Journal of
Marine Science and Technology

Volume 30
Issue 4 *Review-Special Issue (Part 1)*

Article 2

Calanoid Copepods Of China Seas

Chang-tai Shih
National Taiwan Ocean University, ctshih@mail.ntou.edu.tw

Qing-Chao Chen
South China Sea Institute of Oceanology

Yang-Chi Lan
Fisheries Research Institute

Shih-Hui Hsiao
National Taipei University of Education

Chi-Yu Weng
Institute of Oceanography, National Taiwan University/Ocean Data Bank of the Ministry of National Science and Technology Council, Taiwan

Recommended Citation
Shih, Chang-tai; Chen, Qing-Chao; Lan, Yang-Chi; Hsiao, Shih-Hui; and Weng, Chi-Yu (2022) "Calanoid Copepods Of China Seas," *Journal of Marine Science and Technology*: Vol. 30: Iss. 4, Article 2.
DOI: 10.51400/2709-6998.2583
Available at: https://jmstt.ntou.edu.tw/journal/vol30/iss4/2

RESEARCH ARTICLE

Calanoid Copepods of China Seas

Chang-tai Shih [a,*], Qing-Chao Chen [b], Yang-Chi Lan [c], Shih-Hui Hsiao [d], Chi-Yu Weng [e]

[a] National Taiwan Ocean University, Taiwan
[b] South China Sea Institute of Oceanology, China
[c] Fisheries Research Institute, Taiwan
[d] National Taipei University of Education, Taiwan
[e] Institute of Oceanography, National Taiwan University/Ocean Data Bank of the Ministry of National Science and Technology Council, Taiwan

1. Introduction

Calanoid copepods are a well-recognized taxonomic group of Crustacea. They were already placed, with one cyclopoid (*Scribella*) and five calanoid (*Acartia, Calanus, Candacia, Euchirus* (= *Euchaeta*), and *Pontella*) genera, under a single taxonomic unit, the Calanidae, by Dana [1]. Giesbrecht and Sars are the two early principal contributors to the taxonomy of Copepoda, including the Calanoida.

Based on the location of the body articulation, Giesbrecht [2] divided copepods into two groups, the Gymnopleoden and Podopleoden. All copepods, characterized by an articulation between the fifth pedigerous (leg-bearing) somite and genital somite, separating the body into an anterior part (prosome) and a posterior part (urosome), were placed under the suborder Gymnoplea. Podoplea contained all other copepods having this articulation located between the fourth and fifth pedigerous somites. According to the structure of antennules in males, Giesbrecht further divided the Gymnoplea into two tribes, the Amphaskandria (males with both antennules similar) and Heterarthrandria (males with one of the antennules modified).

Sars [3−9], on the other hand, suggested seven distinct types of copepods, *Calanus, Harpacticus, Cyclops, Notodelphys, Monstrilla, Caligus,* and *Lernaea*, respectively respresenting seven divisions (Suborders) of the Copepoda, i.e., Calanoida, Harpacticoida, Cyclopoida, Notodelphyoida, Monstrilloida, Caligoida, and Lernaeoida. The Calanoida in Sars [3−9], corresponding to the Gymnoplea in Giesbrecht [2], was divided into three sections: Amphascandria (both antennules in males are alike and only transformed slightly without any genicular structure, in the greater number of the genera the adult males are distinguished by a conspicuous transformation and great reduction in oral parts), Isokerandria (both antennules are without any conspicuous difference and oral part of much the same appearance in the two sexes), and Heterarthrandria (one of the antennules in male similar to that in female, the other peculiarly transformed into a powerful grasping organ).

Modifications of classification within the Calanoida have then been proposed and were reviewed by Huy & Boxshall [10]. In 1974, Andronov [11] proposed the phylogenetic relationships of the higher taxa within the Order Calanoida, and included nine superfamilies: Augapatiloidea, Bathypontioidea, Centropagoidea, Eucalanoidea, Megacalanoidea, Platycopioidea, Pseudocyclopoidea, Pseudocalanoidea, and Riocalanoidea. As the results of Andronov's [12] change of names of some superfamilies to conform with the International Code of Zoological Nomenclature and subsequently Boxshall and Halsey's [13] amendment, the Order Calanoida now consists of ten superfamilies and 43 families (30 families, highlighted in red color, present in the China seas):

Order Calanoida Sars, 1903 (30; 105; 560) (= number of families, genera and species occurring in the China seas)

1. Superfamily Arietelloidea Sars, 1902 (changed from Augaptiloidea) (24, 134)

Available online 30 September 2022

* Corresponding author.
E-mail address: ctshih@mail.ntou.edu.tw (C.-t. Shih).

https://doi.org/10.51400/2709-6998.2583

Family Arietellidae Sars, 1902 (4; 16)
Family Augaptilidae Sars, 1902 (7; 45)
Family Discoidae Gordejeva, 1975
Family Heterorhabdidae Sars, 1902 (7; 36)
Family Hyperbionychidae Ohtskua, Roe et Boxshall, 1993
Family Lucicutiidae Sars, 1902 (1; 20)
Family Metridinidae Sars, 1902 (3; 17)
Family Nullosetigeridae Ohtsuka, Imabayashi et Suh, 1999 (1; 6)

2. Superfamily Bathypontioidea Brodsky, 1950 (1, 7)

Family Bathypontiidae Brodsky, 1950 (1; 7)

3. Superfamily Calanoidea Dana, 1846 (17, 46)

Family Calanidae Dana, 1846 (8; 14)
Family Megacalanidae Sewell, 1947 (2; 3)
Family Paracalanidae Giesbrecht, 1893 (7; 29)

4. Superfamily Clausocalanoidea Giesbrecht, 1893 (changed from Pseudocalanoidea) (41, 185)

Family Aetideidae Giesbrecht, 1893 (12; 63)
Family Clausocalanidae Giesbrecht, 1893 (5; 18)
Family Diaixidae Sars,1902
Family Euchaetidae Giesbrecht, 1893 (2; 36)
Family Mesaiokeratidae Matthews, 1961
Family Phaennidae Sars, 1902 (4; 9)
Family Pseudocyclopiidae Sars, 1902
Family Scolecitrichidae Giesbrecht, 1893 (14; 54)
Family Stephidae Sars, 1902 (1; 1)
Family Tharybidae Sars, 1902 (2; 3)

5. Superfamilly Diaptomoidea Baird, 1850 (changed from Centropagoidea) (15, 149)

Family Acartiidae Sars, 1902 (2; 25)
Family Candaciidae Giesbrecht, 1893 (1; 20)
Family Centropagidae Giesbrecht, 1893 (2; 17)
Family Diaptomidae Baird, 1850
Family Fosshagenidae Suárez-Morales et Iliffe, 1996 (1; 1)
Family Parapontellidae Giesbrecht, 1893
Family Pontellidae Dana, 1853 (6; 53)
Family Pseudodiaptomidae Sars, 1902 (1; 16)
Family Sulcanidae Nicholls 1945
Family Temoridae, 1893 (1; 4)
Family Tortanidae Sars, 1902 (1; 19)

6. Superfamily Epacteriscoidea Fosshagen, 1973 (home to new families)

Family Epacteriscidae Fosshagen, 1973
Family Ridgewayiidae M.S.Wilson, 1958 (Now part of the Pseudocyclopidae)

7. Superfamily Eucalanoidea Giesbrecht, 1893 (4, 18)

Family Eucalanidae Giesbrecht, 1893 (2; 7)
Family Rhincalanidae Geletin, 1975 (1; 3)
Family Subeucalanidae Giesbrecht, 1893 (1, 8)

8. Superfamily Pseudocyclopoidea Giesbrecht, 1893 (1, 2)

Family Boholinidae Fosshagen & Iliffe, 1989 (Now part of the Pseudocyclopidae)
Family Pseudocyclopidae Giesbrecht, 1893 (1; 2)

9. Superfamily Ryocalanoidea Andronov, 1974

Family Ryocalanidae Andronov, 1974

10 Superfamily Spinocalanoidea Vervoort, 1951 (split from Pseudocalanoidea) (3, 9)

Family Spinocalanidae Vervoort, 1951 (3; 9)

Platycopioidea is now an independent order by itself. Several changes at the family level have been reported. Boholinidae and Ridgewayiidae are now part of the Pseudocyclopidae. A new family, Kyphocalanidae, was established by Markhaseva & Schulz [14].

Calalnoid copepods are the dominant taxa in marine zooplankton and are often being the focal point in various biological and oceanographic studies, for which reliable species identification is required. The present project aims to provide basic taxonomic information of the species of calanoid copepods occurring in the China seas, i.e., Bohai Sea, Yellow Sea, East China Sea, Taiwan Strait, South China Sea, and east of Taiwan. The website, https://copepodes.obs-banyuls.fr/en/, managed by Razouls, C., F. de Bovée, J. Kouwenberg & N. Desreumaux (2005–2919), has been frequently consulted.

2. Morphology of the calanoida

Unless otherwise mentioned, all morphological terms here follow Huy and Boxshall [10]. The following description is mainly based on *Calanus sinicus*, the dominant calanoid species in the China seas.

The calanoid copepods in general are small in size; mostly the body length is under 3 mm, frequently it may be less than 1 mm, and occasionally up to or slightly over 10 mm in some genera. The body of calanoids consists of the prosome (the anterior part, including cephalosome and thorax) and urosome (the posterior part) which are separated by an articulation between the 5th or the last pedigerous somite of thorax and the genital somite of urosome (Fig. 1).

2.1. Prosome

The prosome contains cephalosome and thorax. The cephalosome, or head, is formed by the fusion of the five cephalic somites and the first thoracic somite. Each somite in the cephalosome bears a pair of appendages on its ventral surface. These appendages, from front backward, are: antennule, antenna, mandible, maxillule, maxilla, and maxilliped. Among these appendages, antennule, maxilla, and maxilliped are uniramous (branchless) and antenna, mandible, and maxillule are biramous (two branches).

Basically a biramous appendage is composed of a proximal uniramous protopod (2-segmented, the proximal segment, coxa and the distal segment, basis) and a pair of distal biramous rami (the lateral branch, exopod and the medial branch, endopod). On the front of cephalosome there is a median projection between the antennules, the rostrum, which is divided distally into a pair of rostral filaments. The thorax has seven somites, including the first six pedigerous (leg carrying) somites and the last limbless somite. The 1st pair of these legs is the maxilliped, the next five pairs are the 1st to 5th swimming legs. The 5th swimming legs may be absent in females of some genera and usually

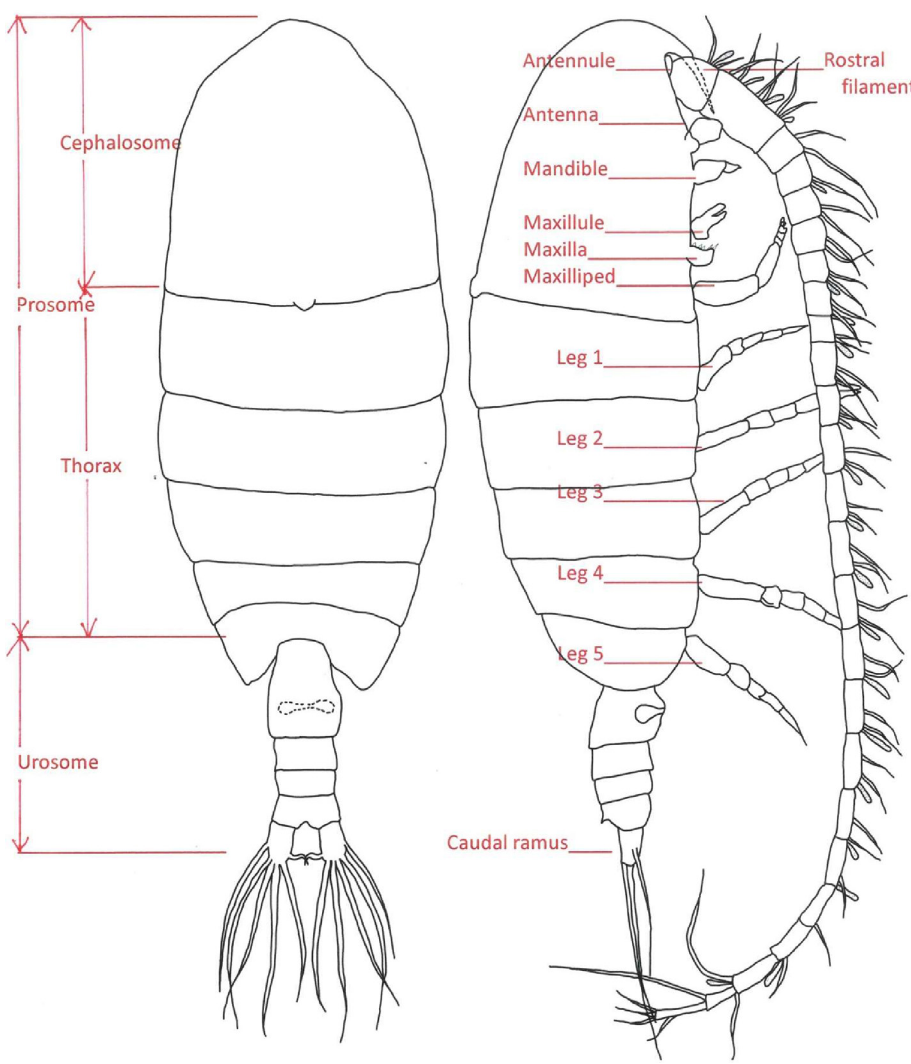

Fig. 1. Dorsal, lateral and ventral views of Calanus sinicus.

exhibit distinct sexual dimorphism. The first pedigerous somite is incorporated with the cephalosome and the last and limbless somite forms the first somite in urosome. Further fusion of thoracic somites sometimes may reduce the prosome from six to five or four segments.

2.2. Urosome

The urosome is 5-segmented, including the 7th thoracic somite or the genital somite (first urosomite) and the anal somite (last urosomite). In female the genital somite is fused with the following urosomite to form the genital double somite, resulting in the difference of the number of segmentation between male and female of the same species Additional fusion of urosomites may reduce the urosome to 3 or 2 segments. The urosomites are free of appendages; a pair of setiferous appendages, the caudal rami, is attached to the posterior surface of anal somite.

2.3. Structure of appendages

Antennule (Fig. 1) is 25-segmented in female, 24-segmented and not geniculate in male, bearing seta and aesthetasc (a simple sensory filament) on the segments. Segments 8 and 9 are partially fused. Aesthetasc is present on all segments except on segments 21 and 24. Antenna (Fig. 2) has 2-segmented protopod, coxa (with 1 seta) and basis (with 2 setae). The biramous rami contains a 7-segmented exopod, with setation formula: 2, 2, 1, 1, 1, 1, 4 and a 2-segmented endopod with bilobular distal segment, having setation formula 2, 8 (medial lobe)+8 (terminal lobe). Mandible (Fig. 3) is formed by a proximal large gnathobase (coxa), and a distal palp. The gnathobase bears several teeth on its medial margin. The palp is composed of the basis (with 4 setae), 2-segmented endopod, with 4 and 10 setae, and 5-segmented exopod, with setation formula: 1, 1, 1, 1, 2.

Maxillule (Fig. 4) is the most complicate cephalic appendage. Its protopod is 3-segmented and consists of a well-developed praecoxal arthrite with 9 spines on medial margin, 4 setae on posterior surface and 1 seta on anterior surface; coxa with 4 setae on endite (medial lobular structure) and 9 setae on epipodite (lateral lobular structure); basis with exite (lateral lobular structure) bearing 1 seta, and proximal and distal endites, each of which carries 4 setae. The praecoxal arthrite and endites of coxa (one) and basis (two) are also named the first to fourth inner lobes in literature. Endopod is 3-segmented with setation formula: 4, 4, 7. One-segmented exopod carries 11 setae.

Maxilla (Fig. 5) is comprised of precoxa, coxa, basis, and 3-segmented endopod. The segmentation is not distinct. Precoxa and coxa are partially fused; each of the proximal and distal precoxal endites and proximal and distal coxal endites bears, respectively, 5, 3, 3, 3 setae, coxal epipodite is represented by a seta; basis bears 4 setae. Setation formula for endopodal

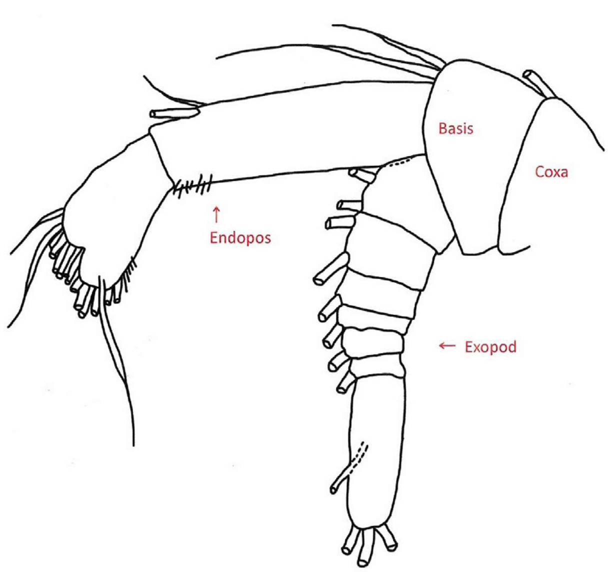

Fig. 2. Calanus sinicus *antenna.*

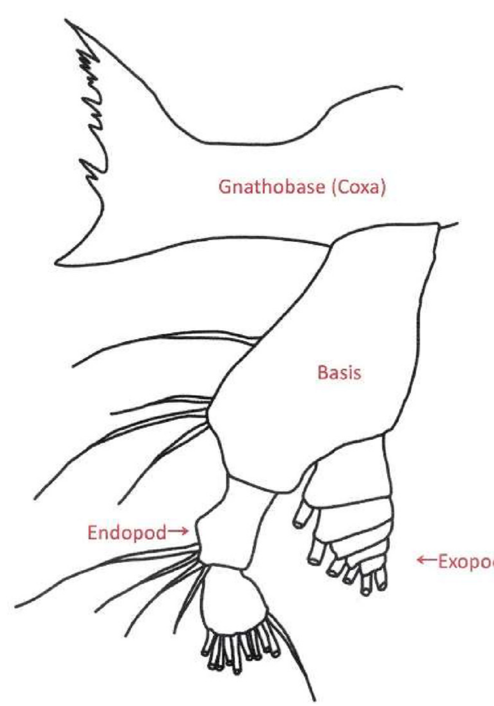

Fig. 3. Calanus sinicus *mandible.*

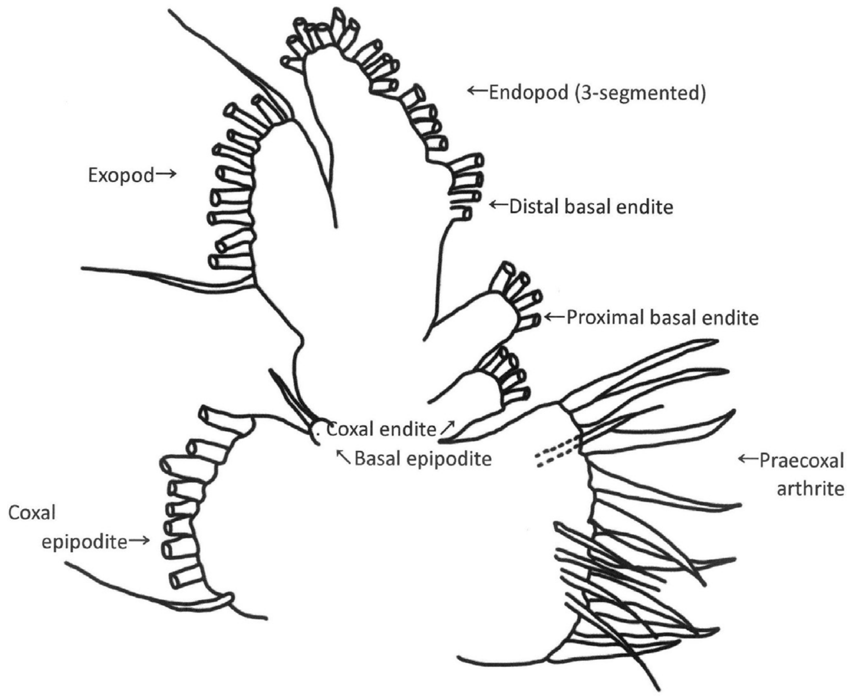

Fig. 4. Calanus sinicus *maxillule.*

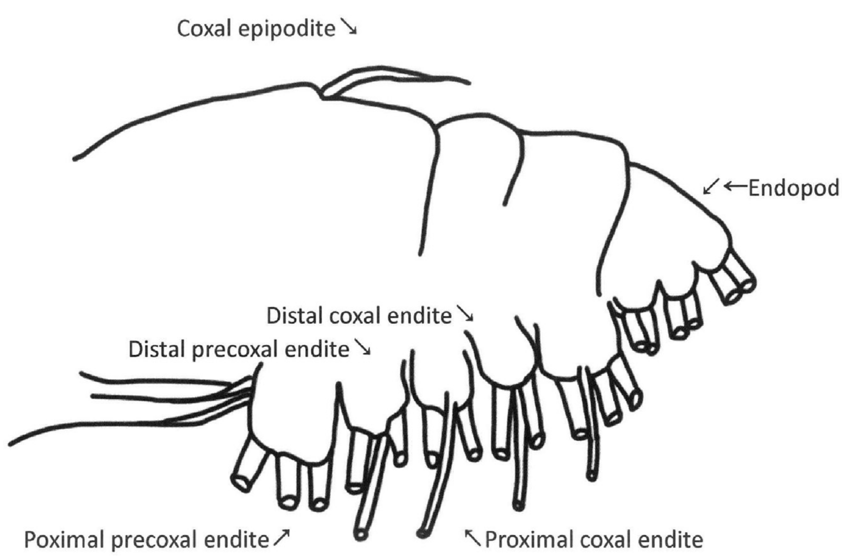

Fig. 5. Calanus sinicus *maxilla.*

segments is 2, 2, 2 [to be verified] Maxilliped (Fig. 6) is the first thoracic leg. It comprises syncoxa (fusion of precoxa and coxa, with a setation formula of 1, 2, 4, 4), basis (with 3 setae), and 6-segmented endopod with setation formula 2, 4, 4, 3, 3 + 1, 4. The first endopodal segment is partially fused with the basis. The swimming leg (Fig. 7) is typically composed of a uniramous 2-segmented protopod, including coxa (the proximal segment) and basis (the distal segment), and a distal pair (biramous) of 3-segmented rami, the exopod (lateral branch) and the endopod (medial branch). The medial margin of coxa in swimming leg 5 is armed with more than 16 compacted teeth in the genus *Calanus*. The spine (in Romanic) and seta (in Arabic) formula of the swimming legs 1–5 is as follows:

Coxa	Basis	Exopod	Endopod
Leg 1 0-1; 0-2; 1-2-3 (Fig. 7a)	0–1	0–1	I-1; I-1; II-I-4
Leg 2 0-1; 0-2; 2-2-4 (Fig. 7b)	0–1	I-0	I-1; I-1; II-I-5
Leg 3 0-1; 0-2; 2-2-4 (Fig. 7c)	0–1	I-0	I-1; I-1; II-I-5
Leg 4 0-1; 0-2; 2-2-3 (Fig. 7d)	0–1	I-0	I-1; I-1; II-I-5
Leg 5 (♀) 0-1; 0-1; 1-2-2 (Fig. 7e)	0–0	I-0	I-0; I-1; II-I-4
Leg 5 (♂) 0-1; 0-1; 2-2-2 (Fig. 7f)	0–0	I-0	I-0; I-0; II-I-0

2.4. Morphological variations

The front profile of head is usually smooth and rounded, a median structure, such as a sharp dorsal median spine, is present in a number of genera, e.g., *Gaetanus* (Fig. 8), or a keel-shaped chitinous crest in some genera, e.g., *Scolecocalanus* (Fig. 9). The lateral sides of the cephalosome usually are slightly convex in contour, in some genera, especially those of the Pontellidae, e.g., *Pontella* (Fig. 10), a lateral hook may present on each side of the head. The structure of rostrum and its filaments also vary significantly, e.g. singly pointed in *Gaetanus* (Fig. 11), stout with 2 sausage-like filaments in *Bathycalanus* (Fig. 12), shallow plate with 2 digitiform filaments in *Pseudoamallothrix* (Fig. 13), lingular, terminal margin with 2 short pointed processes in *Racovitzanus* (Fig. 14), bifurcate, short, and solid in *Parvocalanus* (Fig. 15), etc.

