

A New Species of *Anthessius* (Copepoda, Poecilostomatoida, Anthessiidae) from the Pen Shell, *Atrina pectinata* (Linné) in Korea

Suh, Hae-Lip and Choi, Sang-Duk

(Department of Oceanography, College of Natural Sciences, Chonnam National University,
Kwangju 500-757, Republic of Korea)

한국산 키조개에서 채집된 *Anthessius*
(Copepoda, Poecilostomatoida, Anthessiidae)의 1신종

서 해 립·최 상 덕
(전남대학교 자연과학대학 해양학과)

적 요

한국 연안에서 서식하는 키조개의 외투강에서 채집된 요각류 1종이 *Anthessius*속의 신종임이 확인되어 *A. atrinae*로 명명하였다. 본 종은 제2안테나 마지막 마디에 있는 3개의 claw와 제4외지 마지막 마디의 강모식 II, I, 5를 갖는 점과 caudal ramus의 형태의 차이에 의하여 다른 종과 구별된다.

Key words: Poecilostomatoida, *Anthessius atrinae* n. sp., bivalve infection, Korea

INTRODUCTION

Members of the genus *Anthessius* Della Valle, 1880 (Copepoda: Poecilostomatoida: Anthessiidae) are associated with marine ascidians, pelecypods, gastropods and fishes. Illg (1960) described five species of *Anthessius* from the northeastern Pacific. Stock *et al.* (1963), in revision of the genus *Anthessius*, listed 23 species. Since then 13 more species were described by Stock (1964), Humes and Ho (1969), Humes and Stock (1965), Reddiah (1966), Humes (1973, 1976), Ho (1983), Do and Kajihara (1984), and Avdeev and Kazatchenko (1985). Of these Nair (1988) recently removed the following species of *Anthessius*

associated with Tridacnidae (Pelecypoda) to a new genus *Tridachnophilus*: *A. alatus* Humes & Stock, 1965; *A. amicalis* Humes & Stock, 1965; *A. discipedatus* Humes, 1976; *A. solidus* Humes & Stock, 1965. Thus, the genus *Anthessius* now includes 32 species.

In the course of the parasitological survey of marine invertebrates from the Korean coast, it has been reported two poecilostomatoid copepods parasitic on marine pelecypods (Suh and Choi, 1990).

