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First record of the family Platyscelidae (Crustacea, Amphipoda, Hyperiidea) from Jeju Island, Korea, with description of newly recorded species, *Tetrathyrus arafurae*

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This study aims to discover and document amphipods from Korea, contributing to the clarification of the Korean amphipod taxonomy. As part of this effort, a newly recorded species belonging to the platyscelid amphipod genus *Tetrathyrus* Claus, 1879 was collected during a pelagic zooplankton survey from off Jeju Island, Korea. The newly recorded species, *Tetrathyrus arafurae* Stebbing, 1888, is characterized by the morphology of the carpi on both gnathopods 1 and 2, and the inner rami on both uropods 1 and 2. This species is morphologically similar to *T. focipatus* Claus, 1879, but can be distinguished by differences in the structure of the basis of pereopod 5, inner rami of uropods 1 and 2, and length ratio of telson. This study represents the first record of both the genus *Tetrathyrus* and the family Platyscelidae in Korean waters. Additionally, a keys to the families of the superfamily Platysceloidea occurring in Korean waters, the family Platyscelidae, and the genus *Tetrathyrus* are provided.

Keywords: Crustacea, hyperiid, plankton, Platysceloidea, taxonomy

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Introduction

The superfamily Platysceloidea is characterized by the both antennae 1 and 2 being positioned on the ventral margin of the head. In addition, males usually possess a strongly zig-zagged, five-articulated antenna 2. The taxonomy of Platysceloidea has presented substantial challenges (Shih and Chen, 1995). Several genera have historically been grouped into families based on superficial morphological similarity and loosely defined characters rather than robust phylogenetic evidence. As a result, the current classification system of families within this superfamily requires systematic revision, and the phylogenetic relationships among the genera need to be carefully reexamined (Zeidler, 2016). Nonetheless, to date, 12 families, Amphithyridae Zeidler, 2016, Anapronoidae Bowman & Gruner, 1973, Brachyscelidae Stephensen, 1923, Eupronoidae Zeidler, 2016, Lycaeidae Claus, 1879, Lycaeopsidae Chevreux, 1913, Oxycephalidae Bate, 1863, Parascelidae Bovallius, 1887, Platyscelidae Bate, 1863, Pronoidae Dana, 1852, Thamneidae Zeidler, 2016, and Tryphanidae Boeck, 1871 have been recorded worldwide (Horton *et al*., 2025).

Among the 12 families, the family Platyscelidae Bate, 1863 can be distinguished from other families within the superfamily Platysceloidea by its reduced pereopod 7 and the presence of a fissure on pereopod 6 (Zeidler, 2016). The nomenclature of the family Platyscelidae has undergone several historical revisions. It was originally referred to as Typhidae Dana, 1853 (Claus, 1879; Stebbing, 1888; Chevreux, 1900; Chevreux and Fage, 1925), a name based on the genus *Typhis* Risso, 1816. However, as *Typhis* had already been used for a molluscan genus by Montfort (1810), the name was invalidated under the rules of zoological nomenclature. In response, Bate (1862) introduced

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the family name Platyscelidae, based on *Platyscelus* Bate, 1861, which was the next available and valid genus name. Later, Claus (1879) erroneously established the genus *Eutyphis* to consolidate several existing genera, including *Platyscelus*, which led Bovallius (1887) to propose the family name Eutyphidae, incorrectly attributing its authorship to Dana (1853). At present, following Bate's original designation, the family is officially recognized as Platyscelidae, based on the valid genus *Platyscelus*.

To date, 11 species belonging to four genera, *Hemityphis* Claus, 1879, *Paratyphis* Claus, 1879, *Platyscelus* Bate, 1862, and *Tetrathyrus* Claus, 1879 have been recorded worldwide within the family Platyscelidae (Horton *et al*., 2025). The genus *Amphithyrus* was previously included in Platyscelidae, however, following a comprehensive review by Zeidler (2016), it was reassigned to the newly established family Amphithyridae due to significant morphological differences from the other genera in Platyscelidae. As a result, only four genera are currently retained within Platyscelidae. Among these, the genus *Tetrathyrus* comprises two species and was established by Claus (1879), with *T. forcipatus* designated as the type species. The genus *Tetrathyrus* is characterized by the absence of a carpal process on gnathopod 1 and the absence of a fissure on pereopod 6.