Appendages of the cephalosome also show some degrees of morphological variations. Antennule: Setae are unusually plumose, e.g., *Pontellina* (Fig. 16), or long, e.g., *Paraeuchaeta* (Fig. 17). One of the antennules is geniculate in male, e.g., *Centropages* (Fig. 18).

Antenna: Basis is generally separated from exopod and endopod, but in some genera it is fused with segment 1 of endopod, forming an allobasis, e.g., in *Acartia* (Fig. 19). Exopod and endopod are usually subequal in length, but in some genera, mostly of the Aetideidae, exopod is 2 times or more as long as endopod, e.g., *Euchirella* (Fig. 20); in other genera endopod may be 2 times or more as long as exopod, e.g., *Acartia* (Fig. 20). Number of segments in exopod varies, generally from 6 to 8, but 3-segmented in *Acartiella* (Fig. 21).

Mandible: General appearance and number of teeth are variable in gnathobase, for example, it may transform to an elongate rod-like structure in

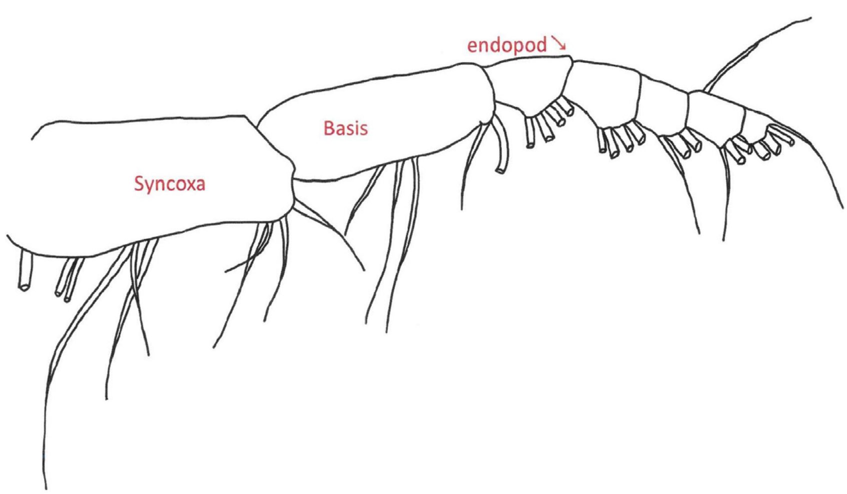

Fig. 6. Calanus sinicus*: Maxilliped.*

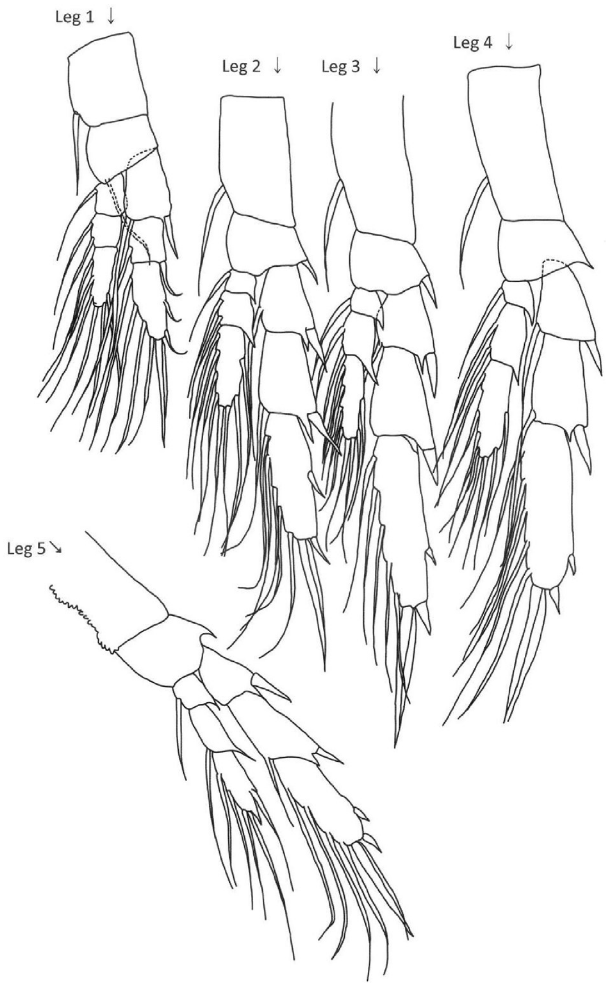

Fig. 7. Calanus sinicus *Swimming legs: a. leg 1; b. leg 2; c. leg 3; d. leg 4; e:leg 5, female: f. leg 5, male.*

Pseudaugaptilus (Fig. 22), number of teeth may reduce to 2 large teeth with a small tooth in between in Centraugaptilus (Fig. 23). Exopod is usually inserted terminally on basis, but at mid-length in Eucalanus (Fig. 24).

Maxillule: Reduction and transformation of segmentation of maxillule are seen in a large number of genera. Apparent change is noted in the genus Augaptilus, having the appendage reduced to a 3-segmented rod (text Fig. 25); in Arietellus (Fig. 26), exopod is overwhelmingly developed, being the largest part of the maxillule while endopod is reduced to a small bulb-like structure. Missing some parts of the appendage occurs frequently, e.g., in Tortanus, basis, exopod and endopod are completely absent (Fig. 27); in Subeucalanus, coxal endite disappears (Fig. 28). Sometimes setae transform into spines, e.g., in Mesorhabdus one seta of the precoxal arthrite modifies to form a strong and large spine (Fig. 29). Maxilla: Morphological modification exhibits significantly in the characteristics of setae of various components of the appendage. Some setae of basis or endopod transform into spines, e.g. *Hemirhabdus* (Fig. 30); endopod is ending in a fortified claw, e.g., *Onchocalanus* (Fig. 31); setae of endopod are similar to worm or brush, e.g. *Onchocalanus* (Fig. 32); or some endites are missing, e.g. *Hemirhabdus* (Fig. 33).

Maxilliped: Some setae of maxilliped are armed with shield-like structure, e.g., *Centraugaptilus* (Fig. 34). In some genera of the Scolecitrichidae, e.g., *Scaphocalanus* (Fig. 35), the seta of middle endite of coxa has mushroom-like terminal; significant reduction including segmentation and armature occurs in the genera of the Acartiidae, e.g., *Acartiella* (Fig. 36) and Tortanidae, e.g., *Tortanus* (Fig. 37). Legs 1–4 in general have 3-segmented endopod and exopod; but the segmentation may be reduced to 2 (e.g., *Labidocera*) or 1 (*Macandrewella*) in endopod and to 2 (e.g., *Euchirella*) in exopod of leg 1; to 2 (e.g., *Valdiviella*) or 1 (e.g.,*Chiridiella*) in endopod of leg 2; and to 2 (e.g. *Tortanus*) in endopod of legs 3 and 4.Leg 5 is the most variable among all legs and is sexually dimorphic. In females, leg 5 varies from biramous and similar to legs 1–4 (e.g., *Calanus*) to a single knob-like structure (e.g., *Bestiolina*, Fig. 38) or entirely absent (e.g., *Scolecithrix*). Different degrees of variation are present: biramous but with different number of segments: 3-segmented exopod and 2-segmented endopod (e.g.,*Lucicutia*), 2-segmented (e.g., *Euaugaptilus*) or 1-segmented (e.g., *Acartiella*) in both exopod and endopod.

In genera with uniramous leg 5, the number of segments may vary from 5 (e.g., *Nullosetigera*, Fig. 39), to 4 (e.g., *Pseudodiaptomus*, Fig. 40), 3 (e.g., *Arietellus*, Fig. 41), 2 (e.g., *Paracalanus*, Fig. 42) or 1 (e.g., *Paraugaptilus*, Fig. 43). Variation in leg 5 is much more pronounced in male than in female. Rarely leg 5 of male is nearly identical to leg 5 of female (e.g., Euaugaptilus, Fig. 44). Sometimes one leg is similar to leg 5 of female and the other leg is modified slightly (e.g., Calanus, Fig. 45) or greatly forming achela (e.g., Centropages, Fig. 46). Sometimes both legs 5 are about the same size and biramous with 3-segmented exopod and endopod but different slightly in form (e.g., Mesorhabdus, Fig. 47). In some genera legs 5 may be biramous but are totally different in form from leg 5 of female of the same species (e.g., Scaphocalanus, Fig. 48). In other genera, one leg is biramous and the other leg is uniramous (e.g., Temoropia, Fig. 49), uniramous on both legs (e.g., Eucalanus, Fig. 50), or uniramous on one side and absent on the other (e.g., Subeucalanus, Fig. 51)

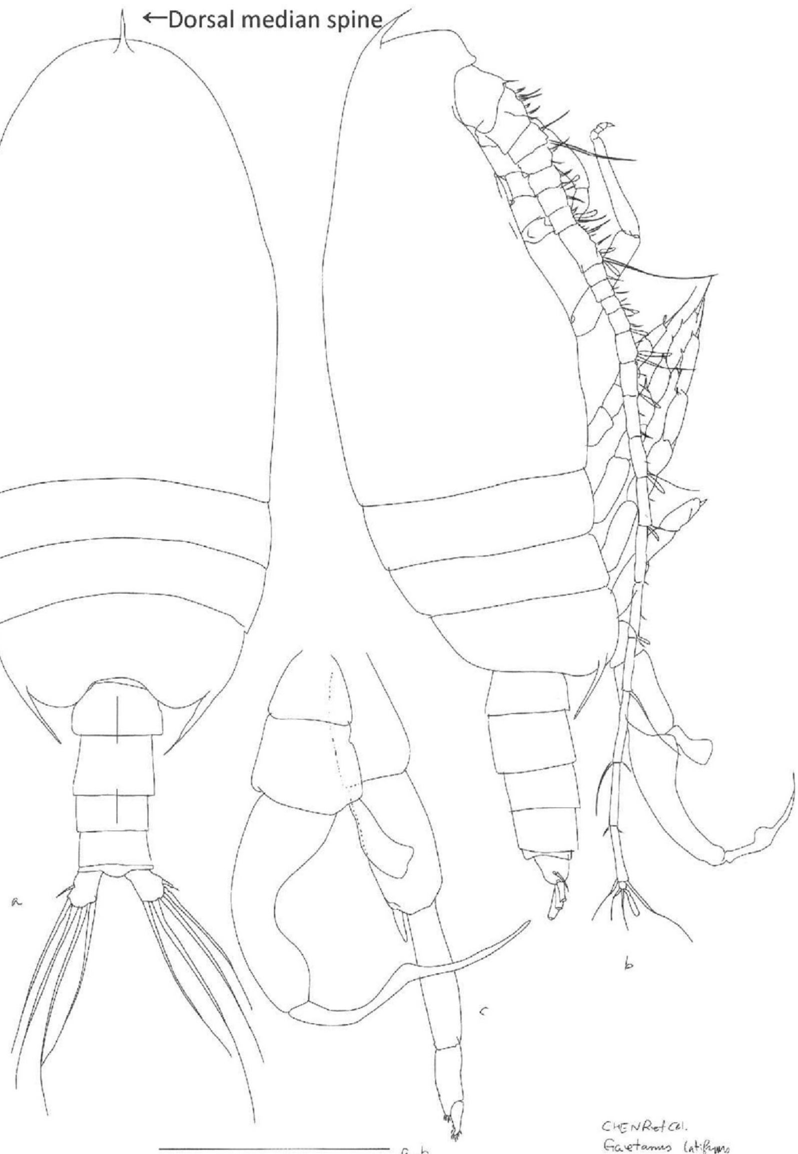

Fig. 8. Gaetanus latifrons *Male (dorsal & lateral), head with median spine.*

3. Taxonomy of calanoida

General discussion of the taxonomy of calanoid copepods from the levels of genus up to superfamily is available in Boxshall & Halsey [13]. Some monographs or articles of faunistic studies are important in calanoid taxonomy. These include Sars [3−9,27] (1901−1903, North Atlantic: Norwegian Sea; 1925, North Atlantic and Mediterranean), Breemen [28] (1908, northern North Atlantic and North Sea), With [29] (1915, northern North Atlantic), Rose [30] (1933, Mediterranean and eastern North Atlantic), Giesbrecht [31] (1893, Mediterranean Sea), Vives & Shmeleva [32] (2007, eastern North Atlantic off Portugal), Vervoort [33,34](1963, 1965, eastern tropical Atlantic), Harding [35](2004, western N Atlantic off Canada), Wilson [36,37](1932a and b, western North Atlantic: Woods Hole region and Chesapeake Bay), Owre & Foyo [38] (1967, Florida Current,

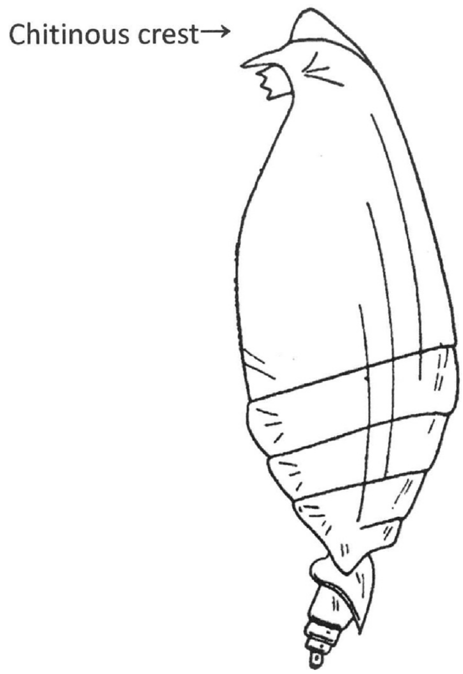

Fig. 9. Scolecocalanus spinifer *Lateral view showing crest of head. Wilson 1950: Fig. 528 [15].*

western North Atlantic), Campos Hernández & Suárez Morales [39] (1994, Gulf of Mexico & Caribbean Sea), Bradford-Grieve et al. [40](1999, western South Atlantic), Gardner & Szabo [41](1982, eastern N Pacific off Canada), Esterly [42–45](1905–1913, eastern North Pacific, San Diego region), Palomares et al. [46] (1998, eastern North Pacific off Mexico), Brodsky [47] (1950, western North Pacific), Mori [48] (1937), Tanaka [17, 49–60] (1956–1965), Tanaka & Omori [61–67](1968–1992), and Chihara & Murano [68] (1997) (North Pacific adjacent to Japan), Scott [69] (1909, tropical western Pacific), Greenwood [70–74](1976–1982, South Pacific: Moreton Bay,Australia), Bradford [75](Bradford-Grieve since 1994) and associates [195] (1980–1999, South Pacific adjacent to New Zealand), Vervoort [76] (1946, Indo-W. Pacific), Mulyadi [77] (2004: Indo-West Pacific), Sewell [78–80] (1929, 1932, 1947, Indian Ocean), Vervoort [81,82](1951, 1957, Antarctic), Wolfenden [83] (1911, Antarctic). Razouls et al. [84] (2005–2019) set up a website (http://copepodes.obs-banyuls.fr/en) to cover taxonomy and distribution of marine copepods of the world.

Taxonomic studies on marine copepods of the China seas were reviewed by Chen [85] and Shih & Young [86]. Major taxonomic studies on the marine Calanoida of the area are Shen & Bai [87], Shen & Lee [88], Chen & Zhang [89], Zheng et al. [90], Chen & Shen [91], Chen & Zhang [92], Lian & Lin [93], Zheng et al. [94], Zhang et al. [95], and Lian et al. [96]. Species lists of the China seas are available, e.g., Shen & Bai [87], Chen [97], Shih & Young [86], Chen [98], Lian & Lin [99], Song, X. et al. [100], Zhang, W.et al. [95], and Lian et al. [96] for the Bohai.