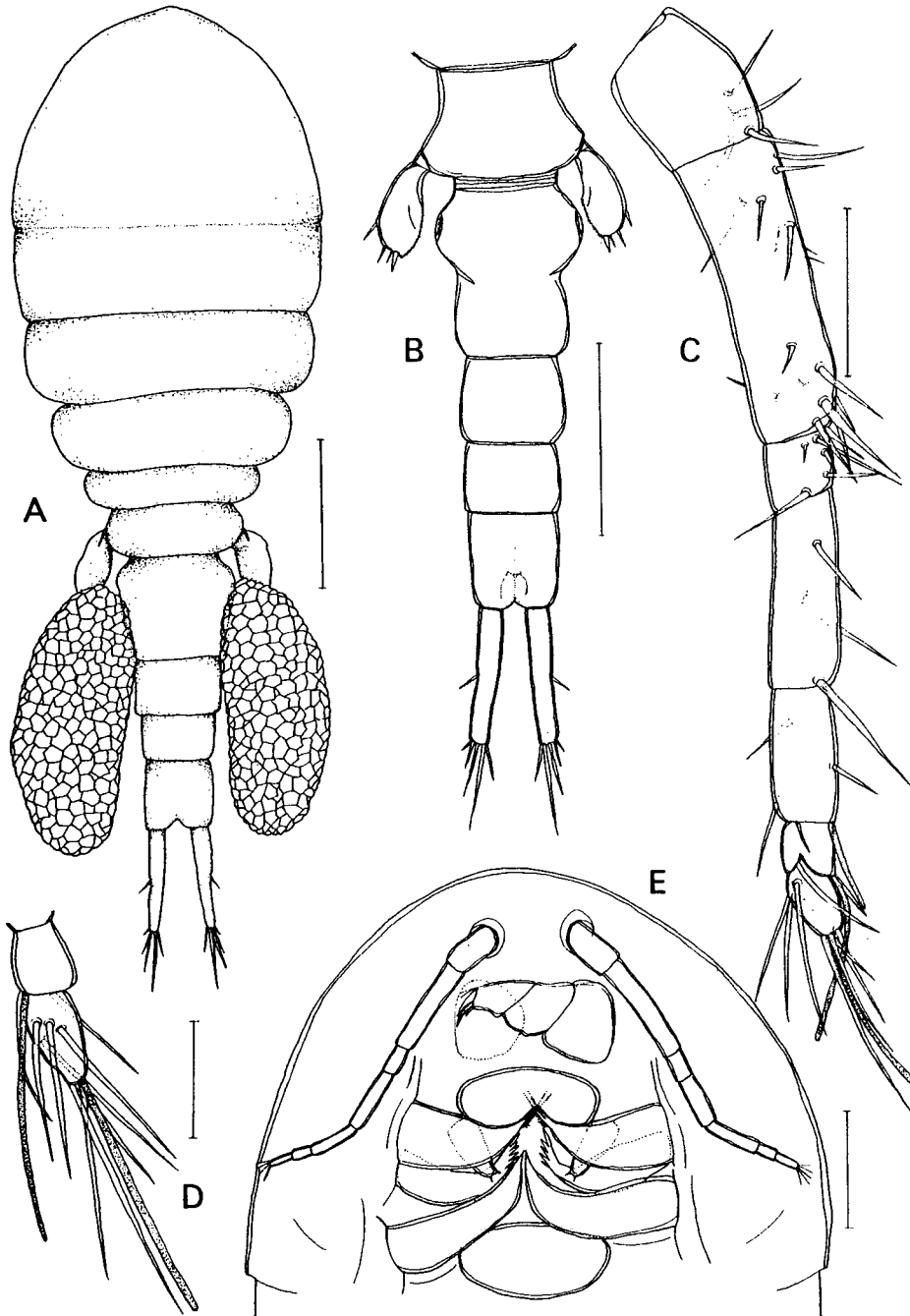


Fig. 1. *Anthessius atrinae*, new species, female. A, habitus, dorsal; B, urosome, ventral; C, antenna 1, ventral; D, terminal segment of antenna 1, dorsal; E, oral region. Scale bars = A, B, 0.5mm; C, 0.1mm; D, 0.05mm; E, 0.2mm.

DESCRIPTION

Anthessius atrinae, new species

(Figs. 1-5)

Type Specimens: Fifteen ♀♀, 6 ♂♂ and 2 copepodids recovered from the mantle cavity of 2 specimens

