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Description of two new species of *Neotanais* Beddard, 1886 (Crustacea, Tanaidacea) from KODOS area

JIN HEE WI[1], HAE LIP SUH[2,4] & OK HWAN YU[3]

[1]*Research Institute for Coastal Environment and Fishery-policy, Industrial –Education Cooperation B/D, Chonnam National University, Gwangju 500-757, Korea*
[2]*Department of Oceanographic Environment, Chonnam National University, Gwangju 500-757, Korea.*
E-mail: suhhl@chonnam.ac.kr
[3]*Biological Oceanography & Marine Biology Division, Korea Institute of Ocean Science & Technology, 787 Haean-ro, Sangnok-gu, Ansan 425-600, Korea*
[4]*Corresponding author*

Abstract

Two new species of *Neotanais* Beddard, 1886 are described from the Korea Deep Ocean Study (KODOS) area in the Clarion–Clipperton Fracture Zone, based on the collections performed on board R/V Onnuri from a depth of 5180 m. *Neotanais triqueturus* **n. sp**. is similar to the '*pfaffi* group' characterized by pereonites with a swollen distolateral margin, pleonites with mid-ventral spurs and tapered lateral margins but can be differentiated by a longer cephalothorax (length: width 1.6: 1), a cheliped with a large protrusion on the mid-dorsal margin of the fixed finger, and the presence of a ventral process on the cheliped carpus. *Neotanais brevis* **n. sp.** has the characteristics of the '*micromopher*' group, with pleonites narrower than pereon, a cheliped carpus without a ventral process, and a uropod endopod with nine articles but can be differentiated by a combination of the pleonites without mid-ventral spurs, a relatively longer pleotelson (length: width 1: 1.5 vs. 1: 2), a uropod basis with one seta on each of the ventral and dorsal margins, and the cheliped fixed finger with proximal denticles.

In this study, in order to prove *N. triqueturus* and *N. brevis* were new species, full descriptions and a comparison with the closely related species are given. In addition, comprehensive comparisons with the species of *Neotanais* from the east-central Pacific are tabulated and discussed.

Key words: Clarion–Clipperton Fracture Zone, deep-sea, macrofauna, Tanaidacea, *Neotanais*

Introduction

This study area, the Clarion–Clipperton Fracture Zone has been considered to be very important due to the presence of manganese nodules lying on the ocean floor, the potential for mineral exploitation, and because it is the first region where an environmental management plan is underway (Lodge *et al.* 2014). Therefore, this area became one of the best surveyed deep-sea regions in the Pacific (Larsen 2011). During the last decade, the collection and identification of macrobenthos has been performed in the Korea Deep Ocean Study (KODOS) area to investigate whether the mining of manganese nodules could affect the benthic environment (Kim *et al.* 2000; Choi *et al.* 2004; Wi *et al.* 2014). Because the ongoing KODOS expeditions have been concentrated on collecting and recording deep-sea benthic organisms prior to their precise identification, the taxonomical and ecological information on the macro-benthos is very poor currently. According to a recent investigation in this area, the peracarid Tanaidacea in particular were strongly represented, making up 27% of the benthic crustaceans in the KODOS area, but the systematics are still unresolved (KODOS Annual Reports 2014).

The Neotanaoidea Sieg, 1980 within the suborder Tanaidomorpha, has attracted interest due to it being an exclusively deep-sea taxon, which includes only one family Neotanaidae Lang, 1956 and four genera (*Carololangia* Gardiner, 1975; *Herpotanais* Wolff, 1956; *Neotanais* Beddard, 1886; *Venusticrus* Gardiner, 1975), and 47 species. Of these, the most speciose genus is *Neotanais*, with 42 species (Anderson 2013). Hitherto, six

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Pleopod 1 to 5 (Fig. 6J) all alike. Basis with one ventral plumose seta and one dorsal plumose seta. Exopod first article with one plumose seta on dorso-distal corner; second article 2.4 times as long as first article, bearing four distal plumose setae. Endopod much longer than exopod, with one plumose seta on dorsal margin, four distal plumose setae, and two inner plumose setae on ventral margin.

Uropod (Fig. 4A, I) biramous. Basis 0.6 times as pleotelson. Exopod with two articles, first article with one simple seta, second article twice as long as first article, 1.3 times as long as first endopodal article, with two distal setae. Endopod with nine articles, article 1 naked, article 2 with small seta, article 3 naked, article 4 with two dorsal setae, article 5 with one seta, article 6 with two long simple setae and one plumose seta, article 7 with one short seta, article 8 naked, and article 9 with six setae on tip.

Remarks. *Neotanais brevis* **n. sp**. corresponds closely with the '*micromopher*-group', characterized by pleonites narrower than the pereon, a cheliped carpus without a ventral process, and a uropod endopod with nine articles. The group consists of *N. micromopher* Gardiner, 1975 and *N. dinotomer* Gardiner. In particular, the following morphological characteristics of *N. micromopher* match those of *N. brevis*: cheliped dactylus shorter than the fixed finger and the pleonite basis with one ventral seta and one dorsal seta as in *N. dinotomer* and the pleonite without a mid-ventral spur, a slightly longer uropod than pleon, and the length to width ratio of the first article of the antennule (3.8: 1). However, both species of the *micromopher*-group differ from *N. brevis* by the following characteristics: a short pleotelson (length: 1: 2 vs. 1: 1.5, respectively), the wider pereonites of a rectangular shape, the number of inner setae on the maxilliped endite (two vs. four and five), and the pleotelson fused to pleonite 5. On the other hand, the characters of long pleotelson (length:width < 1:1.5), slightly longer uropod compared to the pleon, and the pleonite without a mid-ventral spur are shown in *N. robustus* Wolff, 1956 described by Gardiner (1975) and *N. antarcticus* Kussakin, 1967. However, both species can also be differentiated from *N. brevis* by their relatively longer cephalothorax measurement compared to the combined length of pereonites1–2, relatively broad pereonites, and a uropod with an exopod half the length of endopod article 1.

Morphological comparison between eight species within *Neotanais* from the east–central Pacific. Currently, eight species of *Neotanais* have been described from the eastern central Pacific, including the two new species examined in the present study, and the morphological comparisons between them are given in Table 2. Although the characteristics do occasionally overlap, the comprehensive comparisons of these characteristics do definitively identify the eight distinct species. As an example, the pereon to pleon length ratios were similar in *N. triqueturus*, *N. americanus*, *N. pacificus*, and *N. capillus*; however, the combination of the remaining characteristics given in Table 2 separates the four species. In addition, some characteristics exist only in one or two species. The relative length of the dactylus to the fixed finger of the cheliped was shorter in *N. americanus* and *N. capillus* while it was longer only for *N. pfaffi*. The proximal denticles on the fixed finger of the cheliped were only seen in *N. capillus*. The dorsal and ventral setae of the pleopod basis showed the fewest number (1, 1, respectively) in *N. brevis* and the greatest number for *N. pfaffi* (5, 7, respectively) and *N. calcarulus* (8, 2, respectively). The dorsal setal number for the cheliped carpus varied greatly. Although *N. americanus* and *N. calcarulus* showed the same setal number on the cheliped carpus, the presence/absence of ventral process on the cheliped carpus differentiates them. The combination of the length of each pereonite, the presence/absence of mid-ventral spur on the pleonites, the pleotelson length to width ratio, and the length ratio of the uropod to pleotelson also differentiated each species in the eastern central Pacific and the result proved *N. triqueturus* and *N. brevis* to be new species.

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