Sea; Chen, Q. & Zhang [89], Zheng et al. [90,94], Lian & Lin [93,101], Chen [97], Shih & Young [86], Wang, Gao et al. [102], Zuo et al. [103], Chen [98], Lian & Lin [99], Zhang et al. [95], Zhu et al. [104],

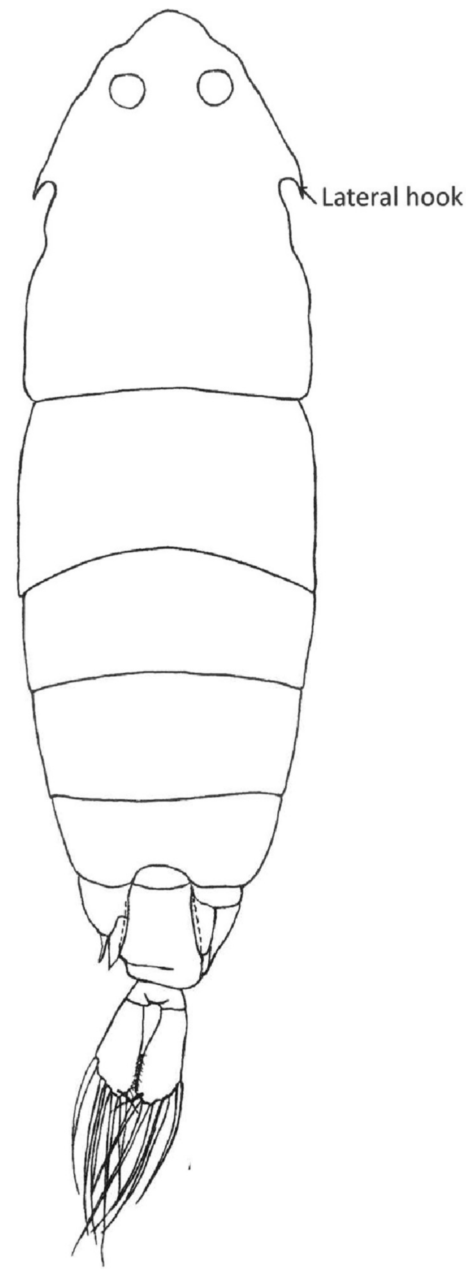

Fig. 10. Pontella chierchiae *a. Dorsal view showing lateral hooks on cephalosome.*

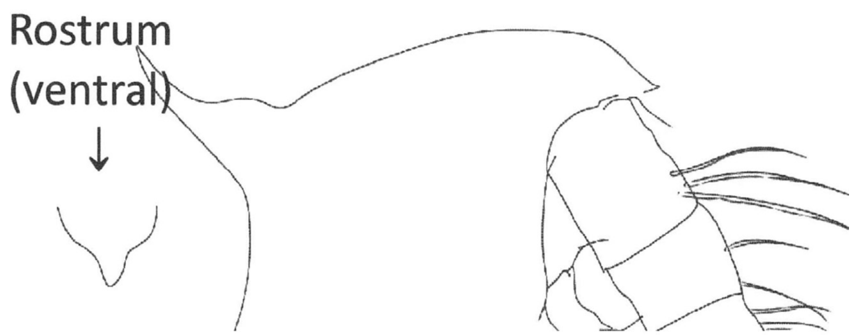

Fig. 11. Gaetanus latifrons *rostrum.*

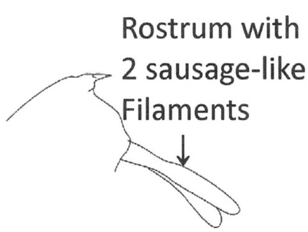

Fig. 12. Bathycalanus richardi *Rostrum stout with 2 sausage-like filaments.*

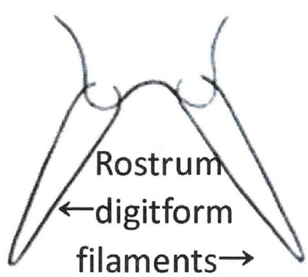

Fig. 13. Pseudoamallothrix ovata *Rostrum. Tanaka 1962: Fig. 137d [16].*

Fig. 14. Racovitzanus levis *Rostrum with 2 short pointed. Tanaka 1961: Fig. 125d [17].*

Chen et al. [105], Chen, H. & Liu [106], and Lian et al. [96] for the Yellow Sea; Chen & Zhang [89], Zheng et al. [90], Tan [107,108], Tseng et al. [109], Lian & Lin [93], Zheng et al. [94], Lian & Lin [101], Chen [97], He & Yang [110], Meng et al. [111–115], Lin & Nakamura [116], Shih & Young [86], Shih & Chiu [117], Yang et al. [118,119], Hwang [120], Lo et al. [121], Hwang & Wong [122], Hwang et al. [123], Zuo et al. [103], Dur et al. [124], Chen [98], Lan et al. [125,126], Lian & Lin [99], Tseng et al. [127], Wang et al. [128], Zhang et al. [129], Jin et al. [130], Zhang et al. [95], Tseng et al. [131], Tseng et al. [132], Chen & Liu [106], and Luo et al. [133], and Lian et al. [96] for the East China Sea. Tan [107, 108], Wong et al. [134], Hsiao [135], Hwang, Tu et al. [120], Liao et al. [136], Dur et al. [124], Lin [137], Lan et al. [126], Lee,

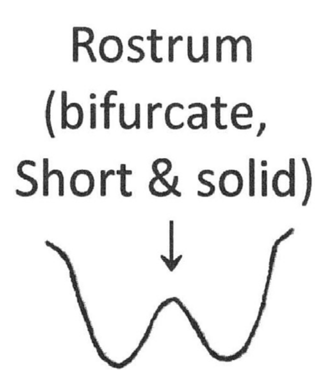

Fig. 15. Parvocalanus crassirostris *Female. Rostrum: bifurcate, short, and solid.*

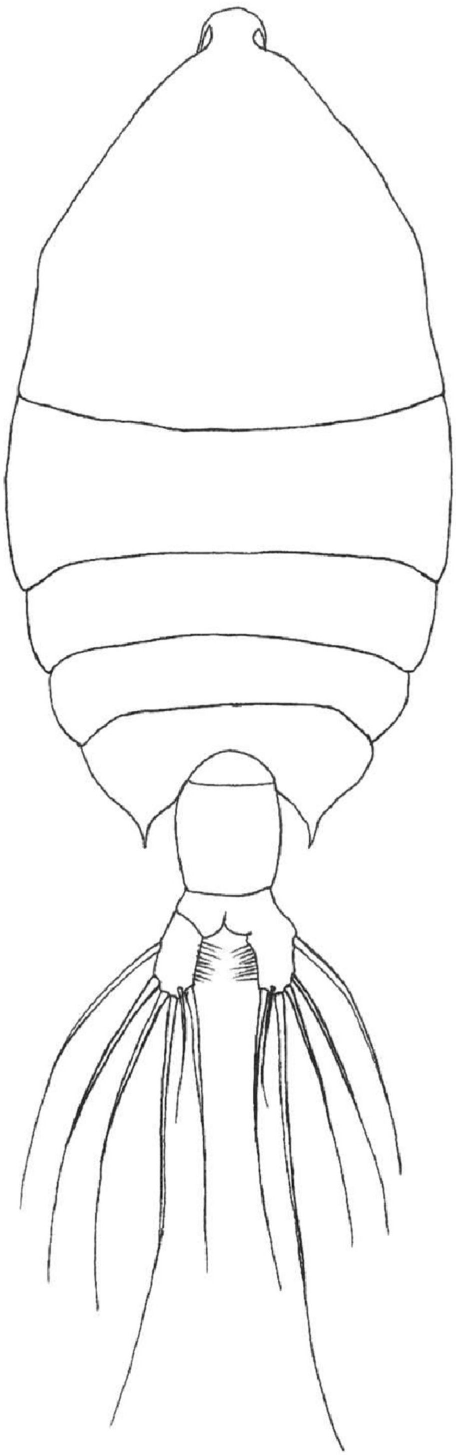

Fig. 16. Pontellina plumata *Femal (dorsal) antennule.*

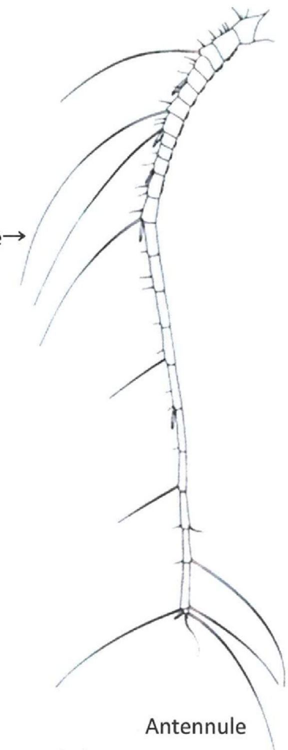

Fig. 17. Paraeuchaeta malayensis *Antennule setae on antennule long. Park 1995: Fig. 19i [18].*

Liu & Su [138], Lee et al. [139], Hsiao et al. [140,141], and Ka & Hwang [142] for East of Taiwan. Zheng et al. [90], Tan [107,108], Tseng [143,144], Zheng et al. [94,145], Chen [97], Li & Huang [146], Huang & Chen [147], Lin & Lian [148], Zhu et al. [149], Dai et al. [150], Zhu et al. [151], Huang et al. [152], Lo et al. [153], Hsieh& Chiu [154], Hwang et al. [155], Hsieh et al. [156], Lan et al. [157], Lo et al. [158], Hsieh et al. [159], Hwang et al. [123], Dur et al. [124], Lian & Lin [99], Tseng et al. [160], Chen [98], Hwang et al. [161], Hwang et al. [162], Lan et al. [163], Hsiao et al. [140], Ka & Hwang [142], Dahm et al. [164] and Lian et al. [96] for the Taiwan Strait; and Wilson [15], Rose [165,166], Shen & Lee [88], Zheng et al. [90], Chen, Q. & Shen [91], Chen Zhang [92], Chen [167], Zheng et al. [94], Chen [97], Chen et al. [168], Chen et al. [169], Shih & Young [86], Hwang et al. [170], Chen et al. [171], Lee [172], Lee & Chen [173], Tan et al. [174], Hwang & Wong [122], Hwang et al. [175], Chen [98], Hsu et al. [176], Lian & Lin [99], Tseng et al. [177], Tseng et al. [194], Yun et al. [178], Zhang et al. [179], Chang et al. [180], Zhang & Wong [181], Lin et al. [182], Lo et al. [183], Li, K. et al. [184], Lian et al. [96] for the South China Sea.

Research in calanoid copepods of the China seas has been relatively active in the last two decades. Using Shih and Young [86] as a reference point, the numbers of family, genus and species reported from the China seas have been increased significantly from 27, 72 and 295 in 1995, respectively, to 30, 106 and 562 currently.

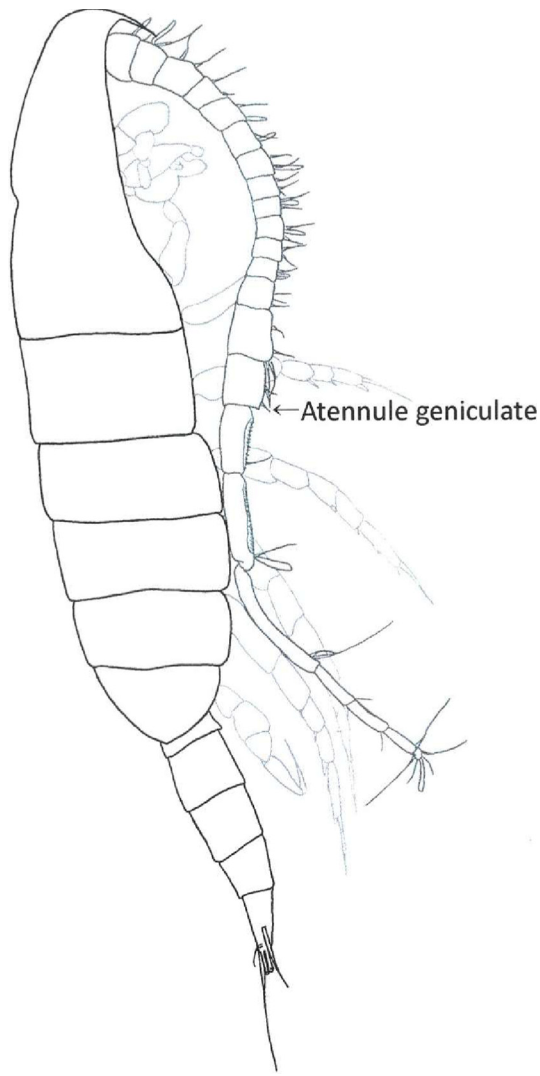

Fig. 18. Centropages orsinii *showing prehensile.*

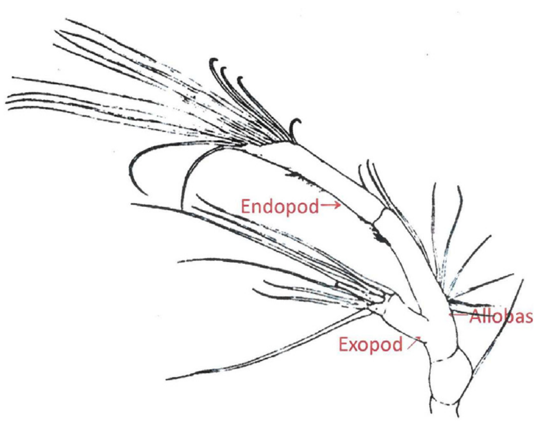

Fig. 19. Acartia bilobata *Antenna showing allobasis. Abraham 1970: Fig. 14 [19].*

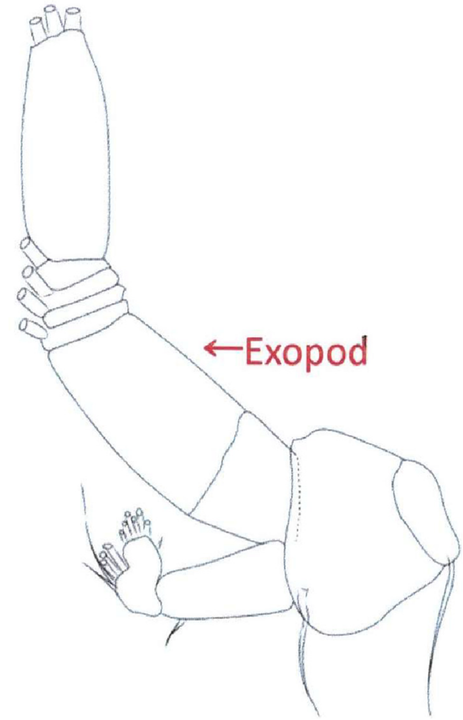

Fig. 20. Euchirella pulchra *Antenna(e) showing exopod more than 2 times as long as endopod.*

4. Distribution

Distribution of calanoid copepods in the China seas is strongly affected by the oceanic currents (Fig. 52) and the East Asian seasonal monsoons. Monsoon changes wind direction, northeasterly in October to April and southwesterly in the remainder of the year, and therefore affects the direction and strength of oceanic currents.

The North Equatorial Current in the Pacific Ocean travels westward near Equator, runs into the Philippine coast, and divides into two branches: the northward Kuroshio and southward Mindanao currents. The Kuroshio, a western boundary current of the North Pacific and equivalent to the Gulf Stream in the North Atlantic Ocean, flows northward along the east coast of Taiwan and continental slope of the East China Sea, and finally turns northeastward then eastward to travel south of Japan [185]. Along its northward path, the Kuroshio makes three westward intrusions, from south to north, 1) through the Luzon Strait into the South China Sea and Taiwan Strait, 2) through a sill between the Taiwan island and southwestern end of the Ryukyu Islands into the southern East China Sea, 3) at the continental slope southwest of Kyushu into the northern East China Sea [186] All China

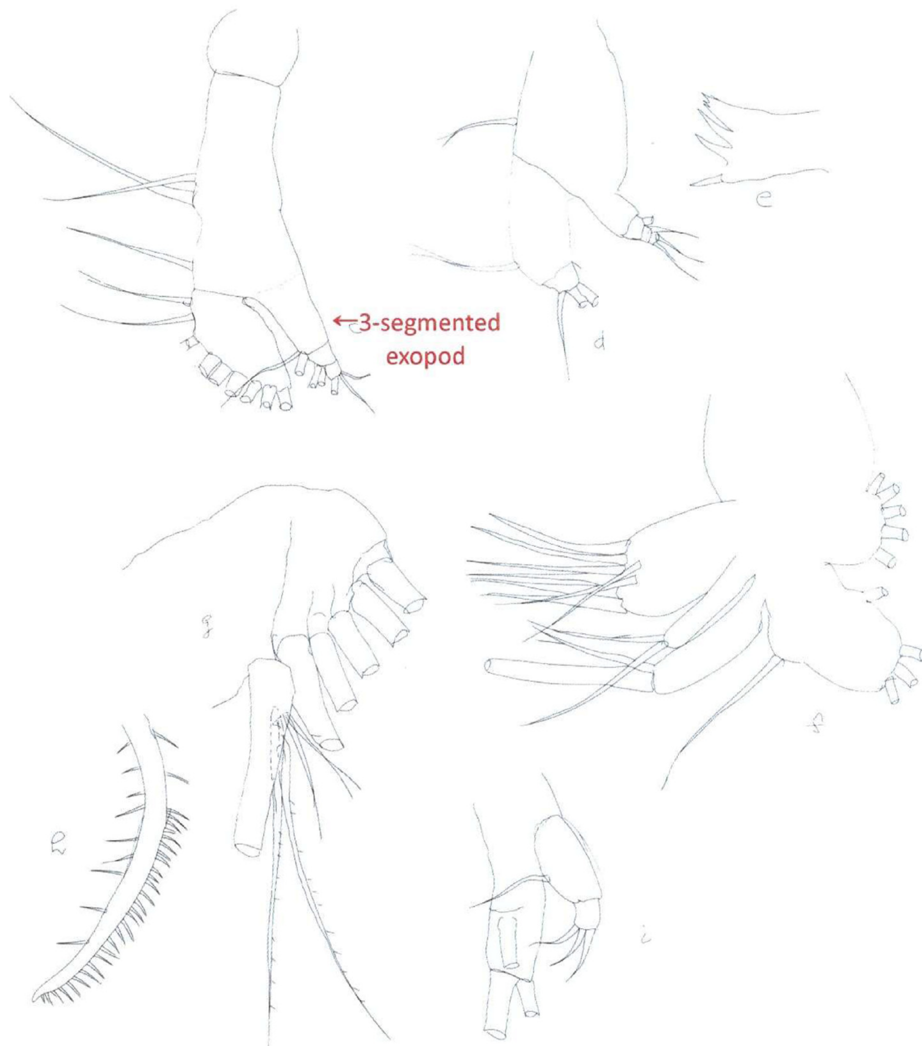

Fig. 21. Acartiella sinensis *c: antenna with 3-segmented exopod.*

seas, except the South China Sea, are shallow and mostly limited to continental shelf. The South China Sea has an average depth of 1200 m. Hu et al. [187] reviewed the oceanic circulation in the South China Sea. According to Fang et al. [188], the South China Sea has four major currents in the 0–400 m layer, i.e., the Nansha Western Coastal Current (NWCC), the Nansha Eastern Coastal Current (NECC), the North Nansha Current (NNC), and the Nansha Counter-wind Current (NCC), which (except NECC) are significantly affected by monsoons. In the northeastern South China Sea a northeastward counter-wind current, the South China Sea Warm Current (SCSWC), is a strong and narrow current throughout winter in the open sea off the Guangdong Province. It extends northward along the west coast of the southern Taiwan Strait in summer [189]. While travelling northward, a branch of the Kuroshio penetrates through Luzon Strait into the South China Sea. This Kuroshio intrusion has impact on copepod distribution in the South China Sea and Taiwan Strait.

Taiwan Strait is a shallow passage, 60 m in average depth, between the island of Taiwan on the east and mainland China on the west and connects the South China Sea to the East China Sea. The southward China Coastal Current (CCC) dominants on the west of the Strait and, on the east, the two northward currents, South China Sea Warm Current (SCSWC) dominates in summer and Kuroshio Branch Current (KBC) dominates in other seasons. These currents are heavily influenced by the forcing

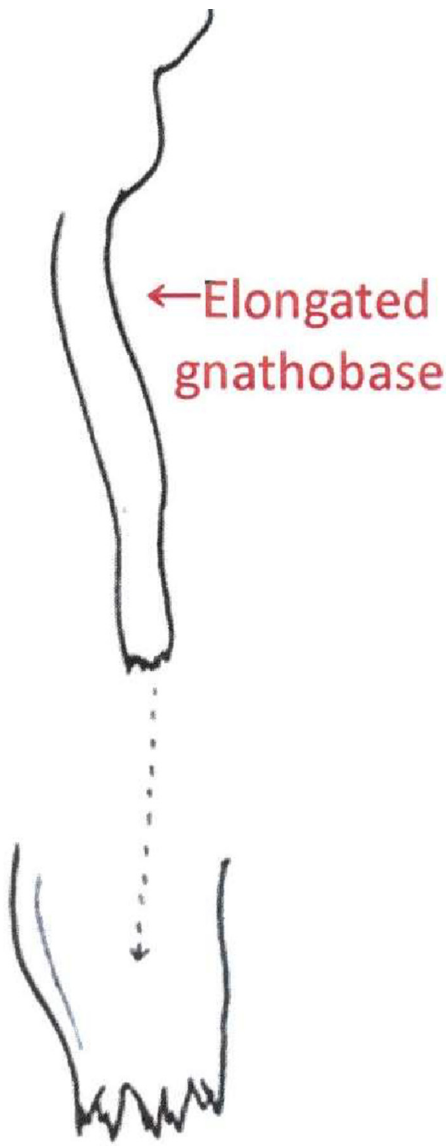

Fig. 22. Psedaugaptilus orientails *Mandible gnathobase forming an elongate rod-like structure. Tanaka 1964: Fig. 216g [20].*

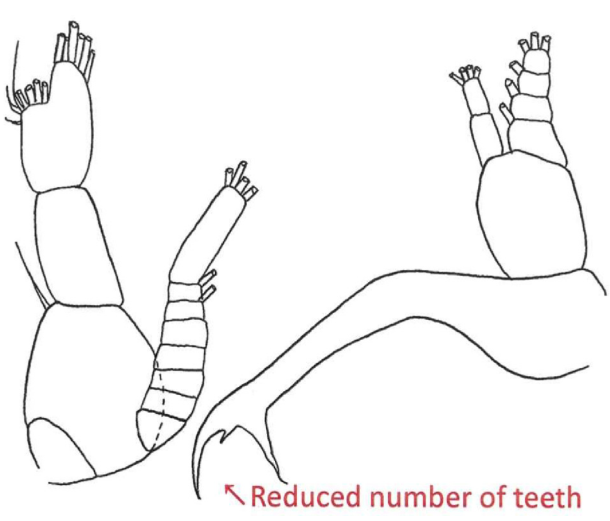

Fig. 23. Centraugaptilus horridus *Mandible gnathobase with 2 large teeth and 1 small tooth in between.*

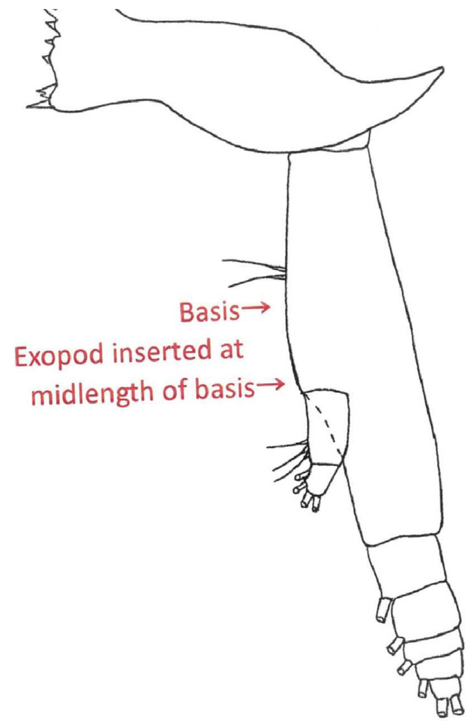

Fig. 24. Eucalanus hlyalinus *mandible with exopod exerted at mid-length of basis.*

of annual cycle of monsoons, reinforcing the northward currents in summer but southward current in other seasons [190]. The oceanic circulation in the East China Sea and Yellow Sea is basically composed of two systems: 1) on the east and northward flowing: Kuroshio in the Okinawa Trough and its two branches (Western Kuroshio Branch, WKB and Eastern Kuroshio Branch, EKB) over the outer shelf and 2) on the west and southward flowing in winter and weakening or changing to northward flowing in summer: the China Coastal Current (a general term for all coastal currents along Chinese coast, e.g., Bohai Sea Coastal current, Yellow Sea Coastal Current, Jiangsu Coastal Current, Zhejian-Fujian Coastal Current, Yuedong Coastal Current) along the east coast and over inner and middle shelves [186].

