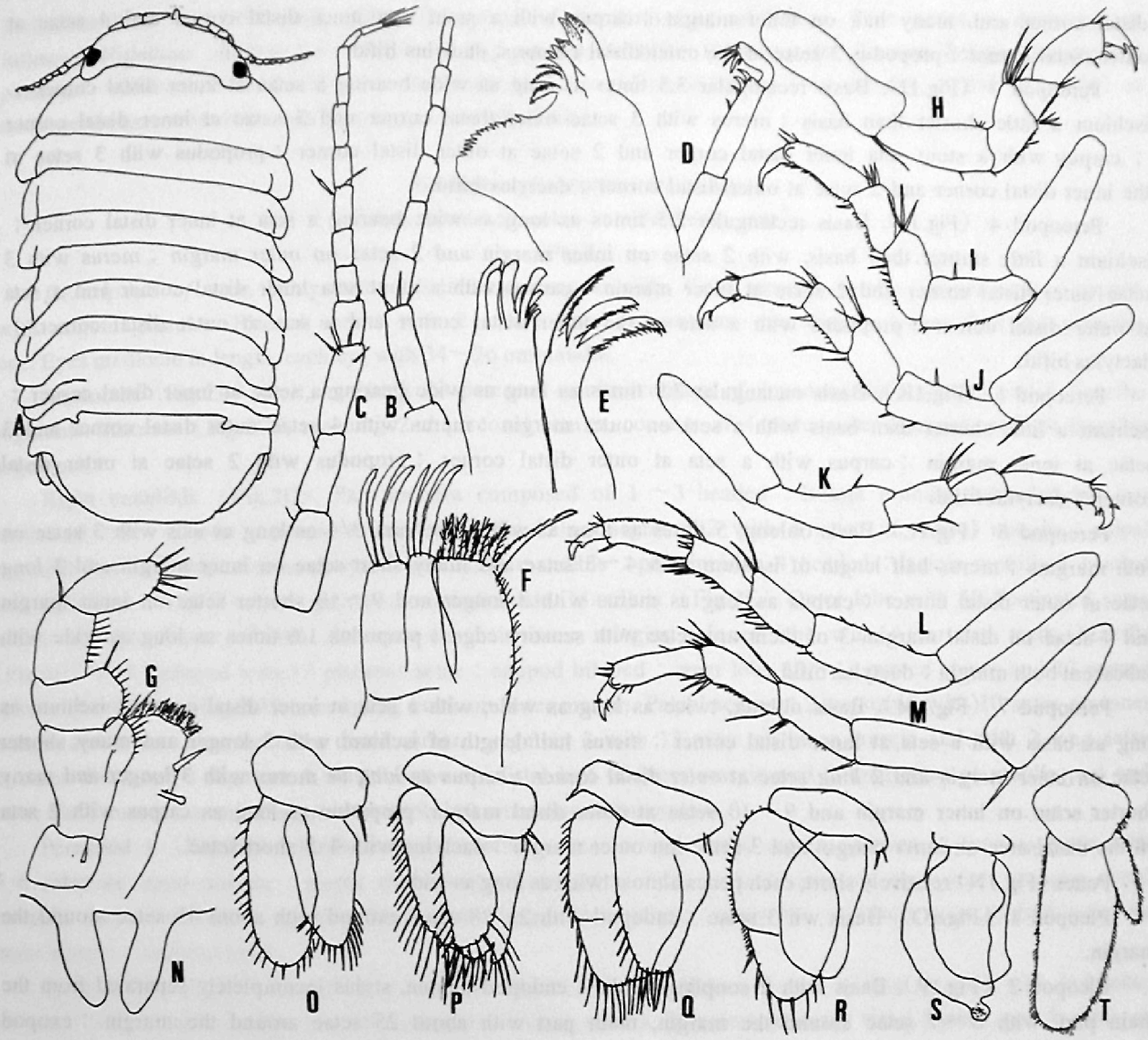

Fig.1 *Gnorimosphaeroma pulchellum* n. sp.
A. Dorsal view ; B. Antennule ; C. Antenna;. D. Right mandible ; E.. Maxillula ; F. Maxilla ; G. Maxilliped ; H-J. Pereopods 1-3 ; K-M. Pereopods 5-7 ; N. Penes ; O-S. Pleopods 1-5 ; T. Uropod (All : Holotype male).

around the margin.