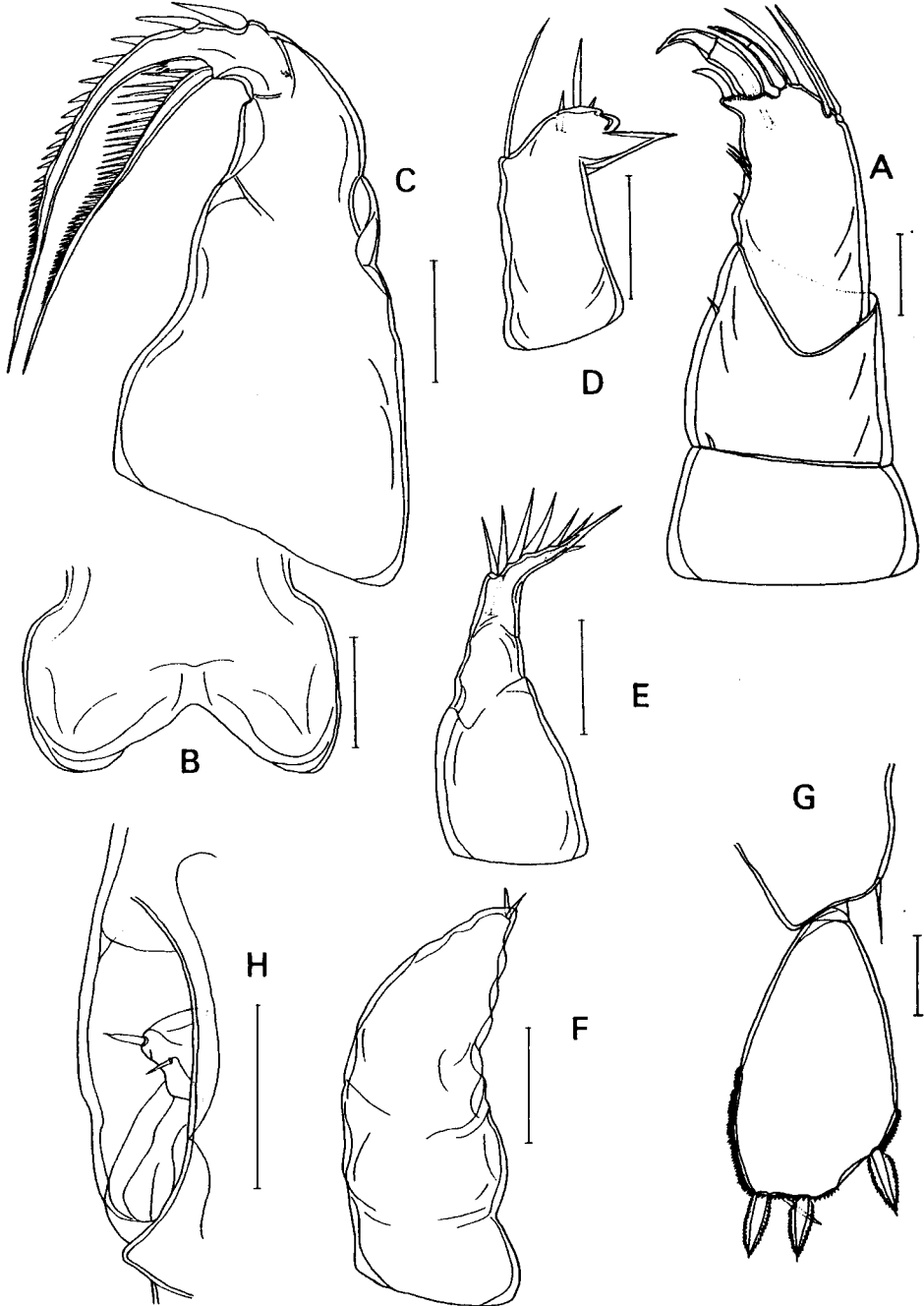


Fig. 2. *Anthessius atrinae*, new species, female. A, antenna 2; B, labrum; C, mandible; D, maxilla 1; E, maxilla 2; F, maxilliped; G, leg 5; H, leg 6. Scale bars = A, C-H, 0.05mm; B, 0.1mm.

associated with Tridacnidae (Pelecypoda) to a new genus *Tridachnophilus*: *A. alatus* Humes & Stock, 1965; *A. amicalis* Humes & Stock, 1965; *A. discipedatus* Humes, 1976; *A. solidus* Humes & Stock, 1965. Thus, the genus *Anthessius* now includes 32 species.

In the course of the parasitological survey of marine invertebrates from the Korean coast, it has been reported two poecilostomatoid copepods parasitic on marine pelecypods (Suh and Choi, 1990).