Western Kuroshio Branch (WKB) is born at the continental slope northeast of Taiwan to carry Kuroshio water to the western East China Sea shelf. Eastern Kuroshio Branch (EKB) is born at continental slope southwest of Kyushu to carry Kuroshio water to the eastern East China Sea shelf. Its secondary branches south of Jeju-do include: 1: Tsushima Warm Current (TWC) flowing in the East China/Japan seas through the Korea-Tsushima.

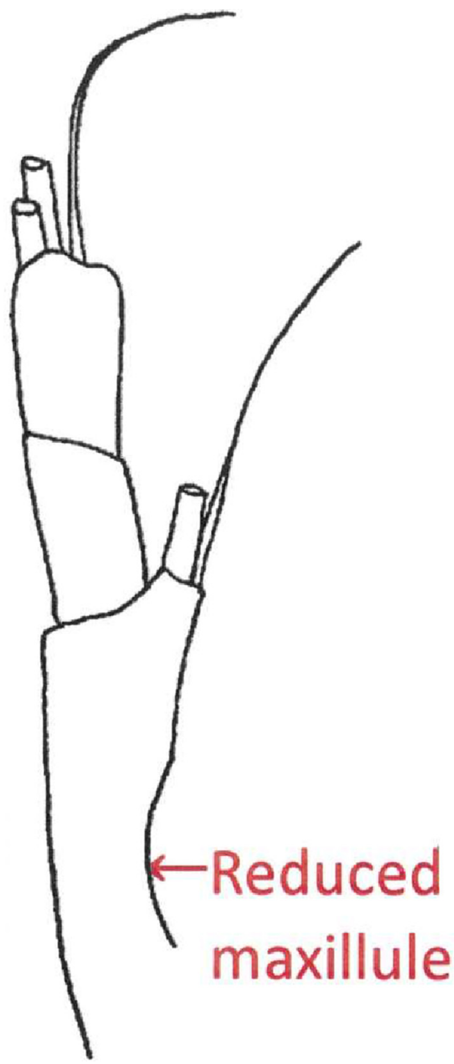

Fig. 25. Augaptilus longicaudatus *Maxillule reduced to a 3-segmented rod.*

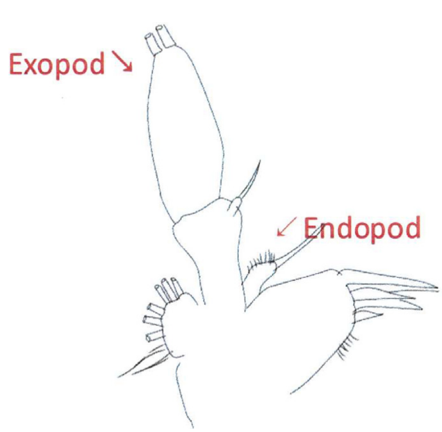

Fig. 26. Arietellus tripartitus *Maxillule with overwhelmingly developed exopod and diminished endopod.*

Straits; 2: Cheju Warm Current (CWC) rounding Jeju-do clockwise eventually turning into the northern Okinawa Trough west of Kyushu, forming the Western Kyushu Current (WKC); and 3: Yellow Sea Warm Current (YSWC) flowing northward in winter monsoon from CWC at the Yellow Sea entrance west of Jeju-do.

Coastal currents on the inner shelf and the shallow part of the middle shelf in general are seasonal, with large variations in current direction and speed. In winter they tend to flow southward along the Chinese and Korean coasts; in summer the currents are reversed in direction along the western coast of Korea and southeastern Chinese coast south of the Changjiang River mouth. In summer less-saline water coming from the South China Sea flows through the Taiwan Strait and then spreads eastward over the western East China Sea.

Bohai Sea is a semi-enclosed and shallow bay connected on its east side with the Yellow Sea [191]. The current system in Bohai Sea is mainly composed of the continuation of the YSWC from the Yellow Sea which entering the Bohai Sea through the northern part of the Bohai Strait and the outgoing Yellow Sea Coastal Current through the southern part of Bohai Strait to the Yellow Sea. The Bohai Sea is characterized to have strong winter gales which can greatly enhance the water exchange.

The following discussion about the distribution of some calanoid species in the China seas, unless otherwise mentioned, is based on Chen [192]. *Calanus sinicus* is a high saline and high thermal species and a major species of zooplankton in the open central waters of Bohai Sea, Yellow Sea, and East China Sea. Its distribution extends to the north coast of South China Sea in winter, however, losing its dominancy in the zooplankton community. The expansion and reduction of distribution of *C. sinicus* are highly related to the oceanography of the area [122]. *C. sinicus* breeds in May/June, August, and November in the Bohai Sea and northern Yellow Sea, slightly earlier in March/April, July/August, and October in the southern Yellow Sea, in April, June/July, and October in the East China Sea, and slightly later in April/May, July/August, and January in the Taiwan Strait. There are only two breeding seasons in the Guangdong coastal waters and the Beibu Gulf of the South China Sea. The change in breeding seasons in different seas is apparently related to the water temperature, and therefore ocean currents. Increase of zooplankton biomass in the China seas corresponds with breeding season of the copepods.

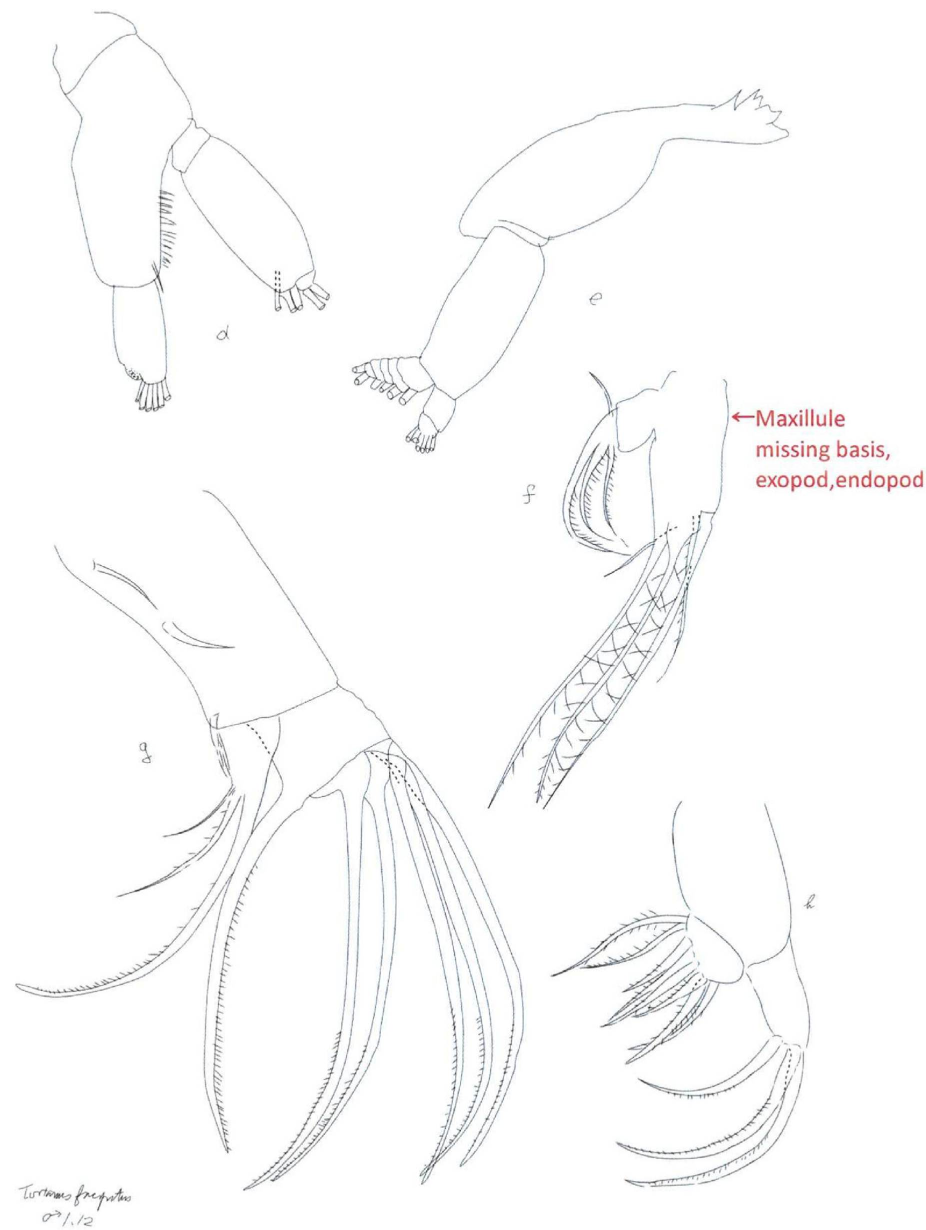

Fig. 27. **Tortanus forcipatus** *f. Maxillule with complete absence of basis, exopod and endopod.*

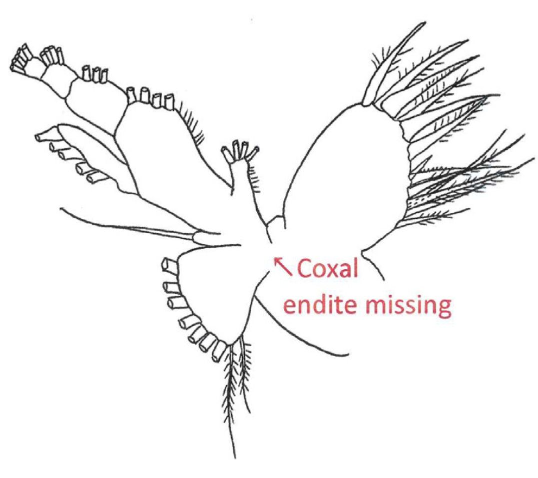

Fig. 28. **Subeucalanus subtenuis** *Maxillule with absence of coxal endite.*

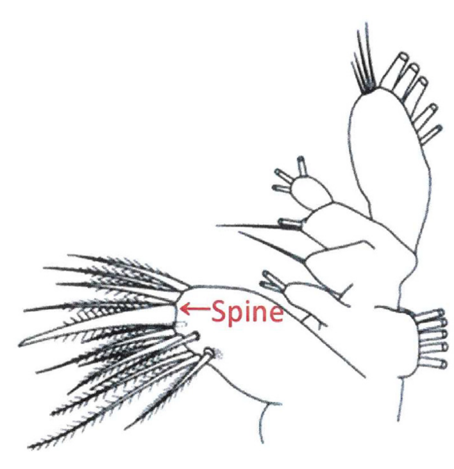

Fig. 29. **Mesorhabdus gracilis** *Maxillule one of the marginal setae on precoxal arthrite forming a strong and thick spine. Park 2000, Fig. 13e [21].*

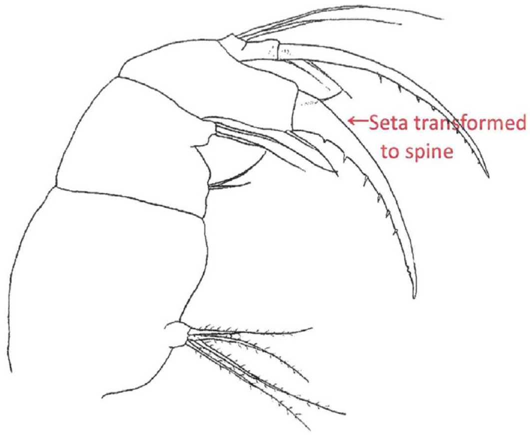

Fig. 30. Hemirhabdus grimaldi maxilla with some setae of basis and endopod transforming to strong spines.

Fig. 31. Onchocalanus trigoniceps *Maxilla with endopod ending in a fortified claw. Park 1983: Fig. 8a [22].*

Fig. 32. Onchocalanus trigoniceps *Maxilla setae of endopod are similar to worm or brush. Park 1983: Fig. 8a [22].*

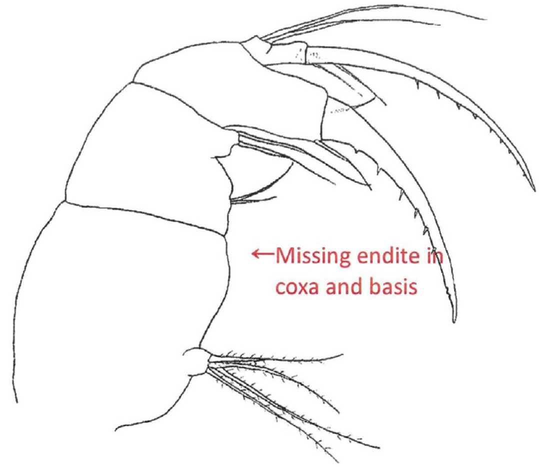

Fig. 33. Hemirhabdus grimaldi *Maxilla with distal precoxal endite missing.*

In the Bohai Sea, *Calanus sinicus* is common throughout the year. It is predominant in summer and fall in the central part. In late spring to early summer its dominancy expands to the coastal waters due to the influence of the inward drifting Yellow Sea Warm Current.

In the Yellow Sea, *Calanus sinicus* is always abundant in the central open waters and is a representative species in spring, summer, and autumn. In late spring to early summer the shoreward expansion of high saline water carries *C. sinicus* to the Shandong coastal area. In summer and fall, owing to the expansion of the less saline coastal waters, *C. sinicus* is forced to retreat toward central part.

Calanus sinicus is a dominant species throughout the year in the open waters of the East China Sea. Its distribution expands to the coastal waters from the Changjiang River mouth to Taiwan Strait in winter when Changjiang River runoff is weakened and influence of NE monsoon and the China Coastal Current is strengthened.

In winter, and extending to spring, influenced by the China Coastal Current and enforced by the NE monsoon, *Calanus sinicus* is drifted to the coastal waters of Guangdong and may be as far west as the Beibu Gulf, a gulf surrounded by Vietnam and China (three provinces: Guangxi, Guangdong and Hainan).

Labidocera euchaeta is, similar to *Calanus sinicus,* also recorded in all China seas. However, it is a species of low saline waters and, different from *C. sinicus*, is more abundant in coastal waters than in open seas. It is a dominant species in the coastal waters of northern Liaoning Peninsula and Laizhou

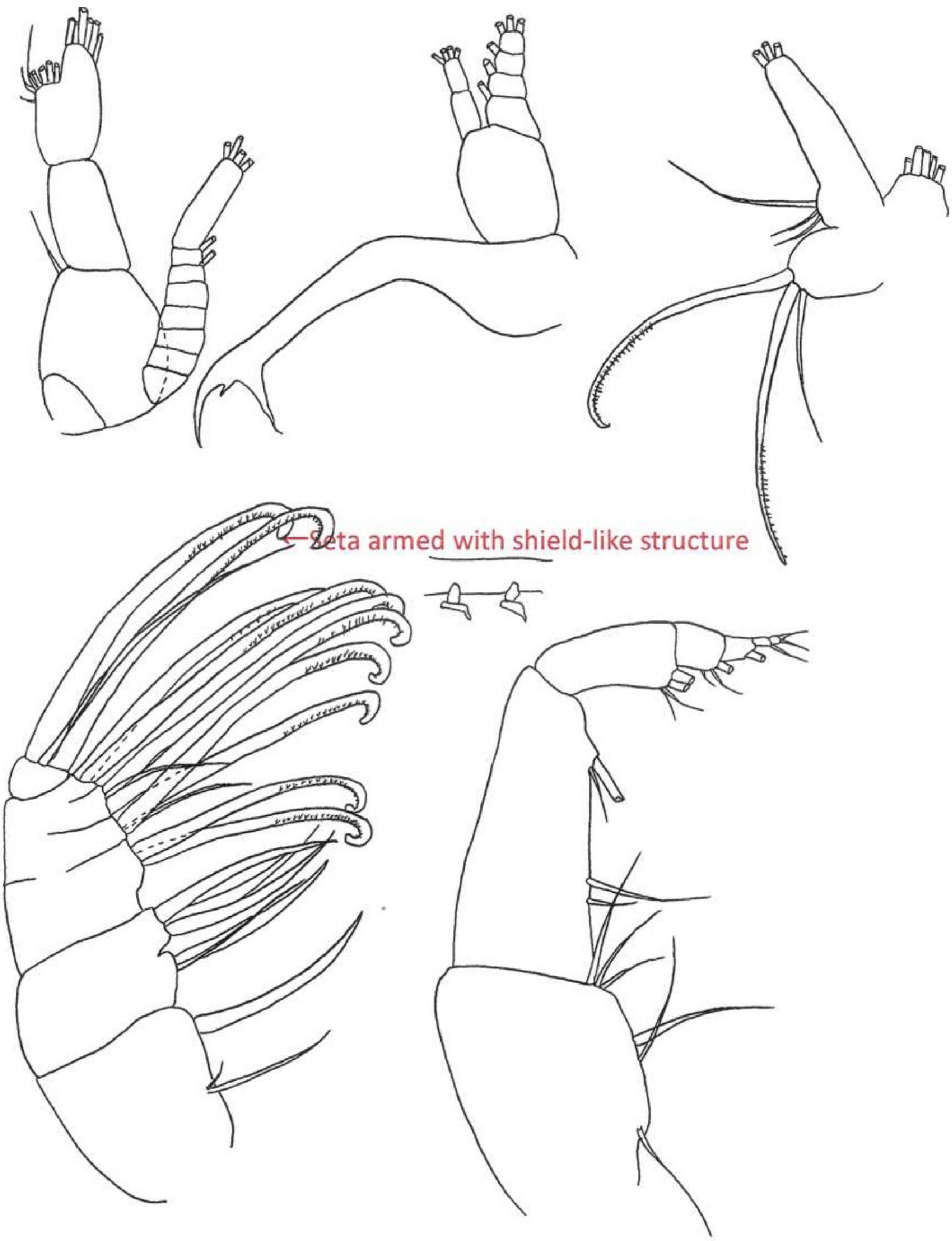

Fig. 34. Centraugaptilus horridus *Maxilliped (8–10): setae armed with shiel-like structure.*

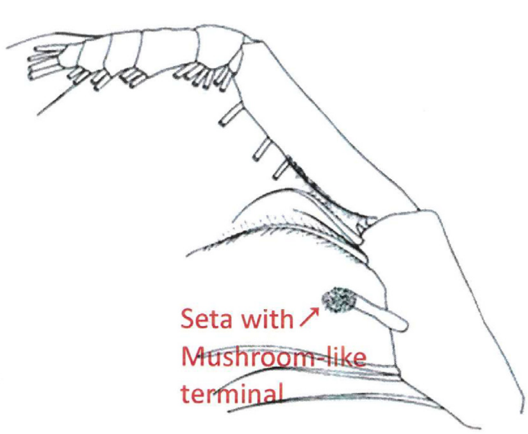

Fig. 35. Scaphocalanus brevirostris *Maxilliped: seta od middle endite of coxa with mushroom-like terminal. Remove all other figures and all numbers. Park 1970: Fig. 137 [23].*

Gulf in the Bohai Sea, and southern Liaoning Peninsula in the Yellow Sea. Its dominance in the northern Liaoning coastal water is replaced by *C. sinicus* in late spring and early summer due to the strengthening Yellow Sea Warm Current. In the East China Sea, *L. euchaeta* is a dominant species in the coastal waters, especially a year round dominant species in the Changjiang River mouth. In the South China Sea it is abundant in the coastal waters of Guangdong Province.