Until now, no species of the genus *Tetrathyrus* had been recorded from Korean waters. However, *Tetrathyrus forcipatus* has been reported from neighboring regions, including Chinese and North Korean waters (Choi, 1973; Shih and Chen, 1995). Although the genus *Tetrathyrus* had not previously been recorded in South Korea, *Tetrathyrus arafurae* Stebbing, 1888 was collected during a pelagic zooplankton survey conducted in the Southern Sea near Jejudo Island (Fig. 1). This paper thus represents the first record of both the genus *Tetrathyrus* and the family Platyscelidae from Korean waters, adding a newly recorded species to the Korean hyperiid amphipod fauna. In addition, keys to the families of the superfamily Platysceloidea occurring in Korean waters, genera of the family Platyscelidae, and species of the genus *Tetrathyrus* are provided.

Materials and Methods

Specimens were collected with a MOCNESS net from subtidal waters of the South Sea, Korea (Fig. 1). The specimens were fixed in 95% ethanol and dissected in glycerol on Cobb's aluminum hole slides. The materials were examined under stereoscopic (Olympus SZX 10) and compound microscopes (Olympus BX 51), and drawings and measurements were made with the aid of a drawing tube. Line drawings were produced using the program Clip Studio Paint (Celsys, Japan). Body length was measured from the end of the rostrum to the end of the urosome, along the dorsal parabolic line of the body. The examined specimens are deposited at the Marine Biodiversity Institute of Korea (MABIK) in Seocheon, Korea and the Department of Biological Science, Dankook University (DKU), Cheonan, Korea.

Systematic Accounts

Order Amphipoda Latreille, 1816
Suborder Hyperiidea H. Milne Edwards, 1830
Superfamily Platysceloidea Spence Bate, 1862
Family Platyscelidae Spence Bate, 1863
공옆새우과 (신칭)
Genus *Tetrathyrus* Claus, 1879
둥근머리공옆새우속 (신칭)

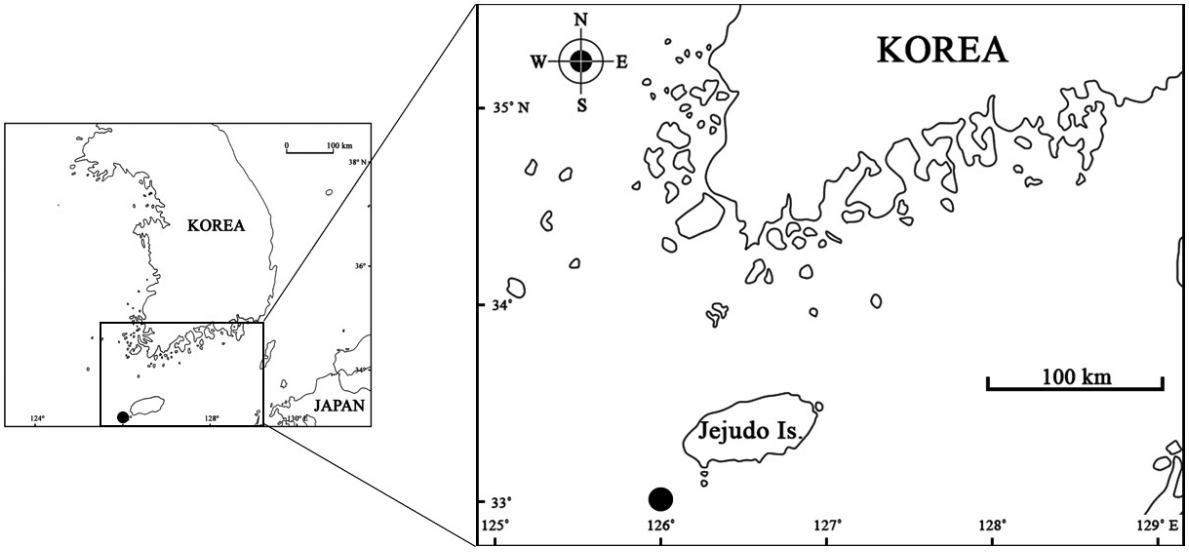

Fig. 1. Distribution of the *Tetrathyrus arafurae* (●: Jeju sea).

***Tetrathyrus arafurae* Stebbing, 1888 (Figs. 2–4)**
긴다리공옆새우 (신칭)
Tetrathyrus arafurae Stebbing, 1888: 1483.

Material examined. 1♂, dissected (appendages on one slide), MABIK CR00259792, 1♂, DKU202515, Jeju sea, 32°59′53″N, 125°59′43″E, 14 Jun 2019, by MOCNESS net, collected by SH Choo.