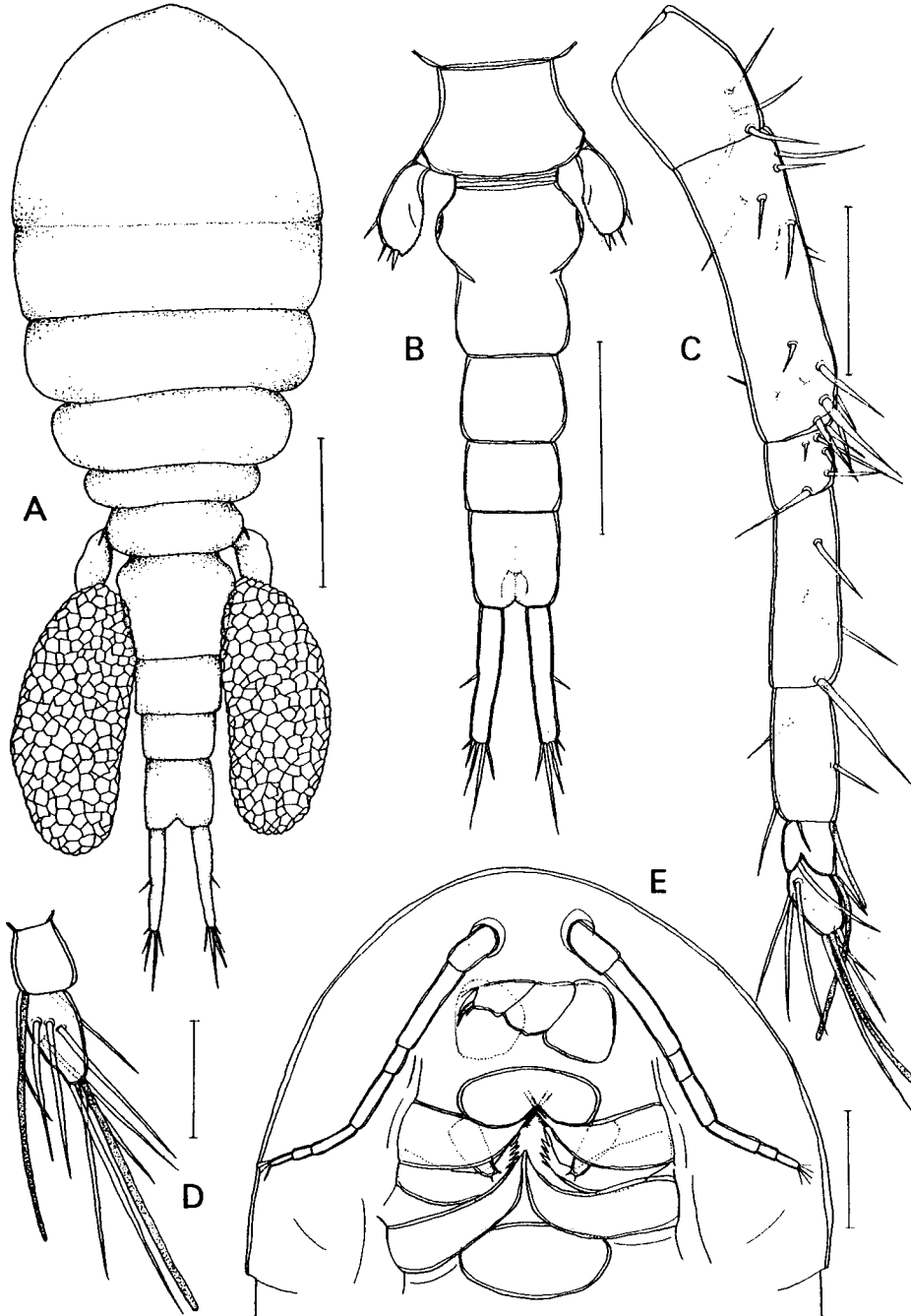


Fig. 1. *Anthessius atrinae*, new species, female. A, habitus, dorsal; B, urosome, ventral; C, antenna 1, ventral; D, terminal segment of antenna 1, dorsal; E, oral region. Scale bars = A, B, 0.5mm; C, 0.1mm; D, 0.05mm; E, 0.2mm.

DESCRIPTION

Anthessius atrinae, new species

(Figs. 1-5)

Type Specimens: Fifteen ♀♀, 6 ♂♂ and 2 copepodids recovered from the mantle cavity of 2 specimens