Pereopod 1 (Fig.1H). Basis rectangular, 3.3 times as long as wide bearing a seta at inner distal corner ; ischium slightly tapering towards the tip with 2 short setae on inner margin and 3 very short setae near the outer distal corner ; merus triangular with 3 setae at inner distal corner, many hair on inner margin and 5 setae at outer distal corner ; carpus triangular with inner distal corner ; propodus 3 setae near the inner distal corner ; dactylus bifid.

Pereopod 2 (Fig.1I). Basis rectangular 3.7 times as long as wide bearing a seta at inner distal corner ; ischium slightly tapering towards the tip with several short setae on both margin ; merus with 3 setae outer

distal corner and, many hair on inner margin ; carpus with a stout seta inner distal corner and 4 setae at outer distal corner ; propodus 3 setae at the outer distal corner. ; dactylus bifid.

Pereopod 3 (Fig.1J). Basis rectangular 3.5 times as long as wide bearing a setae at inner distal corner ; ischium a little shorter than basis ; merus with 3 setae outer distal corner and 3 setae at inner distal corner ; .carpus with a stout seta inner distal corner and 2 setae at outer distal corner ; propodus with 3 setae at the inner distal corner and 2 setae at outer distal corner ; dactylus bifid.

Pereopod 4 (Fig.1J). Basis rectangular 3.5 times as long as wide bearing a seta at inner distal corner ; ischium a little shorter than basis, with 2 setae on inner margin and 2 setae on outer margin ; merus with 3 setae outer distal corner and 2 setae at inner margin ; carpus with a stout seta inner distal corner and a seta at outer distal corner ; propodus with a seta at the inner distal corner and a seta at outer distal corner. ; dactylus bifid.

Pereopod 5 (Fig.1K). Basis rectangular 3.9 times as long as wide bearing a setae at inner distal corner ; ischium a little shorter than basis with a seta on outer margin ; merus with 4 setae outer distal corner and 3 setae at inner margin ; carpus with a seta at outer distal corner ; propodus with 2 setae at outer distal corner ; dactylus bifid.

Pereopod 6 (Fig.1L). Basis oblong, 5 times as long as wide ; ischium 3/4 as long as asis with 3 setae on both margins ; merus half length of ischium with 4～5 setae and many short setae on inner margin and 3 long setae at outer distal corner ; carpus as long as merus with 3 longer and 9～10 shorter setae on inner margin and 4 setae on distal margin, 3 of them are setae with sensory edge ; propodus 1.6 times as long as wide with pubescent both margin ; dactylus bifid.

Pereopod 7 (Fig.1M). Basis oblong, twice as long as wide, with a seta at inner distal corner ; ischium as long as basis with a seta at inner distal corner ; merus half length of ischium with 3 longer and many shorter setae on inner margin and 2 long setae at outer distal corner ; carpus as long as merus with 3 longer and many shorter setae on inner margin and 9～10 setae at outer distal margin, propodus as long as carpus with 2 seta on the distal area on inner margin and 3 setae ion outer margin ; dactylus with 4-5 short setae.

Penes (Fig.1N) relatively short, each penes almost twice as long as wide.

Pleopod 1 (Fig.1O). Basis wit 3 setae ; endopod with 25-28 setae exopod with about 45 setae around the margin.

Pleopod 2 (Fig.1P). Basis with 2 coupling hooks ; endopod unique, stylus incompletely separated from the main part, with 6～7 setae around the margin, main part with about 25 setae around the margin ; exopod lanceolate wit 42～46 setae.

Pleopod 3 (Fig.1Q). Basis with 3 setae ; endopod with 16～18 setae ; exopod with 34～37 setae.

Pleopod 4 (Fig.1R). Basis with 2 coupling hooks ; endopod with 30～35 setae ; exopod with 1 or 2 setae.

Pleopod 5 (Fig.1S) with 2 bosses.

Uropod (Fig.1T). Basis round ; endopod rectangular densely pubescent along inner margin ; exopod small and 42% as long as endopod.

Remarks : The present species is most closely allied to *G. chinense*, especially in having small endopod of uropod and lacking of any setae of original description from the of setae 2-3, and in having a small number of teeth on Maxilla, but the former is separated from the latter in the following features : (1) more numerous setae on endopod of maxilla, whereas less numerous setae of exopod ; (2) less numerous flagella of antennule, (3)less numerous flagella of antenna, (4) longer anterior suture line than the posterior one, (5) more numerous setae on outer distal corner of merus of pereopod 1 (6)not completely separated stylus from endopod, in male second pleopod, (7)less numerous teeth on the exopod of maxilliped.

Etymnology : L. *pulcelium/pulchellus* = very pretty.