Description. Adult male (MABIK CR00259792), body (Figs. 2, 3A) 6.1 mm long, dorsally smooth. Head ovate, slightly deeper than long, subequal in length to pereonites 1–4 combined; eyes well developed, covering most of head. Urosomite 3, and Telson fused with urosomite 2. Antenna 1 (Fig. 3B), peduncle reduced to one article, lateral margin convex, flagellum 4-articulate, with large, expanded, crescent-shaped callynophore, with rows of aesthetascs on lateral and posterior margins. Antenna 2 (Fig. 3C) elongate, slender, strongly zig-zagged, 5-articulate, with most articles fold back on each other.

Gnathopod 1 (Fig. 3D) subchelate; ischium short, trapezoidal, posterior margin with 1 seta; merus relatively expanded, broadening distally, 2.82× ischium, anterodistal corner with 1 seta, posterior margin with 5 setae; carpus longish ovate, 0.67× merus, posterior margin with 4 setae; propodus subrectangular, relatively slender, 0.76× carpus, anterior margin convex, posterodistal corner excavate; dactylus falcate, short, 0.08× propodus.

Gnathopod 2 (Fig. 3E) similar to gnathopod 1, but elongate.

Pereopod 3 (Fig. 3F) slender; basis elongate, anterior margin concave, posterior margin strongly curved; ischium short, 0.12× basis, anterior margin concave; merus 4.93× ischium, anteroproximal margin slightly concave, anterior margin curved; carpus subrectangular, 0.82× merus; propodus slender, anterior margin slightly curved, 0.67× carpus; dactylus falcate, short, 0.15× propodus.

Pereopod 4 (Fig. 3G) similar to pereopod 3, but elongated.

Pereopod 5 (Fig. 3H), basis characteristic in form, elongate, expanded, 2.44× longer than wide, midanterior margin convex, anterodistal margin with 6 setae; ischium trapezoidal, short, 0.05× basis, posterior margin concave; merus subrectangular, 5.59× ischium; carpus subrectangular, 1.43× merus; propodus relatively slender, 0.86× carpus; dactylus narrow, falcate, 0.17× propodus.

Pereopod 6 (Fig. 4A) basis elongate-ovate, expanded, 2.07× longer than wide, narrowing distally, anteroproximal margin convex; ischium trapezoidal, short, 0.07× basis, posterior margin concave; merus subrectangular, 2.62× ischium, anterior margin with serration; carpus longish oval, 0.57× merus, half of anterior margin with serration; propodus relatively slender, 0.83× carpus, half of anterior margin with serration; dactylus narrow, falcate, 0.21× propodus.

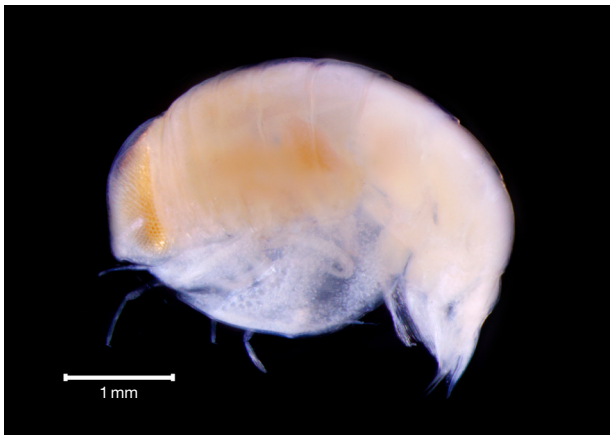

Fig. 2. *Tetrathyrus arafurae* Stebbing, 1888, adult male, 6.1 mm, habitus. Scale bar = 1.0 mm.

Pereopod 7, lost.

Uropod 1 (Fig. 4B), peduncle subrectangular, widening distally, laterodistal corner slightly produced; outer ramus lanceolate, 0.93× peduncle, lateral and medial margins with serrulation; inner ramus lanceolate, broader than outer ramus, 1.12× outer ramus, lateral and one third of medial margins with serration.

Uropod 2 (Fig. 4B) characteristic in form, shorter than uropod 1; peduncle subrectangular, widening distally; outer ramus lanceolate, 1.18× peduncle, medial margin with serrulation; inner ramus lanceolate, broader than outer ramus, 1.76× outer ramus, half of lateral and medial margins with serrulation.

Uropod 3 (Fig. 4B) characteristic in form, shorter than uropod 2; peduncle subrectangular; outer ramus lanceolate, slender, 1.36× peduncle, medial margin with serrulation; inner ramus lanceolate, broader than outer ramus, 1.21× outer ramus, lateral and medial margins with serrulation.

Telson (Fig. 4B) characteristic in form, fused with urosomite 2–3, 1.24 × urosomite 2–3 combined, entire, elongate, isosceles triangle in shape, unarmed.

Distribution. Cosmopolitan (Tropical and Subtropical waters).