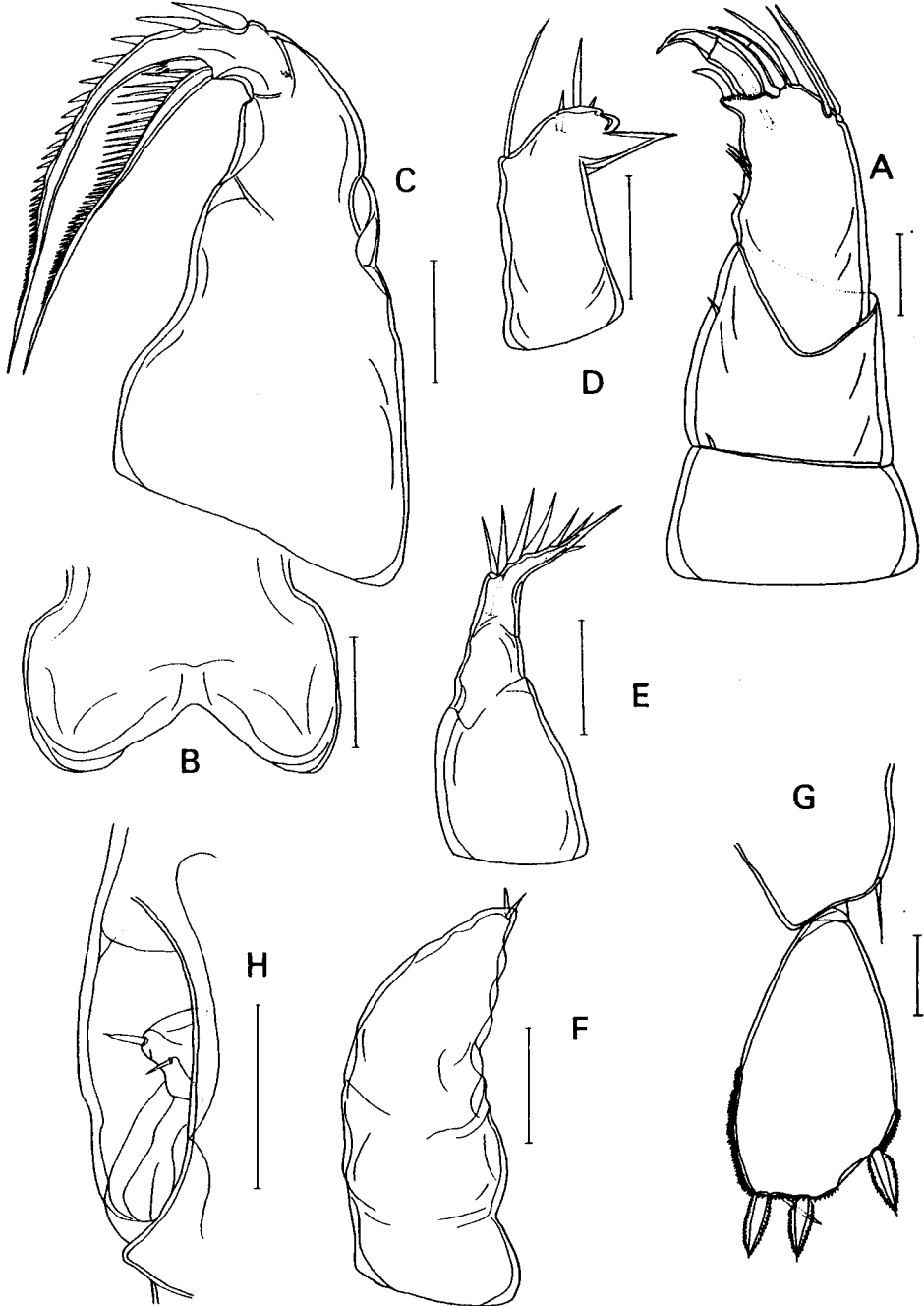


Fig. 2. *Anthessius atrinae*, new species, female. A, antenna 2; B, labrum; C, mandible; D, maxilla 1; E, maxilla 2; F, maxilliped; G, leg 5; H, leg 6. Scale bars = A, C-H, 0.05mm; B, 0.1mm.

of *Atrina pectinata* (Linné) bought from fish market at Pusan (collected from off Pusan), on November 23, 1987, by Il-Hoi Kim. Holotype ♀ and allotype ♂ and intact paratypes (12♀♀, 2♂♂ and 3 copepodids) will be deposited in the U.S. National Museum of Natural Science, Smithsonian Institution, Washington, D.C.

Other Materials Examined: Nine ♀♀ and 2 ♂♂ collected from a single specimen of *Atrina pectinata* (Linné) sampled at Wando Island in southern Korea, on April 24, 1990, by Jae-Duk Shim. The specimens