Material examined;; 7 ♂♂ (1 ♂ holotype, 5.5 ㎜ in body length and 6 ♂♂ paratypes 4.3～5.0 ㎜ in body length) and 2 ♀♀ (paratypes, 4.2～4.5 ㎜ in body length), mouth of Obitsu river, Kisarazu City, Chiba

Prefecture Nov. 18, 1997, coll. Aikra Tukagoshi, of the University of Tokyo, Type series is deposited as follows : Holotype (TOYA Cr-12482) and 4 paratypes (12483～12486) at the Toyama Science Museum 2 paratypes (OMNH Ar 3943～3944) at the Osaka Museum of Natural History ; 2 paratypes (CBM-ZC 4076) at the Natural History Museum and 2 paratypes, Institute, Chiba..

***Gnorimosphaeroma iriei* n. sp.**

(Jap. name : Saigoku-kotsubumushi, new)

(Fig.2)

Description. of male. Body ovate, 1.8 times as long as wide. Color grayish-brown. Dorsal surface smooth with minute granules. Pleonal somite with 2 suture lines and anterior one slightly longer than the posterior one. Eyes mediocre in length, each eye with 34～36 ommatidia.

Antennule (Fig.2B) short,, reaching 1st pereonal somite, consists of 2 peduncular segments and 8 flagellar segments. Antenna (Fig.2C), reaching 2nd pereonal somite, consists of 4 peduncular segments and 10 flagellar segments.

Right mandible (Fig.2D). Pars incisiva composed of 1～3-headed ; lacinia mobilis 4-headed but not chitinized ; 5～6 setae ; processus molaris wide. Palpal segment 2 with 6 setae in. lateral margin ; palpal segment 3 with 2 seta eon inner apical area. Left mandible ; pars incisiva 4-headed ; lacinia mobilis 3-headed and chitinized ; 4 or 5 setae ; processus molaris wide. Maxillula (Fig.2E). Outer lobe with 10 Pectinated setae at the tip, inner four of with denticles on their inner margins : Inner lobe with 4 serrated teeth. Maxilla (Fig.2F) with endopod with 12 plumose setae ; exopod bilobed ; inner lobe 10～11 curved spines and 12 curved spines. Maxilliped (Fig.2G) a coupling hook on inner margin. Palpal segment 2 trapezoid with 10 setae on inner margin and a seta near the outer distal corner ; segment 3 with 12 setae on inner margin and with 2 long setae at outer distal end ; segment 4 with 8 setae on distal half of inner margin and 2 long setae at middle part and outer distal corner ; terminal segment with 9～10 setae around the margin.

Pereopod 1 (Fig.2H). Basis rectangular with a seta at inner distal corner, ischium as long as basis with 5-6 setae on inner margin ; merus about half the length of basis with 3 relatively long setae at outer distal corner ; carpus as long as merus with 8 setae along distal margin ; propodus relatively stout with 6 setae on inner margin ; dactylus bifid.

Pereopod 2 (Fig.2I). Basis long, 4 times as long as wide ; ischium 4/5 time as long as wide, with 4-5 setae on inner margin and 4 setae on outer margin ; merus with a long seta at inner distal corner and 2 setae at outer distal margin ; carpus rectangular a little longer than merus, with a seta on inner margin and 2 setae on outer margin ; dactylus bifid.

Pereopod 3 (Fig.2J). Basis rectangular, 4 times as long as wide, with 3 setae on inner margin and a long seta at inner distal margin ; ischium a little shorter than basis and densely pubescent along inner margin on inner margin ; merus half length of basis, with 6～7 segment on inner margin and 2 setae at outer distal corner ; carpus 2/3 time as long as basis with 30～33 stout setae on inner margin and a seta at inner most corner and outer distal corner respectively. ; dactylus bifid..

Pereopod 4 Baisis rectangular, 3 times as long as wide, with 4 short setae on inner margin ; ischium 3/4 time as long as basis ; with pubescent inner margin ; merus with 2setae on inner margin and 3 setae at outer distal cornerinner margin pubescent. ; carpus rectangular with 2setae at inner disatal corner and 3 setae at outer distal corner ; propodus as long as ischium wirh 5～6 short seta on inner margin ; dactylus bifid with 3 setae .