Euchaeta concinna is a tropical species and spreads over South China Sea, Taiwan Strait, and East China

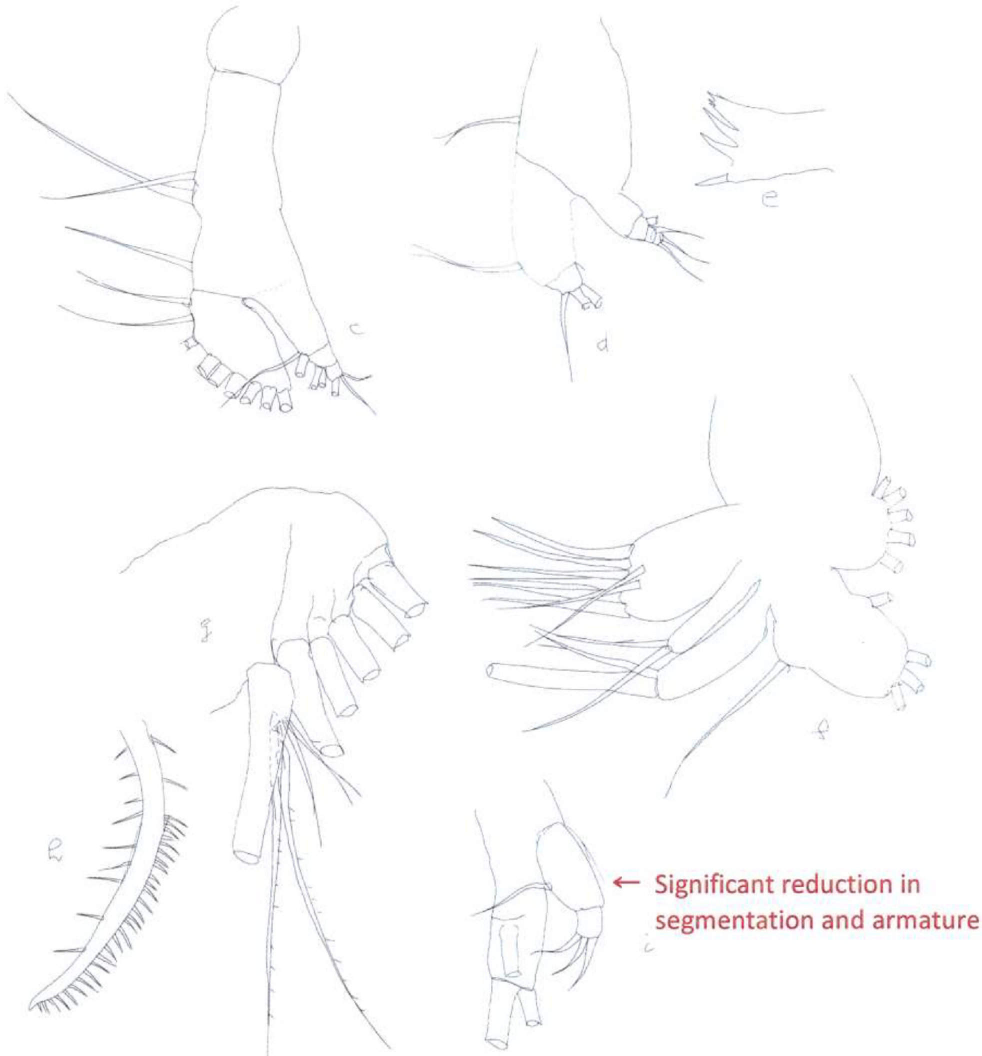

Fig. 36. Acartiella siensis *i. Maxilliped: reduction in segmentation & armature.*

Sea. Less frequently it expands to the southern Yellow Sea by the influence of Yellow Sea Warm Current. In the South China Sea, it is a major component of the subsurface zooplankton community, and abundant in the northern South China Sea where oceanic and coastal waters mix. It is a dominant species on the west coast of Taiwan Strait in summer but is forced to bottom water when the Kuroshio Branch Current sinks in the area west of Taiwan in winter.

Subeucalanus subcrassus is a tropical species and present in both oceanic and coastal waters from the South China Sea to East China Sea, and, to a less extent, the southern Yellow Sea due to the influence of northward drifting Yellow Sea Warm Current in fall and winter. In the South China Sea, *S. subcrassus* has been recorded from open waters in central South China Sea to near shore waters south of Guangdong Province and as well as in the Beibu Gulf and Thailand Gulf. From the northeastern South China Sea northward, *S. subcrassus* is abundant in the Taiwan Strait, especially in summer, and widely distributed and dominant in fall in the East China Sea. It is also fairly abundant in the Ilan Bay, east of Taiwan [139].

The composition of calanoid copepods in the China seas is strongly influenced by the Kuroshio. Grice [193] studied the copepods of the equatorial Pacific. He recorded 109 species of calanoid copepods in his survey. All but four (*Aetideus pacificus, Pleuromamma indica, Parvocalanus dubia* and *Scopalatum smithae*) of the species reported by him also occur in the China seas. There may have more species that are common in the equatorial Pacific

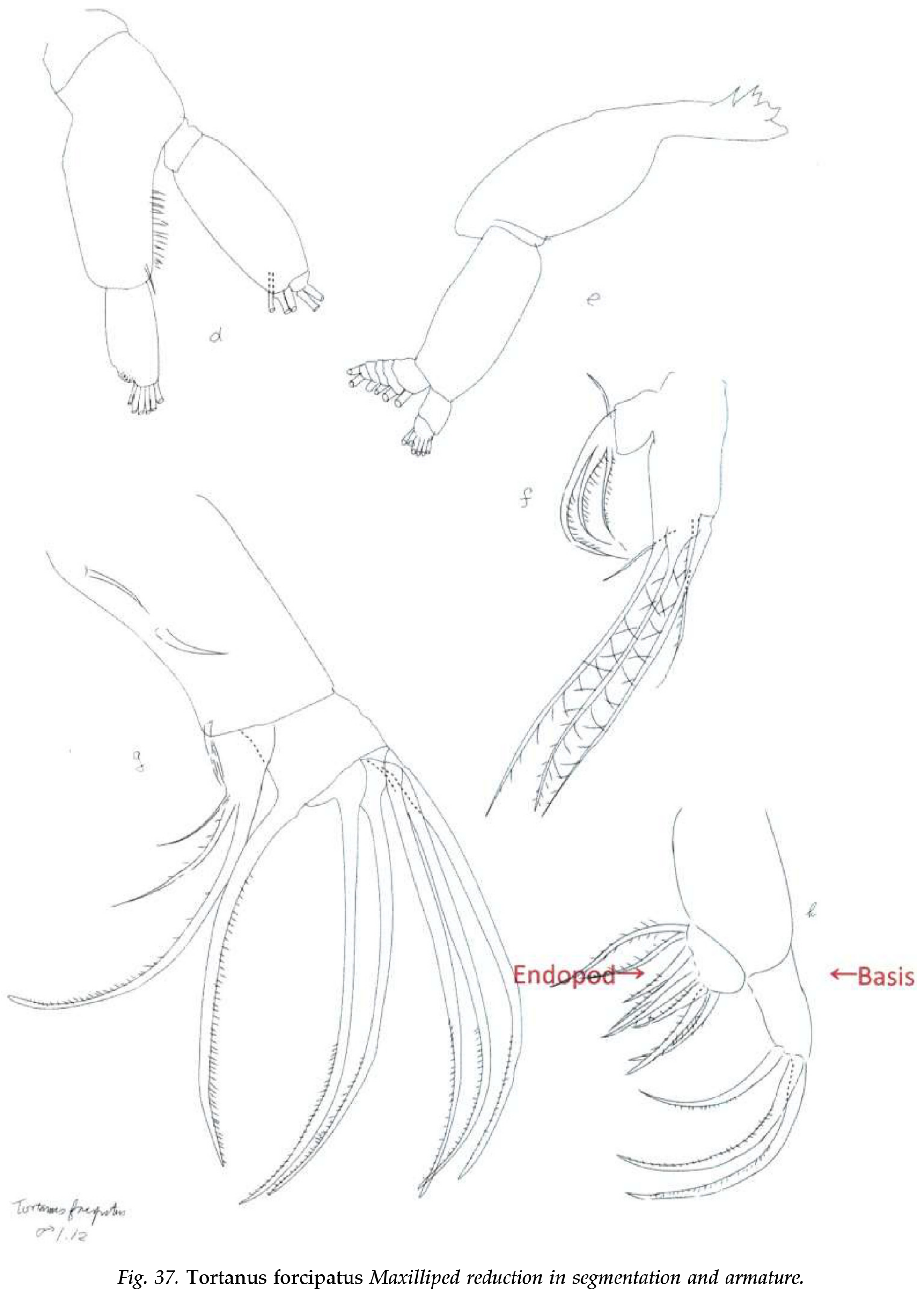

Fig. 37. **Tortanus forcipatus** *Maxilliped reduction in segmentation and armature.*

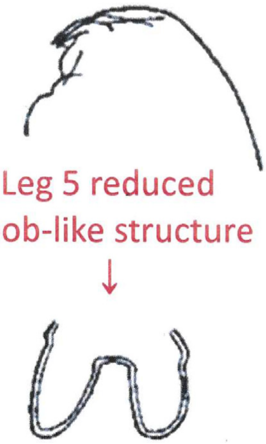

Fig. 38. Bestiolina sinica *female P5. Shen& Lee, 1966: Fig. 16 [24].*

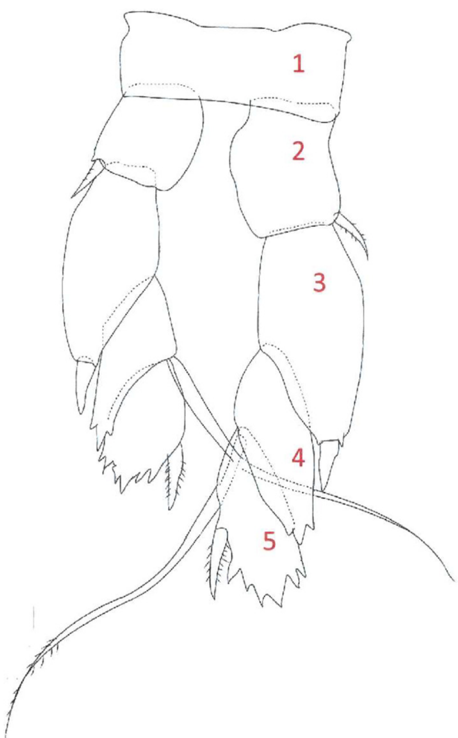

Fig. 39. Nullosetigera helgae *femal P5.*

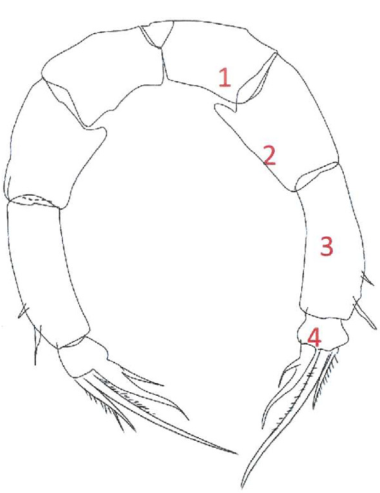

Fig. 40. Peudodiaptomus trihamatus *female P5.*

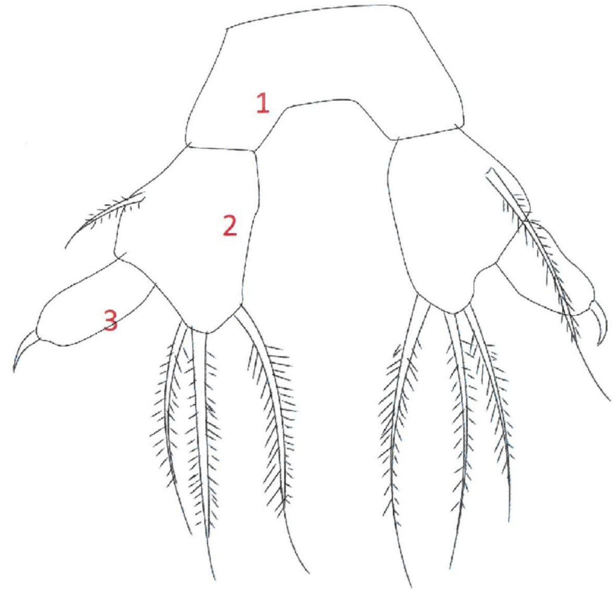

Fig. 41. Arietellus tripartitus *femal P5.*

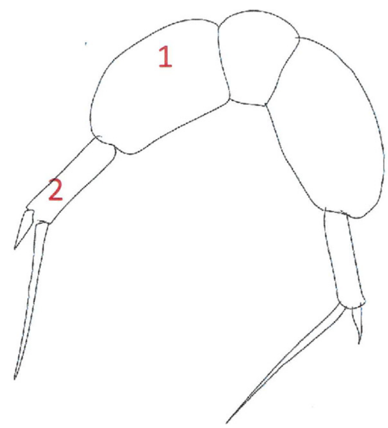

Fig. 42. Paracalanus parvus *d. female P5.*

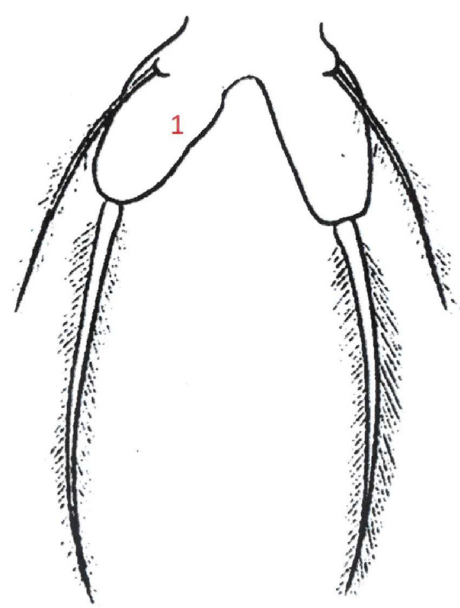

Fig. 43. Paraugaptilus buchani *female P5.*

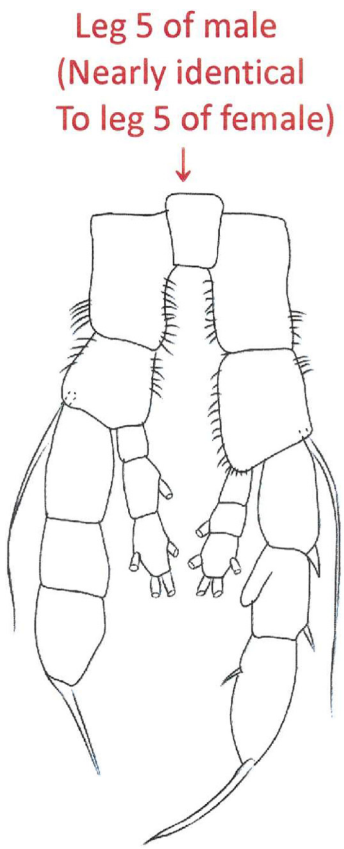

Fig. 44. Euaugaptilus hecticus *male P5.*

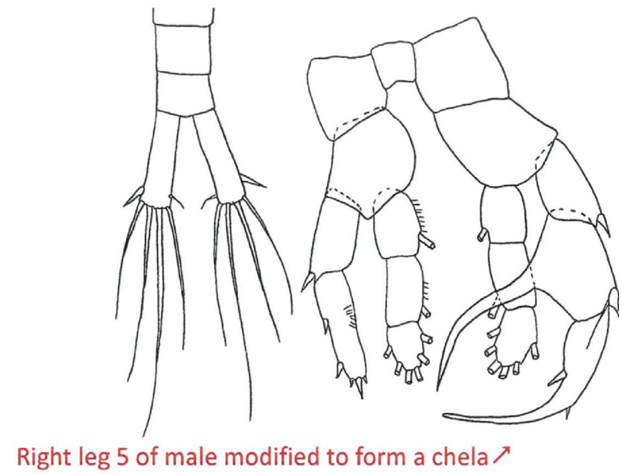

Fig. 46. Centropages tenuiremis *P5 of male.*

and the China seas if more collections from the equatorial water are available for study. This is a clear indication that the Kuroshio, due to its upstream the North Pacific Equitorial Current, is an important contributor to the composition of calanoid copepods in the China seas.

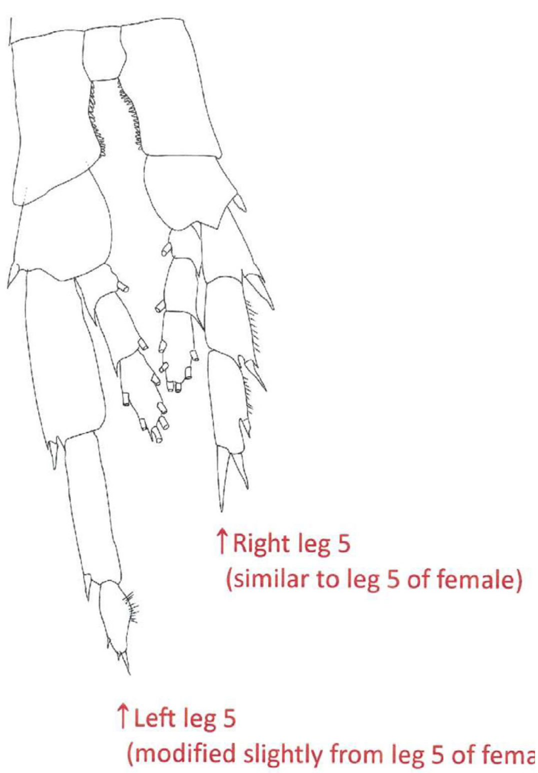

Fig. 45. Calanus sinicus *P5 of male.*

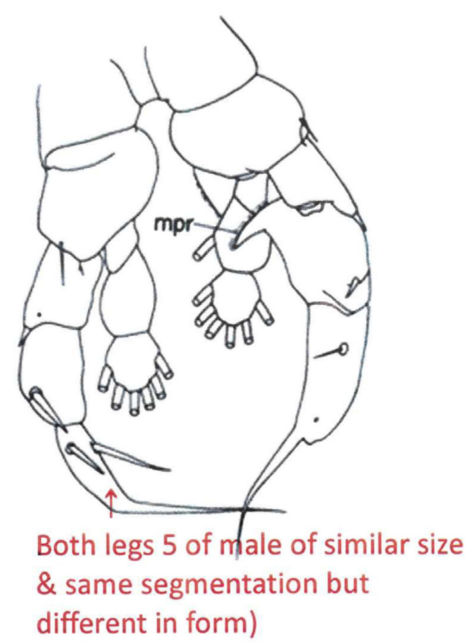

Fig. 47. Mesorhabdus angustus *male P5 (posterior view). Park 2000: Fig. 9g [25].*

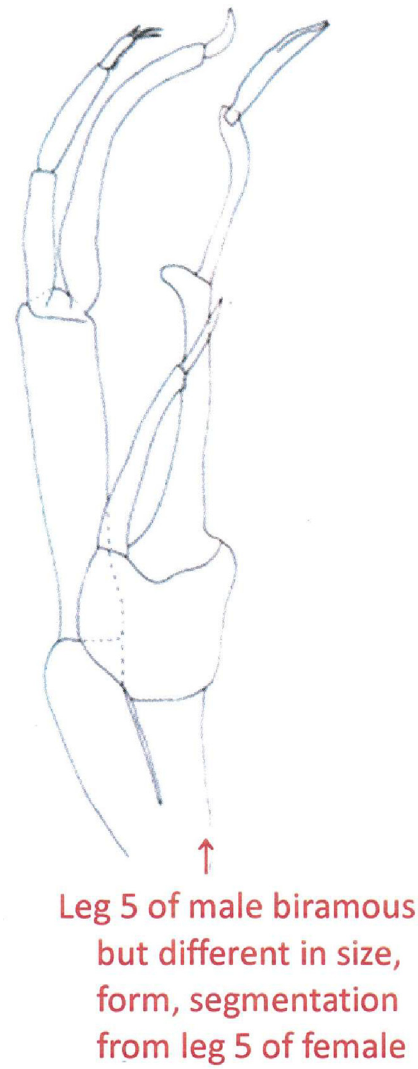

Fig. 48. Scaphocalanus major *male P5 Bradford et al., 1983: fig. 60E [26].*

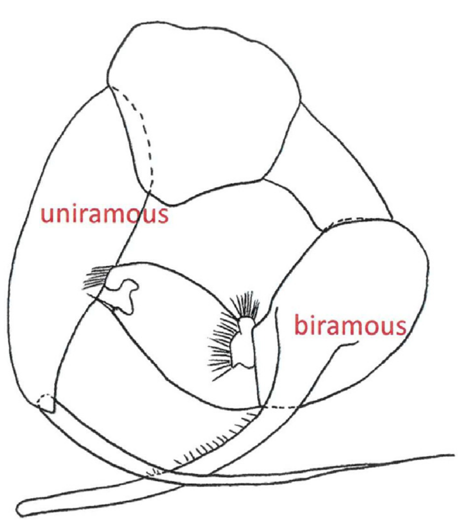

Fig. 49. Temoropia mayumbaensis *Male P5 (posterior view).*

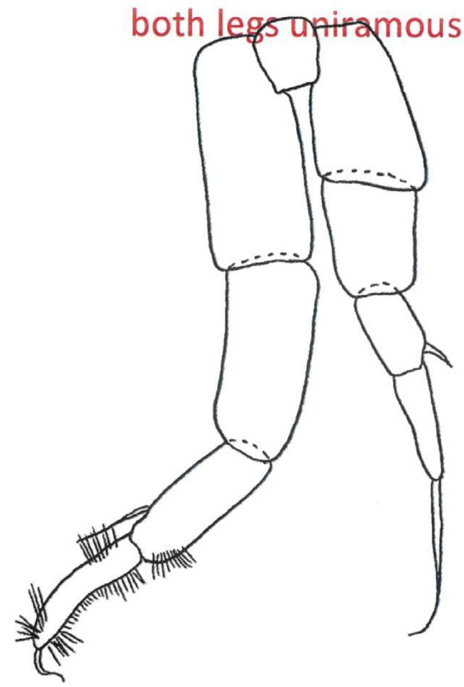

Fig. 50. Eucalanus hyalinus *Male P5 (posterior view).*

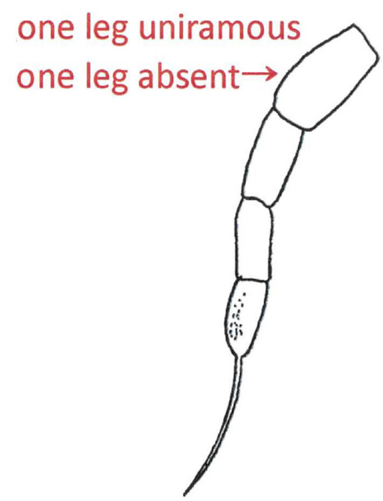

Fig. 51. Subeucalanus Subtenuis *male P5.*

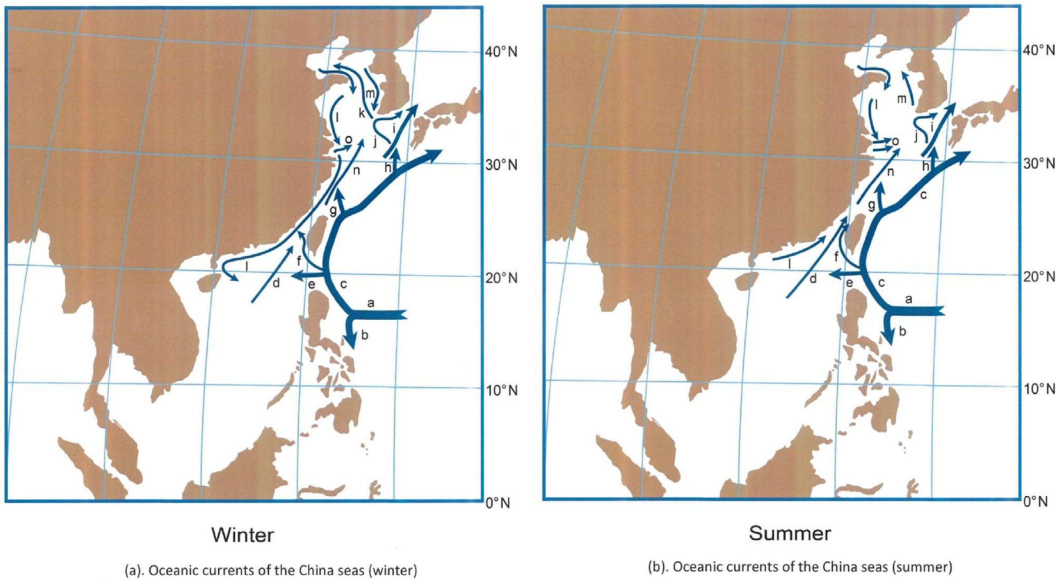

Fig. 52. Legends for oceanic currents related to China seas: a. North Equatorial Current, b. Mindanao Current; c. Kuroshio Current; d. South China Sea Warm Current; e. Kuroshio westward intrusion through Luzon Strait; f. Kuroshio Branch Current; g. Kuroshio Westward Intrusion through a sill between Taiwan and Ryukyu islands into southern East China Sea; h. Kuroshio Eastward Intrusion at the continental slope southwest of Kyushu into the northern East China Sea; i. Tsushima Warm Current: j. Cheju Warm Current; k. Yellow Sea Warm current; 1. China Coastal Current (including various coastal currents from Bohai Sea to South China Sea); m. Korean Coastal Current; n. Taiwan Warm Current; o. Changjiang River Plume.