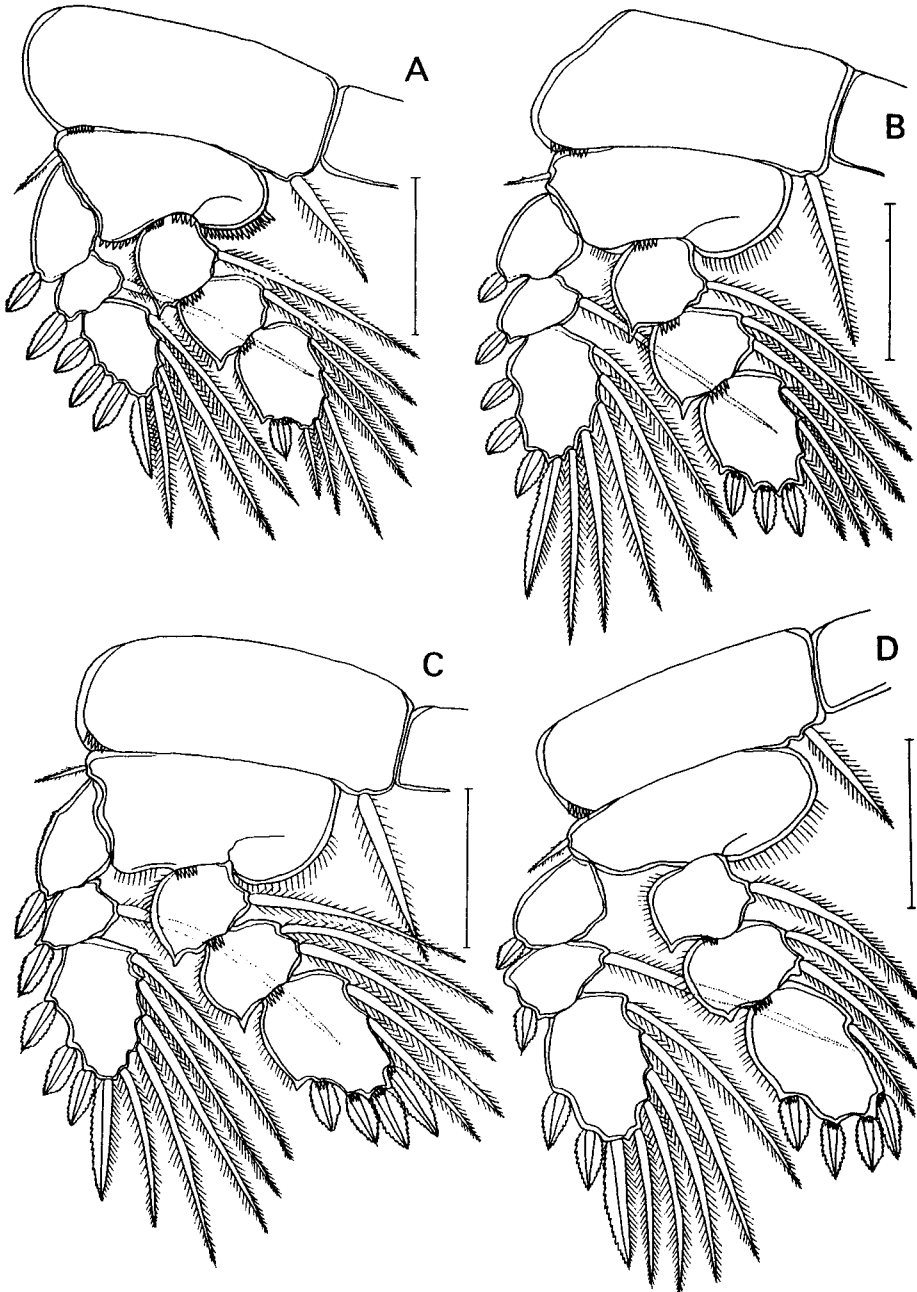


Fig. 3. *Anthessius atrinae*, new species, female. A, leg 1; B, leg 2; C, leg 3; D, leg 4. Scale bars = 0.1mm.

are deposited in Department of Oceanography, Chonnam National University.

Description of female (holotype): Measurements as in Table 1. Body (Fig. 1A) 1.35-1.71 times longer than wide, with cephalothorax separated from first leg-bearing segments. Prosome roundish rhomboid; great width at posterior end of cephalothorax; 1.35-1.71 times as long as wide; 1.11-1.41 times longer than urosome. Urosome (Fig. 1B) 3.17-4.16 times as long as wide. Genital complex swollen in anterolateral margin; 0.93-1.27 times longer than wide. Caudal ramus carrying 4 setae on distal margin and 2 setae (one each on dorsal and lateral surfaces); ratio of length to width about 5.6:1. Egg sac (Fig. 1A) relatively short, reaching only near anterior margin of the caudal ramus; each sac bearing 322-333 eggs (range value for four specimens).

Antenna 1 (Fig. 1C, D) elongated and 7-segmented; second and fourth segments much longer than the others; formula on armature of these segments 4, 15, 6, 3, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. Antenna 2 (Fig. 2A) 3-segmented; basal segment with a small seta at inner proximal corner; second segment with a small seta on inner margin; distal segment bearing 4 setae on inner margin, a seta on lateral surface of distal margin, and 3 unequal claws (middle one being the heaviest) and 3 long setae on distal margin.

Labrum (Fig. 2B) broad, with a large central incision on posterior margin. Mandible (Fig. 2C) typical of *Anthessius*, with dentate lamella between the long blade and the lash-like auxiliary seta; the former with a row of about 35 denticles on outer margin; greatest cuticularized denticle at proximal part of row; auxiliary setae with a row of relatively long denticles on outer margin; both processes without denticles on inner margins. Maxilla 1 (Fig. 2D) bilobed distally; inner lobe pointed and outer lobe with 4 setae. Maxilla 2 (Fig. 2E) with 9 denticles on distal process. Maxilliped (Fig. 2F) not-segmented and greatly reduced, with 2 terminal setae.