Pereopod 5 (Fig.2K). Basis rectangular, 3.5 times as long as wide with 5 setae on inner margin ; ischium as long as basis densely pubescent along inner margin on inner margin ; merus, about half length of ischium with pubescent inner margin, with 2 setae at inner distal corner and 3 setae at outer distal corner ; carpus a stout seta at inner distal corner and 2 setae at outer distal corner ; propodus with 5 setae on inner martin and

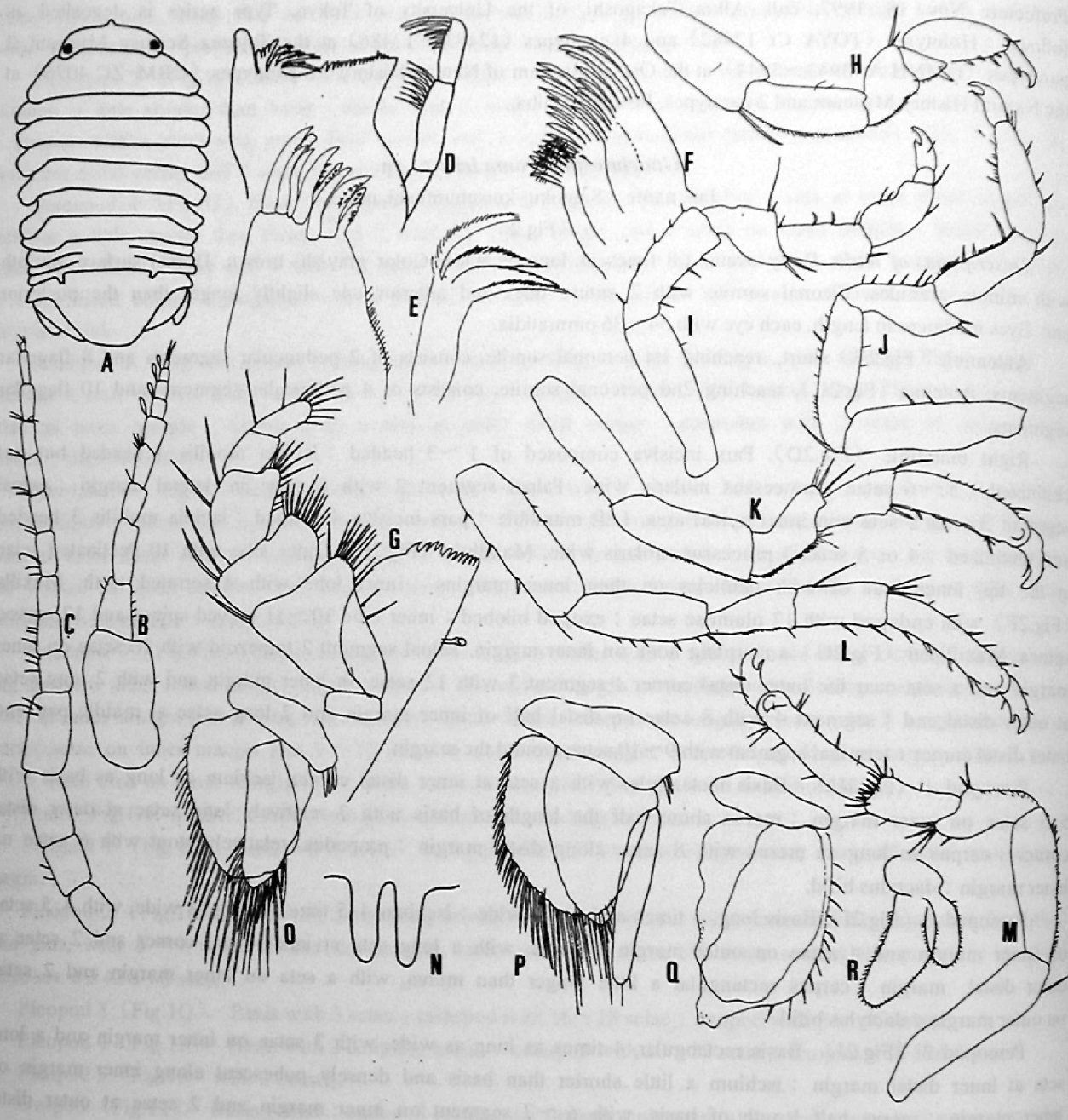

Fig.2. *Gnorimosphaeroma iriei* n.sp.
A. Dorsal view ; B. Antennule ; C. Antenna ; D.right mandible ; E. Maxillula ; F. Maxilla ; G. Maxilliped ; H-J.Pereopods 1-3 ; K-M. Pereopods 5-7 ; N. Penes ; O-P. Plepods1-2 ; Q. Pleopod5 ; R. Uropod (All : Holotype male).

several seta on outer margin ; dactylus bifid.