Remarks. *Tetrathyrus arafurae* Stebbing, 1888 is similar to *T. forcipatus* Claus, 1879 in that both species lack a carpal process on gnathopods 1 and 2. However, *T. arafurae* can be distinguished from its congener by the following features (different characteristics of *T. forcipatus* in brackets): 1) pereopod 5, basis 2.3–2.8× longer than wide (vs. about twice as long as wide); 2) uropod 2, inner ramus articulated with peduncle (vs. fused); 3) uropod 3, inner ramus articulated with peduncle (vs. fused); and 4) telson longer than urosomites 2–3 combined (vs. shorter). Despite the limited number of specimens, due to the characters of uropods 2 and 3 with the outer ramus fused to the pe-

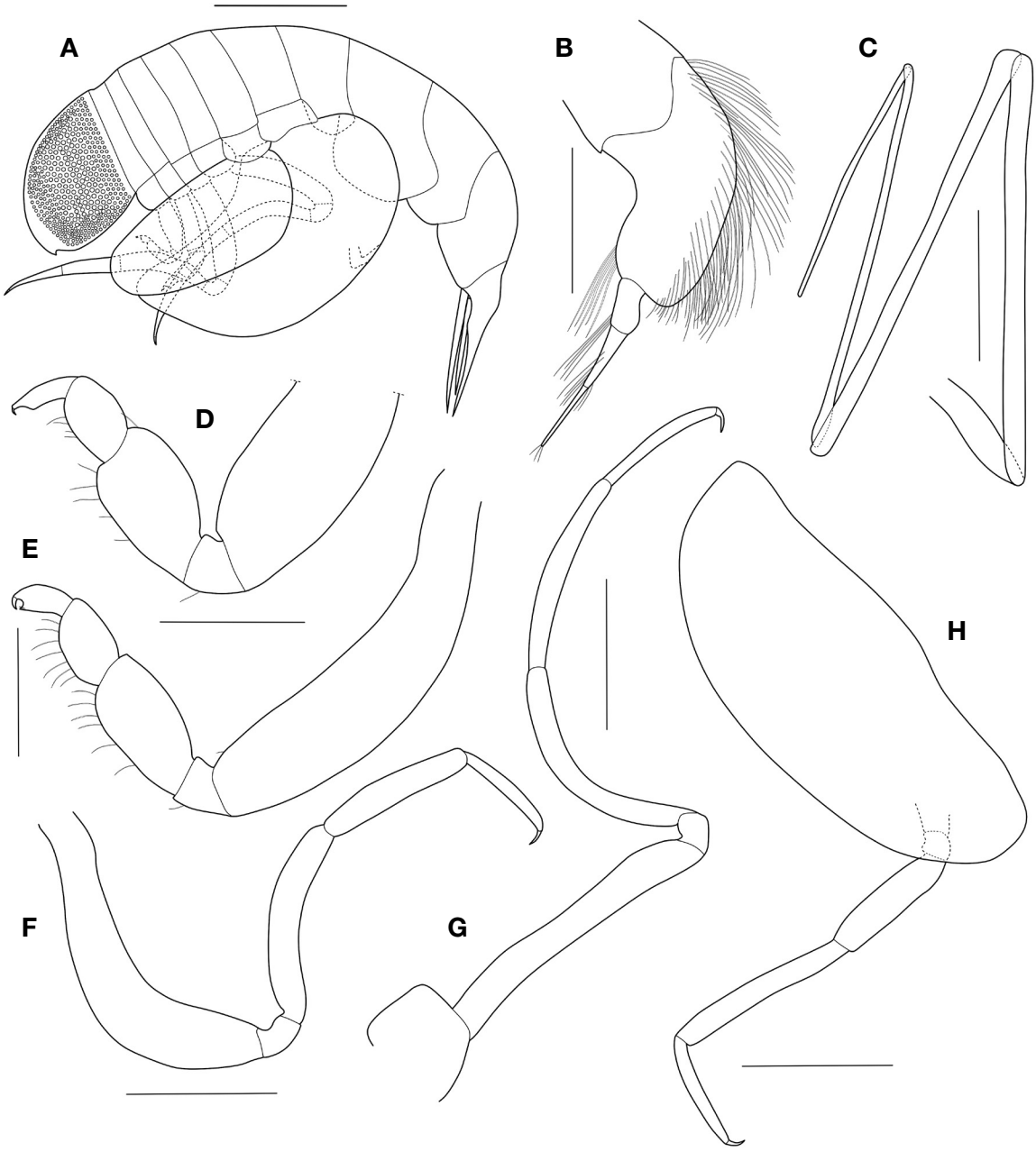

Fig. 3. *Tetrathyrus arafurae* Stebbing, 1888, adult male, 6.1 mm. A, habitus, lateral; B, antenna 1; C, antenna 2; D, gnathopod 1; E, gnathopod 2; F, pereopod 3; G, pereopod 4; H, pereopod 5. Scale bars: A = 1.0 mm; B = 0.2 mm; C, F–H = 0.5 mm; D, E = 0.3 mm.

duncle, a telson shorter than urosomites 2–3 combined, and pereopod 5 with an oval basis about twice as long as wide, our specimens accord with the original description provided by Stebbing (1888).