Legs 1-4 (Fig. 3) with each ramus 3-segmented. All coxae in 4 legs bearing a long plumose seta at inner distal corner, with a row of spinules on outer distal margin. All bases in 4 legs with a long plumose seta on outer distal margin near basal segment of exopod. Distal margin of basis of leg 1 with 2 rows of spinules. Distal margins of bases of leg 2-4 with a row of spinules and a row of hairs. Formula of armature of 4 legs as shown in Table 1 (Roman numerals indicating spines, Arabic numerals representing setae).

Table 1. Measurements of five adlut females and two males of *Anthessius atrinae* n. sp. from *Atrina pectinata* (Linné).

All measurements are given in micrometers (μm), the mean is followed by the range in parentheses.

	Female	Male
Total length	2527 (2453-2613)	1988 (2225-1750)
Prosome length	1370 (1298-1455)	1088 (950-1225)
Urosome length	1153 (1128-1170)	900 (800-1000)
Genital complex length	305 (280-325)	252 (250-253)
Caudal ramus length	253 (230-273)	180 (170-190)
Prosome width	896 (853-940)	700 (650-750)
Urosome width	327 (323-330)	313 (300-325)
Genital complex width	256 (278-230)	258 (238-278)
Caudal ramus width	45 (60-80)	38 —

ramus with 5 setae on distal margin and a seta on lateral margin; ratio of length to width about 4.7:1 (Fig. 4C).

Antenna 1 (Fig. 5A) 7-segmented, armed differently from female; armature of these segments 4, 15 + 3 aesthetes, 6, 3 + 1 aesthete, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. Antenna 2 (Fig. 5B) with an enlarged seta on distal margin of basal segment.

Mandible and maxilla 2 as in female. Maxilla 1 (Fig. 5C) bilobed; inner lobe pointed and outer lobe with 2 long setae and 2 small setae on distal margin. Maxilliped (Fig. 5D) 4-segmented; basal segment with a row of spinules on distal margin; second segment carrying 2 setae and 3 longitudinal rows of spinules on inner margin; third segment relatively short, with a long seta and a spiniform process on inner margin; fourth segment a curved claw bearing a row of small setules along inner margin and a slender seta on inner proximal margin.

Leg 2-4 as in female. Distal segment of endopod of leg 1 (Fig. 4D) with a spine stouter than in female. Leg 5 free segment (Fig. 5E) relatively longer and more slender than in female, with spines slightly stouter than in female; ratio of length to width 2.5:1. Leg 6 (Fig. 4E) with 2 long setae on subconical process of the ventral surface of genital complex.

Etymology: The specific name, *atrinae*, is the genitive form of the generic name of the host.

Remarks: Depending on the formula of armature of distal segment of the fourth exopod, Humes and Ho (1965) found that there are two groups of the species in the genus *Anthessius*; one has III, I, 5 and the other II, I, 5. Of the 32 known species, the former contains 19 species and the latter 13. The present new species belongs to the latter group including *A. dilatatus* (Sars, 1918), *A. dolabellae* Humes & Ho, 1965, *A. graciliunguis* Do & Kajihara, 1984, *A. investigatoria* Sewell, 1949, *A. leptostylis* (Sars, 1916), *A. lophiomi* Avdeev & Kazatchenko, 1985, *A. navanacis* (Wilson, 1935), *A. nortoni* Illg, 1960, *A. pinnae* Humes, 1959, *A. proximus* Stock, Humes & Gooding, 1963, *A. saecularis* Stock, 1964, *A. sensitivus* Stock, Humes & Gooding, 1963, and *A. varidens* Stock, Humes & Gooding, 1963.

It has been known that the number of terminal claws on antenna 2 is an useful recognition character in several species of *Anthessius* (Humes, 1973, 1976; Do and Kajihara, 1984; Avdeev and Kazatchenko, 1985). Due to the difference in number of terminal claws of antenna 2, the 13 species in the latter group can be divided into three categories: the first with four terminal claws of *A. dolabellae*, *A. graciliunguis*, *A. investigatoris*, *A. leptostylis*, *A. lophiomi*, *A. navanacis*, *A. nortoni*, *A. proximus*, *A. saecularis*, *A. sensitivus*, and *A. varidens*; the second with three terminal claws of *A. dilatatus*; the third with two terminal claws of *A. pinnae*.