Pereopod 6 (Fig.2L). Basis 3 times as long as wide, with 4 seta on inner margin and 3 setae on outer margin ; ischium 3/4 time as long as basis, with 4～5 setae on inner margin ; merus with many fine setae on

inner margin and a long seta at outer distal corner ; carpus as long as merus, with 3 setae on inner margin and 3 setae at outer distal corner ; propodus with 4 stout setae on inner margin and 6 seta on outer margin dactylus bifid

Pereopod 7. (Fig.2M). Basis oblong, 4.5 times as long as wide, with a seta at inner distal corner ; ischium 5/7 time as long as basis, densely pubescent along inner margin on inner margin ; merus 3/5 time as long as ischium densely pubescent along inner margin on inner margin and 4 setae at outer distal ; corner ; carpus as long as merus with 2 setae at inner distal corner and a seta at outer distal corner ; propodus as long as ischium with 5 setae on inner margin and 7 setae on outer margin ; dactylus bifid.

Penes (Fig.2N) straight and relatively short, each penis 3 times as long as wide.

Pleopod 1 (Fig.2O) Basis with 3 coupling hooks ; endopod with 15-16 plumose setae around the margin ; exopod with 50-56 plumose setae around the margin. ;

Pleopod 2 (Fig.2P). Basis with 4 coupling hooks ; endopod with 33 plumose setae around the margin ; stylus ; exopod narrower than endopod with 15 plumose setae around the margin.

Pleopod 3 Basis with coupling hooks ; endopod with 13 plumose setae around the margin ; exopod with 10 plumose setae around the margin.

Pleopod 4 (Fig.2Q). Basis with coupling hooks ; endopod plumose setae around the margin ; exopod with 16 plumose setae around the margin.

Pleopod 5basis elliptical ; endopod rectangular ; exopod with relatively short 12～14 plumose setae around the margin and 2 bosses.

Uropod (Fig.2R). Basis round ; endopod slightly tapering toward the tip ; exopod 3/5 times as long as wide

Remarks : The present new species is allied to *Gnorimosphaeroma naktongnese*, collected from southern end Korean Peninsula but differs from *naktongense* in the following features (1)less numerous flagellum of antennae (2)less numerous flagellum of antennule (3)more numerous setae at the outer distal corners of pereopod 1 (4) more numerous setae of maxilla, (5) a little shorter exopod of uropod, (6)shorter penes, (7)smaller eyes, (8) less protruded inner margin of propodus of pereopod 2, (9) single coupling hook.

Etymnology : The species name is named for Mr. Teruo Irie, who kindly gave me the species from the type locality and studied on the ecology of this species.

Material examined ; 10♂♂ (1♂ holotype, 5.6 mm in body length and 9♂♂ paratypes 5.0～5.7mm in body length) and 24♀♀ (paratypes 4.1～5.8mm in body length), Ezu-ko Lake, Kumamoto City, Kumanoto Pref., coll. Teruo Irie, Aug. 28 1984 Type series is deposited as follows : Holotype (TOYA Cr-12487) and 11 paratypes (12488～12498) at the Toyama Science Museum, 11 paratypes (OMNH Ar-3945～3955) at the Osaka Museum of Natural History ; 11 paratypes (CBM-ZC-4077) at the Natural History Museum and Institute, Chiba.

***Gnorimosphaeroma rebunense* n. sp.**

(Jap.name : Rebun-kotusubumushi, new)

(Fig. 3)

Description ; Body 1.9 times as long as wide. Height of body is almost average of this genus. Color brownish and blackish gray with many paler irregular patterns. Central part of projection on the anterior part of cephalon and both antennae completely divided. Eyes mediocre in size, each eye composed of 30 ommatidia. Two suture lines are almost same in length. Posterior end slightly protruded.

Antennule, (Fig.3A) reaching the anterior half of first pereonal somite ; peduncle slender and- three segmented ; Flagellum 8 segmented. Antenna (Fig.3C) longer than antennule and reaching the middle part of pereonal somite 2. Flagellum four-segmented and Flagellum composed of 10～11 segments.

Right mandible (Fig.3D) pars incisiva 4-headed ; lacinia mobilis 4-headed but not chitinized ; 4 setae behind lacinia mobilis ; processus molaris wide. Palp three-segmented, segment 2 with 13～15 setae ; segment 3 with 14～15 setae, the terminal one is especially long. Left mandible Pars incisiva 7-headed ; lacinia mobilis