Key to families of the superfamily Platysceloidea from Korean waters

1. Head produced into elongated rostrum in male and female ····· Oxycephalidae Bate, 1863
– Head rounded in male and female or slightly produced in male ····· 2
2. Body rolled into ball; pereopods 5–6 bases covering other articles ····· 3
– Body curved; pereopods 5–6 bases not covering other articles ····· 4
3. Gnathopods 1–2, simple ····· Parascelidae Bovallius, 1887
– Gnathopods 1–2, subchelate ···· Platyscelidae Bate, 1863
4. Telson articulated with double urosomites 2–3 ····· Brachyscelidae Stephensen, 1923

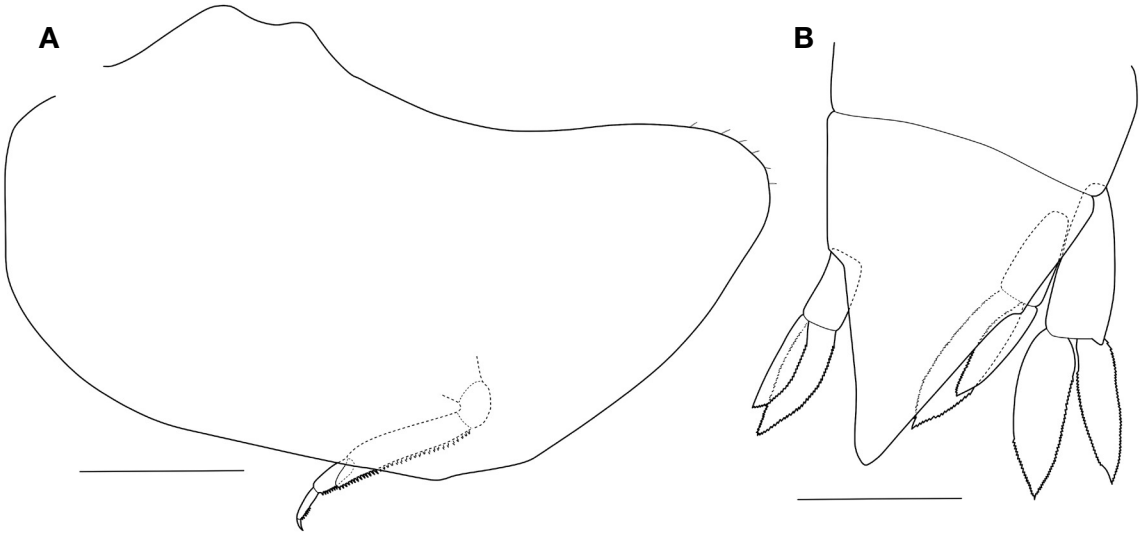

Fig. 4. *Tetrathyrus arafurae* Stebbing, 1888, adult male, 6.1 mm. A, pereopod 6; B, urosomites, uropods, and telson, dorsal. Scale bars: A, B = 0.5 mm.

– Telson fused with double urosomites 2–3 ····· ····· Lycaeidae Claus, 1879

Key to genera of the family Platyscelidae

1. Pereopod 6, basis without fissure ····· ····· *Tetrathyrus* Claus, 1879
– Pereopod 6, basis with fissure ····· 2
2. Gnathopod 1 simple ····· *Paratyphis* Claus, 1879
– Gnathopod 1 carpochelate ····· 3
3. Gnathopod 2, carpal process about 0.7 × propodus ····· ····· *Hemityphis* Claus, 1879
– Gnathopod 2, carpal process as long as propodus ····· ····· *Platyscelus* Bate, 1862

Key to species of the genus *Tetrathyrus*

– Uropods 2–3, inner ramus articulated with peduncle; telson longer than urosomites 2–3 combined ····· ····· *Tetrathyrus arafurae* Stebbing, 1888
– Uropods 2–3, inner ramus fused with peduncle; telson shorter than urosomites 2–3 combined ····· ····· *Tetrathyrus forcipatus* Claus, 1879

Conflicts of Interest

The authors of this paper have no affiliation with any interests and are solely responsible for the paper.

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