A. atrinae belongs to the second category where there is a species, *A. dilatatus* (Sars, 1918). However, *A. atrinae* can be easily differentiated from *A. dilatatus* by the body size, and the shape of caudal ramus and free segment of leg 5. In *A. dilatatus*, according to the original description by Sars, the female is very small with a length of 1.4mm, the ratio of length to width of the caudal ramus of the female is about 3:1, and ratio of leg 5 of the female is about 2:1.

ABSTRACT

An anthessiid copepod, *Anthessius atrinae* n. sp., is described based on the specimens recovered in the mantle cavity of *Atrina pectinata* (Linné) taken from Korean waters. This is distinguished from congeners by formula II, I, 5 on distal segment of exopod of the fourth leg, three terminal claws on distal segment of the second antenna, and the shape of caudal ramus.

ACKNOWLEDGEMENTS

We wish to thank to Dr. Il-Hoi Kim, Department of Biology, Kangreung National University for his kind supply of type specimens and constructive comments on the manuscript. We also express our appreciation to Mr. Jae-Duk Shim, Department of Oceanography, Chonnam National University, for providing us with collection of the pen shell with which the present new copepod was associated.

REFERENCES

- Avdeev, G. V. and V. N. Kazatchenko, 1985. Parasitic copepods from fishes of the genus *Lophiomus* Gill in the Pacific. *Crustaceana*, **50**: 53-59.
- Do, T. T. and T. Kajihara, 1984. Two poecilostomatoid copepods, *Anthessius graciliunguis* n. sp. and *Modiolicola bifidus* Tanaka, 1961 from the blue mussel, *Mytilus edulis galloprovincialis* Lamarck, in Japan. *Fish Pathol.*, **19**: 5-15.
- Ho, J. S., 1983. A new species of copepod associated with *Pleurobranchaea californica* (Gastropoda: Opisthobranchia), with discussion on *Anthessius* associated with notaspidean sea slugs. *Veliger*, **25**: 393-398.
- Humes, A. G., 1973. Cyclopoid copepods associated with marine bivalve mollusks in New Caledonia. *ORSTOM Océanogr.*, **11**: 3-25.
- Humes, A. G., 1976. Cyclopoid copepods associated with Tridacnidae (Mollusca: Bivalvia) in the Moluccas. *Proc. Biol. Soc. Wash.*, **89**: 491-508.
- Humes, A. G. and J. S. Ho, 1965. New species of the genus *Anthessius* (Copepoda, Cyclopoida) associated with mollusks in Madagascar. *ORSTOM Océanogr.*, **3**: 79-113.
- Humes, A. G. and J.H. Stock, 1965. Three new species of *Anthessius* (Copepoda: Cyclopoida: Myicolidae) associated with *Tridacna* from the Red Sea and Madagascar. *Israel South Red Sea Exped.*, **15**: 49-74.
- Illg, P. L., 1960. Marine copepods of the genus *Anthessius* from the northeastern Pacific Ocean. *Pac. Sci.*, **14**: 337-372.
- Nair, B.U., 1988. *Anthessius* spp. (Anthessiidae) associated with Tridacnidae (Mollusca: Bivalvia) removed to a new genus *Tridachnophilus*. *Hydrobiologia*, **167/168**: 567-569.
- Reddiah, K., 1966. Copepods associated with Indian molluscs-(E). *Anthessius mytilicolus* n. sp. from *Mytilus viridis* at Ennore. *J. Mar. Biol. Ass. India*, **8**: 290-294.
- Stock, J. H., 1964. Sur deux especes d'*Anthessius* (Copepoda) des Indes Orientales. *Zool. Meded.*, **39**: 111-124.
- Stock, J. H., A. G. Humes and R. U. Gooding, 1963. Copepoda associated with West Indian invertebrates. III. The genus *Anthessius* (Cyclopoida: Myicolidae). *Stud. Fauna Curacao Carib. Is.*, **17**: 1-37.
- Suh, H. L. and S.-D. Choi, 1990. Two copepods (Crustacea) parasitic on the blue mussel, *Mytilus galloprovincialis*, from the Yongsan River estuary in Korea. *Bull. Korean Fish. Soc.*, **23**: 137-140.

RECEIVED: 8 MARCH 1991

ACCEPTED: 27 APRIL 1991