5. List of species known to occur in the China seas

(BS: Bohai Sea; ES: East China Sea; ET: east of Taiwan, SS: South China Sea; TS: Taiwan Strait; YS: Yellow Sea); b: brackish; e: estuary; i: inshore; o: oceanic; A: abyssopelagic; B: bathlypelagic; Bn: benthic; E: epipelagic; Hb: hyperbenthic; M: mesopelagic).

ACARTIIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Acartia (*Acanthacartia*) *bifilosa* (Giesbrecht, 1881)	0.67–1.25	0.67–1.25	v	v	v	v	v	v	i	E
Acartia (*Acanthacartia*) *bilobata* Abraham, 1970	0.95–1.10	0.90–0.95					v		i	E
Acartia (*Acanthacartia*) *fossae* Gurney, 1927	1.03–1.40	0.91–1.30			v				i	E
Acartia (*Acanthacartia*) *sinjiensi* Mori, 1940	0.86–1.10	0.80–1.03	v	v	v		v	v	b,i	E
Acartia (*Acanthacartia*) *tsuensis* Ito, 1956	0.89–1.00	0.80–0.90			v		v	v	i,b	E
Acartia (*Acanthacartia*) *tumida* Willey, 1920	2.00–2.70	1.80–2.10	v	v	v				e	E
Acartia. (*Acartia*) *danae* Giesbrecht, 1889	0.90–1.34	0.70–1.10	v	v	v	v	v	v	i,o	E
Acartia (*Acartia*) *negligens* Dana, 1849	0.80–1.10	0.90–1.10	v	v	v	v	v	v	o	E
Acartia (*Acartiura*) *clausi* Giesbrecht, 1889	0.70–1.47	0.68–1.31	v	v	v	v	v	v	i,e	E
Acartia (*Acartiura*) *hongi* Soh & Suh, 2000	0.80–1.19	0.70–1.04	v	v	v		v		b,i	E
Acartia (*Acartiura*) *hudsonica* Pinhey, 1926	0.74–1.32	0.71–1.07		v					i,b	E
Acartia (*Acartiura*) *longiremis* (Lilljeborg, 1853)	080–1.40	0.66–1.18		v	v		v	v	i,o	E
Acartia (*Acartiura*) *omorii* Bradford, 1976	0.90–1.30	0.80–1.20	v	v	v	v	v	v	i	E
Acartia (*Euacartia*)*forticrusa* Soh, Moon, Park, Bun & Venmathi Maran, 2013	0.79–0.88	0.69–0.80		v				v	i,e	E
Acartia (*Euacartia*)*sarojus* Madhupratap & Haridas, 1994	0.85–0.94	0.70–0.83						v	i	E
Acartia (*Euacartia*) *southwelli* Sewell, 1914	0.73–0.84	0.68–0.75	v	v	v	v	v	v	e	E
Acartia (*Odontacartia*) *amboinensis* Carl, 1907	1.33–1.42	1.29–1.33						v	i	E
Acartia (*Odontacartia*) *bispinosa* Carl, 1907	1.20–1.60	1.17–1.40		v				v	e,i	E
Acartia (*Odontacartia*) *erythraea* Giesbrecht, 1889	1.10–1.50	1.00–1.40		v	v	v	v	v	i,o	E
Acartia (*Odontacartia*) *japonica* Mori, 1940	1.30–1.65	1.19–1.36					v		i	E
Acartia (*Odontacartia*) *ohtsukai* Ueda & Bucklin, 2006	1.06–1.51	0.95–1.33		v					i	E
Acartia (*Odontacartia*) *pacifica* Steuer, 1915	1.00–1.51	0.95–1.33	v	v	v	v	v	v	i	E
Acartia (*Odontacartia*) *spinicauda* Giesbrecht, 1889	1.25–1.55	1.16–1.32	v	v	v	v	v	v	e	E
Acartiella sinensis Shen & Lee, 1963	1.22–1.40	1.00–1.23	v	v	v		v	v	i,e,o	E

AETIDEIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Aetideopsis armatus (Boeck, 1872)	2.80–4.50	2.90–4.00			v		v		o	M/B
Aetideopsis retusa Grice & Hulsemann, 1967	1.98–2.80	2.25–2.70				v			o	B
Aetideus acutus Farran, 1929	1.48–1.80	1.22–1.98		v	v	v	v	v	o	E/M
Aetideus armatus (Boeck, 1872)	1.33–2.25	1.25–2.10		v	v	v	v	v	o	E/M
Aetideus bradyi Scott A., 1909	1.38–2.07	1.00–1.50			v				o	E/M
Aetideus divergens Bradford, 1971	1.69–1.90	1.25–1.43						v	o	E/M
Aetideus giesbrechti Cleve, 1904	1.50–2.20	1.10–1.70		v	v	v	v	v	o	E/M
Aetideus truncatus Bradford, 1971	1.60–1.80	1.45			v				o	E/M
Bradyetes pacificus Ohtsuka, Boxshall & Shimomura, 2005	1.96–2.98	unknown			v				o	E/M
Bradyidius angustus (Tanaka, 1957)	unknown	1.32–1.57				v			o	M
Bradydius armatus (Vanhöffen, 1897)	1.70–2.70	1.50–2.20		v	v		v	v	o	E
Bradyidius similis (Sars G.O., 1902)	2.54–3.24	2.40–2.771			v			v	o	E/Bn
Chiridiella macrodactyla Sars G.O., 1907	2.35–3.00				v			v	o	M/B
Chiridiella pacifica Brodsky, 1950	2.50–3.10	2.85						v	o	B
Chiridius gracilis Farran, 1908	2.08–3.50	1.96–2.65			v	v		v	o	M
Chiridius molestus Tanaka, 1957	2.10–2.72	1.80–2.16			v			v	o	M
Chiridius poppei Giesbrecht, 1893	1.59–2.45	1.50–2.13		v	v		v	v	o	E/M
Chirundina indica Sewell, 1929	4.05–5.00	3.75–4.10						v	o	E/M
Chirundina streetsii Giesbrecht, 1895	3.60–6.00	3.40–5.20			v	v		v	o	E/M
Euchirella amoena Giesbrecht, 1888	2.70–4.10	2.90–3.85		v	v	v	v	v	o	E
Euchirella bella Giesbrecht, 1888	3.33–4.85	3.10–4.13		v	v	v	v	v	o	E/M
Euchirella bitumida With, 1915	4.70–7.10	4.80–6.10			v			v	o	M/B
Euchirella curticauda Giesbrecht, 1888	2.50–4.85	3.00–4.30		v	v	v		v	o	M
Euchirella formosa Vervoort, 1949	4.75–5.50	4.75–5.20			v			v	o	E/M
Euchirella galeata Giesbrecht, 1888	5.20–6.70	4.70–5.33			v			v	o	E/M
Euchirella grandicornis Wilson C.B., 1950	5.97–7.00	unknown			v	v	v	v	o	E/M
Euchirella maxima Wolfenden, 1905	5.84–8.20	6.10–7.35						v	o	E/M
Euchirella messinensis (Claus, 1863)	3.80–6.20	2.80–5.46		v	v	v		v	o	E/M
Euchirella orientalis Sewell, 1929	4.33–6.25	4.77			v			v	o	E/M
Euchirella pseudopulchra Park, 1976	3.18–4.40	unknown						v	o	M/B
Euchirella pulchra (Lubbock, 1856)	2.88–4.40	2.87–4.15			v			v	o	M
Euchirella rostrata (Claus, 1866)	2.00–4.07	2.50–3.10			v				o	E/M
Euchirella speciosa Grice & Hulsemann, 1968	4.32–5.10	unknown			v				o	E/M
Euchirella splendens Vervoort, 1963	3.40–5.20	3.37–3.76						v	o	E/M
Euchirella truncata Esterly, 1911	4.41–6.93	4.50–5.60			v			v	o	M
Euchirella unispina Park, 1968	4.03–4.89	3.85–3.89		v	v			v	o	E
Euchirella venusta Giesbrecht, 1888	4.25–5.06	2.50–4.16		v	v	v	v		o	E/M
Farrania frigida (Wolfenden, 1911)	2.25–3.00	2.34						v	o	M/B
Farrania orba (Tanaka, 1956)	3.56	3.01			v			v	o	M
Gaetanus armiger Giesbrecht, 1888	2.60–4.70	2.60–3.16						v	o	M/B
Gaetanus brevicaudatus (Sars G.O., 1907)	3.90–4.50	unknown						v	o	M/B
Gaetanus brevicornis Esterly, 1906	3.50–5.40	4.25						v	o	M/B
Gaetanus brevispinus (Sars G.O., 1900)	3.60–4.90	2.08–4.00						v	o	E/M
Gaetanus kruppii Giesbrecht, 1903	3.60–5.70	3.70–5.60						v	o	M/B
Gaetanus latifrons Sars G.O., 1905	3.75–5.40	3.30–4.24						v	o	M/B
Gaetanus miles Giesbrecht, 1888	3.00–5.20	3.00–3.55			v			v	o	E/M
Gaetanus minispinus Tanaka, 1969	5.15–5.60	unknown						v	o	M
Gaetanus minor Farran, 1905	2.09–3.73	2.00–3.16		v	v	v	v	v	o	M/B
Gaetanus pileatus Farran, 1903	4.90–6.70	4.44–5.08						v	o	M/B
Gaetanus pungens (Giesbrecht, 1895)	2.60–3.80	2.00–3.04			v	v		v	o	E/M
Gaetanus tenuispinus (Sars G.O., 1900)	2.02–4.00	1.82–3.43			v			v	o	E
Pseudochirella dubia (Sars G.O., 1905)	4.80–6.10	4.00						v	o	B/A
Pseudochirella gibbera Vervoort, 1949	5.50–6.17	unknown						v	o	B
Pseudochirella notacantha (Sars, G.O., 1925)	5.10–6.80	4.90–5.80						v	o	M/B
Pseudochirella obesa Sars G.O., 1920	5.00–6.20	5.76						v	o	MHb
Pseudochirella obtusa (Sars G.O., 1905)	4.70–7.00	4.83–5.50						v	o	M/B
Pseudochirella scopularis (Sars, G.O., 1905)	5.00–6.00	unknown						v	o	M
Undeuchaeta incisa Esterly, 1911	5.36–6.66	4.08–5.58			v	v			o	M
Undeuchaeta intermedia Scott A., 1909	3.56–4.50	3.62–3.69			v	v		v	o	E/M
Undeuchaeta major Giesbrecht, 1888	4.15–6.50	3.90–5.50			v	v		v	o	B
Undeuchaeta plumosa (Lubbock, 1856)	3.00–4.65	2.80–3.93		v	v	v		v	o	M
Valdiviella insignis Farran, 1908	8.50–12.0	8.02–10.0						v	o	M
Valdiviella oligarthra Steuer, 1904	7.20–10.0	6.02–9.08						v	o	B

ARIETELLIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Arietellus aculeatus (Scott T., 1894)	3.45–5.01	3.60–4.62						v	o	M
Arietellus armatus Wolfenden, 1911	4.50–5.01	unknown						v	o	M
Arietellus giesbrechti Sars G.O., 1905	4.70–5.70	4.67–5.35						v	o	M
Arietellus plumifer Sars G.O., 1905	4.55–6.24	4.48–5.90						v	o	M
Arietellus setosus Giesbrecht, 1893	4.27–5.50	3.93–6.20		v	v	v	v	v	o	M
Arietellus simplex Sars G.O., 1905	4.75–6.95	4.85–6.20				v		v	o	M/B
Arietellus tripartitus Wilson C.B., 1950	4.00–4.76	unknown			v			v	o	M
Metacalanus acutioperculum Ohtsuka, 1984	0.73	0.63						v	i	Hb
Metacalanus aurivillii Cleve, 1901	0.53–0.65	0.50–0.69			v		v	v	e/o	E
Metacalanus curvirostris Ohtsuka, 1985	1.19	0.89						v	i	E
Paramisophria japonica Ohtsuka, Fosshagen & Go, 1991	1.85–2.08	1.41–1.64			v				i	Bn
Paramisophria koreana Lim & Min, 2014	1.63	1.45–1.49			v				?	?
Paramisophria platysoma Ohtsuka & Mitsuzumi, 1990	1.08	1.03			v				i	Bn
Paramisophria sinica Lian & Qian, 1994	3.12–3.44	unknown		v				v	i	Bn
Paramisophria sinjinensis Lim & Min, 2014	unknown	1.41		v					?	?
Paraugaptilus buchani Wolfenden, 1904	3.00–3.63	2.85–3.25						v	o	M

AUGAPTILIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Augaptilus anceps Farran, 1908	3.57–3.75	unknown						v	o	M
Augaptilus glaciallis Sars G.O., 1900	4.03–5.90	3.20–5.19				v		v	o	M
Augaptilus lamelifer Esterly, 1911	4.40	unknown			v			v	o	M
Augaptilus longicaudatus (Claus, 1863)	2.04–5.09	3.20–4.80		v	v			v	o	E/M
Augaptilus megalurus Giesbrecht, 1889	4.26–6.10	4.00–5.00						v	o	E/M
Augaptilus spinifrons Sars G.O., 1907	3.00–3.85	3.10			v		v	v	o	E/M
Centraugaptilus horridus (Farran, 1908)	5.60–10.2	8.33–8.40						v	o	M
Centraugaptilus porcellus Johnson, 1936	5.40–6.20	5.75				v		v	o	M
Centraugaptilus rattrayi (Scott T., 1894)	4.70–6.18	4.80–5.81						v	o	M
Euaugaptilus affinis Sars G.O., 1920	5.40	unknown						v	o	M
Euaugaptilus angustus (Sars G.O., 1905)	5.76–7.90	5.12–5.48			v				o	M
Euaugaptilus brodski Hulsemann, 1967	3.95–6.83	3.33–5.90						v	o	B
Euaugaptilus elongatus (Sars G.O., 1905)	5.00–6.72	5.20–6.50			v	v		v	o	M
Euaugaptilus facilis (Farran, 1908)	4.00–5.91	3.96–5.00						v	o	M
Euaugaptilus filigerus (Claus, 1863)	4.50–7.64	4.00–5.76			v	v			o	M
Euaugaptilus gracilis (Sars G.O., 1905)	5.80–6.20	unknown			v				o	M/B
Euaugaptilus hecticus (Giesbrecht, 1893)	1.60–2.85	1.20–2.43			v	v	v	v	o	E/M
Euaugaptilus laticeps (Sars G.O., 1905)	6.09–10.13	6.30–9.90			v			v	o	M
Euaugaptilus longimanus (Sars G.O., 1905)	4.30–9.50	5.72–6.30			v			v	o	M
Euaugaptilus magnus (Wolfenden, 1904)	6.50–8.90	6.96–8.80				v		v	o	B
Euaugaptilus marginatus Tanaka, 1964	1.66–2.26	unknown			1				o	E/M
Euaugaptilus nodifrons (Sars G.O., 1905)	5.10–9.50	4.80–8.40					v	v	o	M
Euaugaptilus oblongus (Sars G.O., 1905)	4.65–7.40	5.40–5.70						v	o	M
Euaugaptilus palumboi (Giesbrecht, 1889)	1.90–2.30	1.82–1.98					v	v	o	M
Euaugaptilus rigidus (Sars G.O., 1907)	4.30–5.50	4.30						v	o	M
Haloptilus acutifrons (Giesbrecht, 1893)	2.50–4.66	2.00–3.19			v	v	v	v	o	E/M
Haloptilus austini Grice, 1959	3.06–3.33	unknown			v	v	v	v	o	E
Haloptilus buliceps Farran, 1926	3.30–3.69	unknown			v			v	o	E
Haloptilus chierchiae (Giesbrecht, 1889)	4.05–5.28	3.65–3.95			v			v	o	E
Haloptilus fertilis (Giesbrecht, 1893)	unknown	2.47–3.20			v			v	o	E
Haloptilus fons Farran, 1908	4.80–6.60	unknown			v			v	o	M
Haloptilus longicirrus Brodsky, 1950	2.00–3.77	unknown			v	v	v	v	o	E/M
Haloptilus longicornis (Claus, 1863)	1.72–2.63	1.16–1.37		v	v	v	v	v	o	E/M
Haloptilus mucronatus (Claus, 1863)	3.00–3.60	2.17–2.68		v	v	v	v	v	o	E
Haloptilus ornatus (Giesbrecht, 1893)	3.00–5.33	2.75–3.05		v	v	v	v	v	o	E/m
Haloptilus oxycephalus (Giesbrecht, 1889)	3.00–5.20	2.40–2.85		v	v	v	v	v	o	E/M
Haloptilus paralongicirrus Park, 1970	2.31–2.70	1.67–2.20				v		v	o	M/B
Haloptilus plumosus (Claus, 1863)	4.15–4.20	unknown						v	o	E/M
Haloptilus spiniceps (Giesbrecht, 1893)	3.20–5.45	2.55–2.81		v	v	v		v	o	E
Haloptilus tenuis Farran, 1908	4.40–4.62	3.50						v	o	M
Pontoptilus muticus Sars G.O., 1905	5.60–6.00	unknown						v	o	M
Pontoptilus ovalis Sars G.O., 1905	4.16–5.62	unknown						v	o	M/B
Pseudaugaptilus orientalis Tanaka, 1964	3.89	unknown						v	o	E/B
Pseudhaloptilus eurygnathus (Sars G.O., 1920)	4.60–5.90	unknown				v		v	o	M/B
Pseudhaloptilus pacificus (Johnson, M.W., 1936)	4.75–6.50	4.60						v	o	M

BATHYPONTIIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Temorites brevis G.O., 1900	1.52–2.12	1.05–1.94				v		v	o	M
Temorites elongata (G.O., 1905)	4.70–6.15	4.68–5.55			v			v	o	M/B
Temorites longicornis (Tanaka, 1965)	unknown	5.18						v	o	M/B
Temorites minor (Wolfenden, 1906)	2.50–2.80	2.30–2.51						v	o	M/B
Temorites sarsi (Grice & Hulsemann, 1967)	2.60–3.04	2.74–3.04						v	o	M/B
Temorites similis (Tanaka, 1965)	2.60–3.12	unknown						v	o	M/B
Temorites spinifera (Scott A., 1909)	3.30	2.60–3.00						v	o	M/B

CALANIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Calanoides carinatus (Krøyer, 1849)	1.70 + 4.00	2.06–3.60		v	v	v	v	v	i,o	E/M
Calanoides philippiensis Kitou & Tanaka, 1969	2.55–2.80	2.50–2.70			v	v	v	v	o	E/M
Calanus jashnovi Hulsemann, 1994	3.40–4.40	3.00–3.80				v			o	M
Calanus sinicus Brodsky, 1962	2.10–3.60	2.00–3.50	v	v	v	v	v	v	i,o	E
Canthocalanus pauper (Claus, 1863)	1.10–1.75	1.00–2.04	v	v	v	v	v	v	o	E
Cosmocalanus caroli (Giesbrecht, 1888)	1.97–2.14	1.50–1.85						v	o	E
Cosmoclanlus darwini (Lubbock, 1860)	1.60–2.58	1.60–2.35		v	v	v	v	v	o	E/M
Mesocalanus lighti (Bowman, 1955)	2.10–3.08	1.90–2.68				v			o	E
Mesocalanus tenuicornis (Dana, 1849)	1.50–3.40	1.50–3.40		v	v	v	v	v	o	E/M
Nannocalanus minor (Claus, 1863)	1.21–2.40	1.08–2.01		v	v	v	v	v	o	E/M
Neocalanus cristatus (Krøyer, 1848	7.60–10.40	6.76–9.60		v	v		v	v	o	E/M
Neocalanus gracilis (Dana, 1852)	1.80–4.44	1.60–3.40		v	v	v	v	v	o	E/M
Neocalanus robustior (Giesbrecht, 1888)	3.00–4.65	2.80–3.60		v	v	v	v	v	o	E
Undinula vulgaris (Dana, 1849)	1.80–3.25	2.00–3.23		v	v	v	v	v	I	E

CANDACIIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Candacia armata Boeck, 1872	1.72–2.90	1.70–2.90			v		v		o	E
Candacia bipinnata (Giesbrecht, 1889)	2.09–3.16	1.90–3.02		v	v	v	v	v	o	E/M
Candacia bispinosa (Claus, 1863)	1.50–2.16	1.36–2.00		v	v	v	v	v	o	E/M
Candacia bradyi Scott A., 1902	1.40–2.10	1.08–1.90		v	v		v	v	o	E
Candacia catula (Giesbrecht, 1889)	1.32–1.70	1.30–1.62		v	v	v	v	v	o	E
Candacia columbiae Campbell, 1929	3.70–4.60	3.20–4.50			v		v		o	E/M
Candacia curta (Dana, 1849)	1.80–2.10	1.46–2.72		v	v	v	v	v	o	E
Candacia discaudata Scott A., 1909	1.55–1.94	1.48–1.82		v	v	v	v	v	i,o	E
Candacia elongata (Boeck, 1872)	1.97–3.50	3.04–3.80					v		o	M
Candacia ethiopica (Dana, 1849)	1.93–3.03	1.96–2.93		v	v	v	v	v	o	E
Candacia guggenheimi Grice & Jones, 1960	1.86–2.06	1.80–2.00		v	v			v	o	M
Candacia longimana (Claus, 1863)	2.68–3.90	2.40–3.72		v	v	v	v	v	o	E/M
Candacia norvegica (Boeck, 1865)	2.28–3.63	2.60–3.25					v	v	o	M
Candacia pachydactyla (Dana, 1849)	1.60–3.40	1.50–3.20		v	v	v	v	v	o	E
Candacia simplex (Giesbrecht, 1889)	1.48–2.35	1.54–2.20		v	v	v	v	v	o	E
Candacia tenuimana (Giesbrecht, 1889)	1.90–2.40	2.00–2.25			v			v	o	M
Candacia truncata (Dana, 1849)	1.50–2.32	1.60–2.42		v	v	v	v	v	o	E
Candacia tuberculata Wolfenden, 1905	1.56–2.40	1.60–2.29			v		v		i?	E
Candacia varicans (Giesbrecht, 1893)	1.98–2.55	1.91–2.45		v	v				o	E/m
Candacia worthingtoni Grice, 1981	1.50–2.40	1.70–1.90			v			v	o	E

CENTROPAGIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Centropages abdominalis Sato, 1913	1.30–2.10	1.20–1.60	v	v	v	v	v	v	i	E
Centropages bradyi Wheeler, 1900	1.30–2.50	1.52–2.40		v	v		v		o	E/M
Centropages brevifurcus Shen & Lee, 1963	0.92–1.41	0.78–1.25			v			v	i/e	E
Centropages calaninus (Dana, 1849)	1.80–2.18	1.68–2.11		v	v	v	v	v	i/o	E
Centropages dorsispinatus Thompson & Scott, 1903	1.04–1.40	1.01–1.25	v	v	v		v	v	i	E
Centropages elongatus Giesbrecht, 1896	1.50–1.91	1.50–2.00	v	v	v	v	v	v	i/o	E
Centropages furcatus (Dana, 1849)	1.38–1.90	1.40–1.75		v	v	v	v	v	i/o	E
Centropages gracilis (Dana, 1849)	1.70–2.16	1.70–2.04		v	v	v	v	v	o	E
Centropages longicornis Mori, 1932	1.88–2.00	unknown			v	v	v	v	o	E
Centropages orsini Giesbrecht, 1889	1.20–1.70	1.11–1.54		v	v	v	v	v	i/o	E

(*continued on next page*)

(continued)

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Centropages sinensis Chen & Zhang, 1965	1.18–1.50	1.25–1.30			v		v	v	i	E
Centropages tenuiremis Thompson & Scott, 1903 nomen dubium	1.35–2.00	1.20–1.80	v	v	v		v	v	i/e	E
Centropages violaceus (Claus, 1863)	1.76–2.24	1.77–2.17					v		o	E
Sinocalanus doerrii (Brehm, 1909)	1.30–2.10	1.20–1.69	v	v	v		v		i	E
Sinocalanus laevidactylus Shen & Tai, 1964	1.20–1.40	1.20–1.30					v	v	i/e	E
Sinocalanus sinensis (Poppe, 1889)	1.47–2.06	1.10–1.96	v	v	v	v	v	v	i	E
Sinocalanus solstitiali Brehm, 1923	1.21–1.27	1.13–1.17			v	v			i/e	E
Sinocalanus tenellus (Kikuchi K., 1928)	1.25–1.48	1.30–1.40	v	v	v	v	v		i/e	E

CLAUSOCALANIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Clausocalanus arcuicornis (Dana, 1849)	1.15–1.62	0.97–1.17	v	v	v	v	v	v	o	E
Clausocalanus dubius Brodsky, 1950	1.80	0.97–1.80			v		v		o	E
Clausocalanus farrani Sewell, 1929	1.04–1.26	0.87–0.99			v	v	v	v	o	E
Clausocalanus furcatus (Brady, 1883)	0.94–1.31	0.70–0.92		v	v	v	v	v	o	E
Clausocalanus ingens Frost & Fleminger, 1968	1.44–1.90	0.99–1.08			v		v		o	E
Clausocalanus jobei Frost & Fleminger, 1968	1.01–1.56	0.87–1.07			v	v		v	o	E
Clausocalanus laticeps Farran, 1929	1.25–1.67	1.01–1.10	v	v	v	v	v	v	o	E
Clausocalanus lividus Frost & Fleminger, 1968	1.04–1.98	1.10–1.45			v	v			o	E
Clausocalanus mastigophorus (Dana, 1863)1.17–1.94	1.05–1.50			v	v	v	v	o	E	
Clausocalanus minor Sewell, 1929	0.94–1.32	0.79–1.06			v	v	v	v	o	E
Clausocalanus parapergens Frost & Fleminger, 1968	0.97–1.38	0.97–1.15			v	v	v	v	o	E
Clausocalanus paululus Farran, 1926	0.65–0.86	0.47–0.60			v		v	v	o	E
Clausocalanus pergens Farran, 1926	0.70–1.10	0.52–0.67		v	v	v	v	v	o	E
Ctenocalanus vanus Giesbrecht, 1888	0.81–1.70	1.08–1.95		v	v	v	v	v	o	E
Microcalanus pusilus Sars G.O., 1903	0.60–0.70	0.70			v			v	o	E/M
Pseudocalanus minutus (Krøyer, 1845)	1.00–2.14	0.85–1.62		v	v	v	v	v	o	E/M

EUCALANIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Eucalanus bungii Giesbrecht, 1893	5.51–8.00	4.80–6.20			v		v		o	E/M
Eucalanus californicus Johnson, 1938	4.40–7.50	4.00–5.00			v			v	o	E/M
Eucalanus elongatus (Dana, 1848)	4.53–5.80	3.00–5.00		v	v	v	v	v	o	E/m
Eucalanus hyalinus (Claus, 1866)	5.10–7.10	4.70–6.25			v	v		v	o	E/M
Pareucalanus attenuatus (Dana, 1849)	3.00–730	2.75–6.04		v	v	v	v	v	o	E/M
Pareucalanus langae (Fleminger, 1973)	5.01–7.22	6.2–6.59			v	v	v	v	o	E/M
Pareucalanus sewelli (Fleminger, 1973)	3.65–6.10	2.89–4.58		v		v		v	o	E

EUCHAETIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Euchaeta acuta Giesbrecht, 1893	3.40–4.70	3.20–4.80			v			v	o	E/M
Euchaeta concinna Dana, 1849	2.10–3.75	2.24–3.10		v	v	v	v	v	i/o	E/M
Euchaeta indica Wolfenden, 1905	2.21–3.00	2.21–2.92		v	v	v	v	v	o	E
Euchaeta longicornis Giesbrecht, 1888	2.56–3.32	2.52–2.88		v	v	v	v	v	o	E
Euchaeta media Giesbrecht, 1888	3.30–4.82	3.05–4.20		v	v	v	v	v	o	E/M
Euchaeta plana Mori, 1937	2.58–3.50	2.75–3.16		v	v	v	v	v	o	E
Euchaeta pubera Sars G.O., 1907	2.86–4.41	3.43–3.69						v	o	E
Euchaeta rimana Bradford, 1974	2.80–4.30	2.80–4.10	v	v	v	v	v	v	o	E
Euchaeta spinosa Giesbrecht, 1893	5.18–7.21	5.22–6.90			v		v	v	o	E/M
Euchaeta tenuis Esterly, 1906	4.70–6.80	4.68–5.63			v		v	v	o	
Paraeuchaeta aequatorialis Tanaka, 1958	4.80–5.61	4.60–4.90						v	o	E/M
Paraeuchaeta barbata (Brady, 1883)	6.00–12.0	6.10–10.00				v			o	E/M
Paraeuchaeta biloba Farran, 1929	5.25–6.75	4.66–5.66					v		o	M/B
Paraeuchaeta bisinuata (Sars G.O., 1907)	4.80–5.97	4.25–5.20				v	v	v	o	M
Paraeuchaeta calva Tanaka, 1958	7.25–8.40	6.67–7.90			v			v	o	M/B
Paraeuchaeta comosa Tanaka, 1958	7.80–10.0	7.50–8.80			v			v	o	B
Paraeuchaeta confusa Tanaka, 1958	6.60–7.93	6.00–7.00			v			v	o	B
Paraeuchaeta elongata (Esterly, 1913)	4.13–8.00	5.50–8.40						v	o	E/M

(*continued on next page*)

(continued)

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Paraeuchaeta eminens Tanaka & Omori, 1968	5.40–6.60	5.60			v			v	o	B?
Paraeuchaeta flava (Giesbrecht, 1888)	3.20	unknown		v	v	v	v	v	o	E
Paraeuchaeta gracilicauda Scott A., 1909	5.78–7.90	6.20–6.50						v	o	M/B
Paraeuchaeta gracilis (Sars G.O., 1905)	5.80–7.04	5.05–6.50				v			o	M
Paraeuchaeta hansenii (With, 1915)	8.10–9.99	8.10–8.90			v			v	o	M
Paraeuchaeta investigatoris Sewell, 1929	5.80–7.00	5.40–6.50						v	o	E
Paraeuchaeta kurilensis Heptner, 1971	5.83–8.35	5.91–6.90						v	o	B
Paraeuchaeta malayensis Sewell, 1929	6.00–7.50	5.60–6.50			v			v	o	M
Paraeuchaeta prudens Tanaka & Omori, 1968	7.30–7.90	unknown						v	o	M
Paraeuchaeta rubra Brodsky, 1950	6.60–8.05	6.00–7.20			v			v	o	M/B
Paraeuchaeta russelli (Farran, 1936)	3.14–4.38	3.10–4.08		v	v		v	v	c/o	E/M
Paraeuchaeta sarsi (Farran, 1908)	6.90–11.3	6.72–9.40		v	v			v	o	M
Paraeuchaeta simplex Tanaka, 1958	3.00–3.81	2.72–3.45			v				c/o	E/M
Paraeuchaeta tonsa (Giesbrecht, 1895)	5.60–6.70	5.10–6.28						v	o	M/B
Paraeuchaeta tuberculata Scott A., 1909	5.73–7.42	5.43–6.18			v	v		v	o	M/B
Paraeuchaeta tumidula (Sars G.O., 1905)	3.30–4.90	3.88–4.65						v	o	B/A
Paraeuchaeta vorax (Grice & Hulsemann, 1968)	6.41–7.78	6.66			v	v		v	o	M/B
Paraeuchaeta weberi Scott A., 1909	6.70–8.50	6.00–6.41			v			v	o	B

FOSSHAGENIIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Temporopia mayumbaensis Scott T., 1894	0.56–1.17	0.84–0.99		v	v	v	v	v	o	M

HETERORHABDIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Disseta palumbii Giesbrecht, 1889	5.70–8.60	5.10–7.80				v		v	o	M/B
Disseta scopularis (Brady, 1883)	8.66–11.0	8.00–10.00			v	v			o	M
Hemirhabdus grimaldii (Richard, 1893)	7.30–11.83	8.32–12.20						v	o	M
Heterorhabdus abyssalis (Giesbrecht, 1889)	2.09–3.73	2.00–3.40			v	v		v	o	M
Heterorhabdus ankylocolus Park, 2000	2.80–3.24	2.72–2.92						v	o	M/B
Heterorhabdus clausi (Giesbrecht, 1889)	2.00–2.70	2.00–2.50			v			v	o	M/B
Heterorhabdus cohibilis Park, 2000	2.80–3.60	2.68–3.32			v			v	o	M
Heterothabdus carribeanensis Park, 1970	1.74–2.52	1.92–2.40				v				M/B
Heterorhabdus confusibilis Park, 2000	2.52–3.44	2.56–3.08						v	o	M?
Heterorhabdus egregious Heptner, 1972	2.37–3.40	2.28–3.70			v				o	B
Heterorhabdus fistulosus Tanaka, 1964	3.39–3.95	3.40–3.85				v			o	M
Heterorhabdus habrosomus Park, 2000	2.16–2.56	2.14–3.08			v				o	M?
Heterorhabdus insukae Park, 2000	2.14–2.56	2.12–2.48			v			v	o	M
Heterorhabdus oikoumenikis Park, 2000	2.60–3.52	2.40–3.28			v			v	o	M/B
Heterorhabdus pacificus Brodsky, 1950	1.92–3.84	2.90–3.96					v	v	o	M
Heterorhabdus papilliger (Claus, 1863)	1.60–2.66	1.60–2.65		v	v	v	v	v	o	M
Heterorhabdus prolatus Park, 2000	1.78–2.14	1.70–2.14						v	o	M/B
Heterorhabdus quadrilobus Park, 2000	2.88–3.84	2.48–3.68						v	o	M
Heterorhabdus spinifrons (Claus, 1863)	2.86–4.20	2.20–3.84			v	v	v	v	o	M
Heterorhabdus spinosus Bradford, 1971	3.09–4.40	2.95–3.80					v	v	o	M
Heterorhabdus subspinifrons Tanaka, 1964	2.27–3.20	2.11–3.16			v	v		v	o	E/M
Heterorhabdus tanneri (Giesbrecht, 1895)	3.08–4.90	3.00–4.25			v				o	E/M
Heterorhabdus tuberculus Park, 2000	2.24–2.84	2.24–2.68			v			v	o	M
Heterostylites longicornis (Giesbrecht, 1889)	2.30–4.30	2.56–4.30			v			v	o	M
Heterostylites longioperculis Park 2000	2.76–3.56	2.92–3.44						v	o	M
Heterostylites major (F. Dahl, 1894)	4.00–5.75	3.75–5.50			v				o	M
Heterostylites submajor Park 2000	4.75–5.50	4.56–8.08			v			v	o	B
Mesorhabdus angustus Sars G.O., 1907	5.80–8.75	6.60–8.50						v	o	B
Mesorhabdus brevicaudatus (Wolfenden, 1905)	3.15–4.24	3.37–3.88			v			v	o	M
Mesorhabdus gracilis Sars G.O., 1907	3.70–5.58	4.91						v	o	M
Mesorhabdus poriphorus Park, 2000	5.25–5.75	5.41–5.50						v	o	M
Neorhabdus latus (Sars, 1905)	6.75–8.91	7.16–8.08						v	o	B
Paraheterorhabdus compactus (Sars G.O., 1900)	2.23–3.50	1.93–3.60						v	o	M/B
Paraheterorhabdus medianus (Park, 1970)	2.48–2.88	2.60–2.84						v	o	M
Paraheterorhabdus robustus (Farran, 1908)	2.92–5.30	2.92–5.30						v	o	M
Paraheterorhabdus vipera (Sars G.O., 1900)	2.16–3.16	2.23–3.50			v	v	v	v	o	E-B

LUCICUTIIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Lucicutia aurita Cleve, 1904	7.30–9.30	7.10–8.40			v	v		v	o	M/B
Lucicutia bicornuta Wolfenden, 1905	6.75–8.40	6.50–8.00			v	v	v	v	o	M/B
Lucicutia clausi (Giesbrecht, 1889)	1.60–2.10	1.60–1.92		v	v	v	v	v	o	E-B
Lucicutia curta Farran, 1905	1.90–2.90	1.80–2.60				v	v	v	o	M/B
Lucicutia flavicornis (Claus, 1863)	1.26–2.50	1.06–1.80		v	v	v	v	v	o	E-B
Lucicutia gaussae Grice, 1963	1.09–1.80	1.14–1.50			v	v	v	v	o	E/M
Lucicutia gemina Farran, 1926	1.40–1.90	1.25–1.72						v	o	E/M
Lucicutia intermedia Sars G.O., 1905	3.36–4.10	3.50–4.20						v	o	M/B
Lucicutia longicornis (Giesbrecht, 1889)	1.44–2.00	1.37–1.80			v			v	o	M/B
Lucicutia longiserrata (Giesbrecht, 1889)	2.00–3.00	1.85–2.52						v	o	M/B
Lucicutia lucida Farran, 1908	2.96–3.65	2.96–3.50						v	o	M/B
Lucicutia macrocera Sars G.O., 1920	3.30–5.37	3.00–5.20						v	o	E/M
Lucicutia magna Wolfenden, 1903	3.13–3.90	3.00–3.55						v	o	E/M
Lucicutia maxima Steuer, 1904	7.80–9.65	7.70–9.00			v			v	o	M/B
Lucicutia oblonga Brodsky, 1950	unknown	3.90–4.10						v	o	B
Lucicutia ovalis (Giesbrecht, 1889)	1.26–2.00	1.20–1.85		v	v	v	v	v	o	M/B
Lucicutia polaris Brodsky, 1950	3.10–4.20	3.25–4.20						v		B/A
Lucicutia sewelli Tanaka, 1963	3.60–4.04	3.77						v	o	B
Lucicutia tenuicauda Sars G.O., 1907	3.80	unknown						v	o	B
Lucicutia wolfendeni Sewell, 1932	5.96–9.80	5.50–8.30						v	o	M/B

MEGACALANIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Bathycalanus eximius Markhaseva in Brodsky, Vyshkvartseva, Kos & Markhaseva, 1983	11.90	unknown						v	o	A
Bathycalanus richardi Sars G.O., 1905	8.25–12.0	6.00–10.0				v		v	o	E-B
Megacalanus princeps Wolfenden, 1904	8.70–13.0	7.90–12.00				v			o	B

METRIDINIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Gaussia asymmetrica Björnberg & Campaner, 1988	9.00–11.0	unknown						v	o	B/M
Gaussia princeps (Scott T., 1894)	9.00–12.0	9.00–12.00						v	o	M/B
Metridia asymmetricaa Brodsky, 1950	3.90–4.20	3.00–3.90						v	o	M/B
Metridia brevicauda Giesbrecht, 1889	1.50–2.25	1.30–1.65			v			v	o	M/B
Metridia curticauda Giesbrecht, 1889	2.25–3.80	1.30–1.65				v			o	B
Metridia macrura Sars, G.O., 1905	7.22–10.5	7.03–9.60						v	o	B
Metridia pacifica Brodsky, 1950	2.40–3.45	1.65–2.60			v				o	B
Metridia princeps Giesbrecht, 1889	6.69–9.00	5.80–8.50				v		v	o	M/B
Metridia venusta Giesbrecht, 1889	2.65–3.15	2.43–2.82			v			v	o	M/B
Pleuromamma abdominalis (Lubbock, 1856)	2.09–4.50	2.00–4.30		v	v	v	v	v	o	E/M
Pleuromamma borealis Dahl F., 1893	1.67–2.50	1.44–2.13		v	v	v	v	v	o	E/M
Pleuromamma gracilis Claus, 1863	1.50–2.55	1.50–2.25		v	v	v	v	v	o	E/M
Pleuromamma piseki Farran, 1929	1.70–2.40	1.60–1.96			v			v	o	E/M
Pleuromamma quadrungulata (Dahl F., 1893)	3.00–5.00	3.08–4.45			v				o	E/M
Pleuromamma robusta (Dahl F., 1893)	2.30–4.70	2.10–4.00		v	v	v	v	v	o	E/M
Pleuromamma scutullata Brodsky, 1950	3.60–4.34	3.10–3.76					v		o	E/M
Pleuromamma xiphias (Giesbrecht, 1889)	3.25–5.87	3.94–6.42		v	v	v	v	v	o	E/M

NULLOSETIGERIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Nullosetigera aequalis (Sars G.O., 1920)	3.00	2.90						v	o	M/B
Nullosetigera auctiseta Soh, Ohtsuka, Imabayashi & Suh, 1999	2.81–3.44	3.06–3.16						v	o	E/M
Nullosetigera bidentata (Brady, 1883)	2.00–3.60	2.00–3.00			v	v	v	v	o	E/M
Nullosetigera helgae (Farran, 1908)	2.13–2.90	2.03–2.80						v	o	E/M
Nullosetigera impar (Farran, 1908)	2.20–3.00	2.28–2.95						v	o	M/B
Nullosetigera mutata (Tanaka, 1964)	2.56–2.69	unknown						v	o	M

PARACALANIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Acrocalanus andersoni Bowman, 1958	0.95–1.30	0.99–1.20			v		v	v	o	E
Acrocalanus gibber Giesbrecht, 1888	0.74–1.28	0.85–1.40	v	v	v	v	v	v	o	E
Acrocalanus gracilis Giesbrecht, 1888	0.80–1.80	0.80–1.36		v	v	v	v	v	o	E
Acrocalanus longicornis Giesbrecht, 1888	0.94–1.55	0.90–1.40		v	v	v	v	v	o	E
Acrocalanus monachus Giesbrecht, 1888	0.88–1.10	0.79–0.98		v	v	v	v	v	o	E
Bestiolina amoyensis (Li & Huang, 1984)	0.85–1.01	0.87–0.92					v	v	i/e	E
Bestiolina coreana Moon, Lee & Soh, 2010	0.90–0.95	0.85–0.96		v					i/e	E
Bestiolina similis (Sewell, 1914)	0.72–1.00	0.70–0.90				v		v	i/e	E
Bestiolina sinica (Shen & Lee, 1966)	0.97–1.02	0.89–0.92						v	i/e	E
Calocalanus contractus Farran, 1926	0.57–0.84	0.45–0.55			v		v	v	o	E
Calocalanus gracilis Tanaka, 1956	0.60–0.70	0.57–0.60			v		v	v	o	E
Calocalanus monospinus Chen & Shen, 1974	0.65–0.80	0.53–0.58			v		v	v	o	E
Calocalanus pavo (Dana, 1852)	0.79–1.40	0.60–1.18		v	v	v	v	v	o	E
Calocalanus pavoninus Farran, 1936	0.60–0.97	0.50–0.60		v	v	v	v	v	o	E
Calocalanus plumatus Shmeleva, 1965	0.53–0.61	unknown			v				o	E
Calocalanus plumulosus (Claus, 1863)	0.87–1.30	0.65–0.90		v	v	v	v	v	o	E
Calocalanus styliremis Giesbrecht, 1888	0.50–0.95	0.45–0.60		v	v		v	v	o	E
Delibus nudus (Sewell, 1929)	0.40–0.70	0.42–0.52		v	v		v	v	o	E
Mecynocera clausi Thompson I.C., 1888	0.90–1.29	0.75–1.12		v	v	v	v	v	o	E
Paracalanus aculeatus Giesbrecht, 1888	0.78–1.36	0.71–1.36		v	v	v	v	v	o	E
Paracalanus denudatus Sewell, 1929	0.56–0.96	0.75					v	v	i	E
Paracalanus gracilis Chen & Zhang, 1965	0.75–0.94	unknown		v	v		v	v	o	E
Paracalanus indicus Wolfenden, 1905	0.70–1.30	0.74–1.40			v				i	E
Paracalanus intermedius Shen & Bai, 1956	0.88	0.78			v			v	i	E
Paracalanus nanus Sars G.O., 1925	0.50–0.77	0.50–0.60			v	v	v	v	o	E
Paracalanus parvus (Claus, 1863)	0.63–1.30	0.50–1.40	v	v	v	v	v	v	i	E
Paracalanus serrulus Shen & Lee, 1963	1.02–1.28	0.97–1.02			v	v	v	v	i/e	E
Parvocalanus crassirostris (Dahl F., 1894)	0.42–0.82	0.34–0.62	v	v	v	v	v	v	i/e	E
Parvocalanus dubia (Sewell, 1912)	0.74	unknown						v	i	E
Parvocalanus elegans Andronov, 1972	0.46–0.51	unknown						v	i	E

PHAENNIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Cephalophanes refulgens Sars G.O., 1907	3.90–5.30	3.00–4.00						v	o	M
Onchocalanus affinis With, 1915	4.80–6.50	4.10–5.86						v	o	M/B
Onchocalanus cristatus (Wolfenden, 1904)	5.00–8.15	5.60–6.50						v	o	M/B
Onchocalanus trigoniceps Sars G.O., 1905	5.10–9.16	4.85–6.95			v		v		o	B
Phaenna spinifera Claus, 1863	1.44–3.02	1.80–2.50		v	v	v	v	v	o	E/M
Xanthocalanus agilis Giesbrecht, 1893	2.14–2.68	2.07–2.58			v		v	v	o	E/M
Xanthocalanus dilatus Grice, 1962	1.50–1.60	1.40						v	o	E
Xanthocalanus multispinus Chen & Zhang, 1975	1.85–1.95	unknown		v	v		v		o	E/M
Xanthocalanus pulcher Esterly, 1911	3.42	unknown		v	v		v		o	M/B

PONTELLIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Calanopia aurilivilli Cleve, 1901	1.17–1.45	1.10–1.38						v	o	E
Calanopia elliptica (Dana, 1849)	1.40–2.10	1.50–1.90		v	v	v	v	v	e/i	E
Calanopia herdmani Scott A., 1909	1.80–1.97	1.70–1.79						v	o	E
Calanopia minor Scott A., 1902	1.14–1.46	1.06–1.37		v	v	v	v	v	i/e	E
Calanopia thompsoni Scott A., 1909	1.80–2.62	1.60–2.52	v	v	v		v	v	i/e	E
Ivellopsis denticauda (Scott A., 1909)	2.86–3.30	2.67–3.26						v	i	E
Labidocera acuta (Dana, 1849)	2.81–4.20	2.29–3.32	v	v	v	v	v	v	i/o	E
Labidocera acutifrons (Dana, 1849)	3.20–4.26	3.28–4.16		v	v	v	v	v	o	E
Labidocera bataviae Scott A., 1909	1.96–2.38	1.70–2.00			v		v	v	o	E
Labidocera bengalensis Krishnaswamy, 1952	1.40–1.68	1.09–1.26			v				o	E
Labidocera detruncata (Dana, 1849)	2.25–4.10	2.15–4.00		v	v	v	v	v	o	E
Labidocera diandra Fleminger, 1967	2.57–3.49	2.51–3.25	v		v			v	o	E
Labidocera euchaeta Giesbrecht, 1889	1.80–3.15	1.58–2.90	v	v	v	v	v	v	e/i	E
Labidocera gallensis Thompson & Scott., 1903	1.80–2.85	1.67–2.45	v	v	v		v		i	E
Labidocera japonica Mori, 1935	1.74–2.06	1.47–1.94		v	v		v		i	E
Labidocera kroeyeri (Brady, 1883)	2.00–2.75	1.95–2.36		v	v		v	v	i	E

(*continued on next page*)

(continued)

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Labidocera laevidentata (Brady, 1883)	1.60–2.36	1.70–1.72					v	v	i	E
Labidocera minuta Giesbrecht, 1889	1.76–2.30	1.36–1.83		v	v	v	v	v	i	E
Labidocera orsinii Giesbrecht, 1889	2.20	unknown						v	i	E
Labidocera pavo Giesbrecht, 1889	1.77–2.52	1.50–2.20	v	v	v	v	v	v	i	E
Labidocera pectinata Thompson & Scott, 1903	1.84–2.15	1.50–2.03						v	i	E
Labidocera rotunda Mori, 1929	1.16–2.66	1.16–2.50	v	v	v	v	v	v	e/i	E
Labidocera sinilobata Shen & Lee, 1963	2.29–2.72	1.94–2.03	v	v	v			v	e/I	E
Pontella alata Scott A., 1909	3.58	3.45			v				o	E
Pontella andersoni Sewell, 1912	3.34	2.86–2.88						v	o	E
Pontella chierchiae Giesbrecht, 1889	3.19–3.58	2.59–3.11	v	v	v		v	v	i/o	E
Pontella danae Giesbrecht, 1889	3.20–5.00	2.74–4.60	v	v	v	v	v	v	i/o	E
Pontella fera Dana, 1849	2.00–3.33	2.33–3.10		v	v	v	v	v	o	E
Pontella kieferi Pesta, 1933	3.13–5.35	2.99–3.11					v	v	o	E
Pontella labuanensis Mulyadi, 1997	2.90–3.10	2.50–2.60			v			v	i	E
Pontella latifurca Chen & Zhang, 1965	2.83–3.72	2.70–2.94					v		o	E
Pontella princeps Dana, 1849	4.98–5.87	4.20–5.56	v	v	v	v		v	o	E
Pontella securifer Brady, 1883	3.60–4.63	3.20–4.63	v	v	v	v	v	v	o	E
Pontella sinica Chen & Zhang, 1965	5.20–5.85	4.94–5.50			v		v	v	i/o	E
Pontella spinicauda Mori, 1937	4.50–5.40	4.20–4.78	v	v	v		v		i	E
Pontella spinipes Giesbrecht, 1889	4.50–4.80	3.10–4.40						v	o	E
Pontella tenuiremis Giesbrecht, 1889	2.80	2.65–2.80			v				o	E
Pontella tridactyla Shen & Lee, 1963	2.14	2.08–2.50						v	e/i	E
Pontella valida Dana, 1852	2.45–3.60	2.57–3.28		v	v			v	i	E
Pontellina morii Fleminger & Hulsemann, 1974	1.38–1.88	1.26–1.68			v	v		v	o	E
Pontellina plumata (Dana, 1849)	1.30–1.94	1.26–1.94		v	v	v	v	v	o	E/M
Pontellopsis armata (Giesbrecht, 1889)	2.00–2.75	1.90–2.59			v		v	v	o	E/M
Pontellopsis herdmani Thompson & Scott, 1903	1.90–2.32	1.76–2.00						v	o	E
Pontellopsis inflatodigitata Chen & Shen, 1974	1.60–2.04	1.50–1.70					v	v	o	E
Pontellopsis krameri (Giesbrecht, 1896)	1.86–2.95	1.60–2.20		v	v		v	v	i/o	E
Pontellopsis laminata Wilson C.B., 1950	1.91–2.32	1.86–2.02						v	o	E
Pontellopsis macronyx Scott A., 1909	1.68–2.10	1.55–1.80			v		v	v	i	E
Pontellopsis perspicax (Dana, 1849)	2.60–5.35	2.25–3.20		v			v		o	E
Pontellopsis regalis (Dana, 1849)	2.65–4.50	2.54–3.58		v	v	v	v	v	o	E
Pontellopsis strenua (Dana, 1849)	1.88–2.80	2.25–2.85		v	v		v	v	o	E
Pontellopsis tenuicauda (Giesbrecht, 1889)	1.55–2.30	1.35–1.74	v	v	v	v	v	v	i/o	E
Pontellopsis villosa Brady, 1883	1.95–3.00	1.80–2.83			v		v	v	o	E
Pontellopsis yamadae Mori, 1937	2.24–2.87	2.05–2.50		v	v		v	v	i	E

PSEUDOCYCLOPIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Pseudocyclops lepidotus Barr & Ohtsuka, 1989	0.90	0.73			v				i	Hb
Pseudocyclops xiphophorus Wells, 1967	0.63–0.76	0.63–0.73						v	i	Hb

PSEUDODIAPTOMIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Pseudodiaptomus annandalei Sewell, 1919	1.05–1.38	0.94–1.13			v	v	v	v	i/e	E
Pseudodiaptomus bispinosus Walter, 1984	1.15–1.30	0.94–1.10					v		i	E
Pseudodiaptomus bulbosus (Shen & Tai, 1964)	1.33	0.89	v	v	v		v		b	E
Pseudodiaptomus forbesi (Poppe & Richard, 1890)	1.15–1.40	1.06–1.20		v	v		v	v	b	E
Pseudodiaptomus incises Shen & Lee, 1963	1.15	0.85						v	b	E
Pseudodiaptomus inflatus Shen & Tai, 1964	unknown	1.02						v	b	E
Pseudodiaptomus inopinus Burckhardt, 1913	1.10–2.20	0.90–1.85	v	v	v		v	v	i/e	E
Pseudodiaptomus ishigakiensis Nishida, 1985	1.20–2.91	1.01–1.05					v		i	E
Pseudodiaptomus koreanus Soh, Kwon, Lee & Yoon, 2012	1.30–1.50	1.10–1.20		v	v				e	E
Pseudodiaptomus marinus Sato, 1913	1.21–1.45	0.85–1.20	v	v	v		v	v	i/e	E
Pseudodiaptomus ornatus (Rose, 1957)	2.10–2.32	unknown			v			v	e	E
Pseudodiaptomus pacificus Walter, 1986	0.98–1.25	0.80–0.98			v				i	E
Pseudodiaptomus poplesia (Shen, 1955)	2.00–2.40	1.50–1.80	v	v	v		v	v	b/i	E
Pseudodiaptomus serricaudatus (Scott T., 1894)	1.03–1.52	0.96–1.29				v	v		i	E
Pseudodiaptomus spatulatus (Shen & Tai, 1964)	1.35	1.05						v	e	E
Pseudodiaptomus trihamatus Wright S., 1937	1.10–1.32	0.94–1.08			v		v		i	E

RHINCALANIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Rhincalanus gigas Brady, 1883	7.20–10.0	6.90					v		o	E
Rhincalanus nasutus Giesbrecht, 1888	2.82–6.10	2.70–4.50	v	v	v	v	v	v	o	E/M
Rhinclanuls rostrifrons (Dana, 1849)	2.41–3.80	2.40–2.95	v	v	v	v	v	v	o	E/M

SCOLECITRIACHIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Amallothrix arcuata (Sars G.O., 1920)	218–2.96	2.34–3.40						v	o	M/B
Amallothrix curticauda (Scott A., 1909)	5.70–6.00	4.70						v	o	M/B
Amallothrix falcifer (Farran, 1926)	1.80–2.20	1.98–2.81						v	o	M/B
Amallothrix gracilis (Sars G.O., 1905)	3.00–4.50	3.30–4.44			v			v	o	M/B
Amallothrix robusta (Scott T., 1894)	2.48–3.10	unknown				v			o	M?
Amallothrix tenuiserrata (Giesbrecht, 1893)	1.00–1.22	1.00–1.45		v	v	v	v	v	o	E/M
Amallothrix timida (Tanaka, 1962)	1.50–1.84	unknown						vl	o	M?
Amallothrix tropica (Grice, 1962)	1.13–1.30	unknown		v	v		v	v	o	?
Amallothrix valens (Farran, 1926)	2.28–2.74	unknown						v	o	E/M
Amallothrix valida (Farran, 1908)	2.10–4.50	4.00–5.35						v	o	M/B
Archescolecithrix auropecten (Giesbrecht, 1893)	1.90–2.75	1.95–2.43						v	o	M
Bradfordiella fowleri (Farran, 1926)	1.44–2.04	1.60–1.90						v	o	M/B
Lophothrix frontalis Giesbrecht, 1895	4.75–7.40	4.50–6.00			v			v	o	M
Lophothrix latipes (Scott T., 1894)	2.65–3.30	2.96–3.19			v	v	v		o	M
Macandrewella cochinensis Gopalakrishnan, 1973	3.00–3.15	2.90–2.95						v	o?	?
Macandrewella joanae Scott A., 1909	3.60	3.40						v	o	M
Macandrewella omorii Ohtsuka, Nishida & Nakaguchi, 2002	3.32–3.54	3.38–4.05						v	?	?
Macandrewella scotti Sewell, 1929	3.20	unknown				v			?	?
Macandrewella stygiana Ohtsuka, Nishida & Nakaguchi, 2002	3.23–3.84	3.25–3.81			v				?	?
Macandrewella tuberculata Chen, 1987	3.40	3.40						v	?	?
Mixtocalanus alter (Farran, 1929)	1.98–2.76	2.30						v	o	M/B
Pseudoamallothrix emarginata (Farran, 1905)	2.50–5.60	3.60–4.25			v		v	v	o	M/B
Pseudoamallothrix ovata (Farran, 1905)	1.48–2.66	1.38–2.93			v	v	v	v	o	M
Racovitzanus levis Tanaka, 1961	1.80–2.00	1.67–1.75			v		v	v	o	M
Scaphocalanus affinis (Sars G.O., 1905)	3.60–5.40	2.80–5.00			v				o	M/B
Scaphocalanus brevicornis (Sars G.O., 1900)	1.90–2.66	1.90–3.40			v	v		v	o	E/M
Scaphocalanus echinatus (Farran, 1905)	1.60–2.56	1.26–2.36	v	v	v	v	v	v	o	E/M
Scaphocalanus magnus (Scott T., 1894)	3.55–5.60	4.02–5.28				v		v	o	M
Scaphocalanus major (Scott T., 1894)	2.20–3.16	1.80–3.30						v	o	M
Scaphocalanus medius (Sars G.O., 1907)	2.00–2.56	1.82						v	o	M/B
Scolecithricella abyssalis (Giesbrecht, 1888)	1.70–2.21	1.45–2.25		v	v	v	v	v	o	E/M
Scolecithricella dentata (Giesbrecht, 1893)	1.21–2.07	1.30–1.94	v	v	v	v	v	v	o	E/M
Scolecithricella globulosa Brodsky, 1950	1.65–2.16	2.10–2.28			v			v	o	E
Scolecithricella longifurca (Giesbrecht, 1888)	1.25–2.00	1.20–1.53			v			v	o	E/M
Scolecithricella longispinosa Chen & Zhang, 1965	1.02–1.20	1.14		v	v	v	v	v	o	M
Scolecithricella marginata (Giesbrecht, 1888)	1.00–1.05	unknown			v				o	E
Scolecithricella minor (Brady, 1883)	1.08–1.70	1.20–1.46		v	v	v	v		o	E
Scolecithricella nicobarica (Sewell, 1929)	1.08–1.50	1.04–1.50		v	v	v	v	v	o	E
Scolecithricella vittata (Giesbrecht, 1893)	1.50–2.00	1.60–2.00		v	v	v	v	v	o	E/M
Scolecithrix bradyi Giesbrecht, 1888	1.08–1.61	1.00–1.56		v	v	v	v	v	o	E/M
Scolecithrix danae (Lubbock, 1856)	1.80–2.52	1.65–2.44		v	v	v	v	v	o	E
Scolecitrichopsis ctenopus (Giesbrecht, 1888)	1.25–1.65	1.30–1.90		v	v	v	v	v	o	E
Scolecocalanus spinifer Wilson C.B., 1950	4.38	4.25						v	o	E
Scottocalanus farrani Scott A., 1909	3.50	3.50–3.54			v			v	o	E
Scottocalanus helenae (Lubbock, 1856)	3.18–4.40	3.80–4.81			v	v	v	v	o	E
Scottocalanus persecans (Giesbrecht, 1895)	3.70–5.76	4.30–5.30			v			v	o	E/M
Scottocalanus rotundatus Tanaka, 1961	4.00–4.07	4.38						v	o	M?
Scottocalanus securifrons (Scott T., 1894)	3.38–4.90	3.79–5.33			v	v	v	v	o	M/B
Scottocalanus sedatus Farran, 1936	3.18–3.40	unknown				v	v		o	E/M
Scottocalanus terranovae Farran, 1929	3.60–3.90	3.60–4.20			v			v	o	M
Scottocalanus thomasi Scott A., 1909	4.95–6.08	5.48–6.00			v			v	o	E/M
Scottocalanus thori With, 1915	4.41–5.76	4.51–5.30						v	o	M

SPINOCALANIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Mimocalanus cultrifer Farran, 1908	1.00–1.95	1.14			v		v	v	o	E-B
Monacilla gracilis (Wolfenden, 1911)	1.80–2.25	unknown				v			o	M/B
Monacilla typica Sars G.O., 1905	1.95–2.50	1.59–2.30				v		v	o	E-B
Spinocalanus angusticeps Sars G.O., 1920	1.98–2.50	1.59–1.76						v	o	M
Spinocalanus horridus Wolfenden, 1911	1.59–3.00	2.00–2.90			v			v	o	B
Spinocalanus magnus Wolfenden, 1904	1.87–3.10	1.80–2.43			v			v	o	M/B
Spinocalanus oligospinosus Park, 1970	1.20–1.50	unknown						v	o	M/B
Spinocalanus spinosus Farran, 1908	1.37–2.40	1.90						v	o	M
Spinocalanus usitatus Park, 1970	1.38–2.08	unknown				v			o	M

STEPHIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Stephos pentacanthos Chen & Zhang, 1965	unknown	0.75–0.80	v	v	v	v	v	v	i	Bn

SUBEUCALANIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Subeucalans crassus (Giesbrecht, 1888)	2.10–4.60	2.40–3.50		v	v	v	v	v	o	E/M
Subeucalans dentatus (Scott A., 1909)	2.25–2.60	1.15–1.20						v	i/o	E
Subeucalans longiceps (Matthews, 1925)	3.89–5.10	unknown					v		o	E
Subeucalans monachus (Giesbrecht, 1888)	1.81–2.84	1.86–2.60			v			v	o	E/M
Subeucalans mucronatus (Giesbrecht, 1888)	2.80–3.49	2.50–3.30	v	v	v	v	v	v	i/o	E
Subeucalans pileatus (Giesbrecht, 1888)	1.80–2.50	1.80–2.25		v	v	v	v	v	i/o	E/M
Subeucalans subcrassus (Giesbrecht, 1888)	1.84–2.92	1.67–2.70		v	v	v	v	v	o	E/M
Subeucalans subtenuis (Giesbrecht, 1888)	1.80–3.53	2.60–3.08		v	v	v	v	v	o	E

TEMORIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Temora discaudata Giesbrecht, 1889	1.11–2.05	1.50–1.97		v	v	v	v	v	i/o	E
Temora longicornis (Müller O.F., 1785)	0.80–1.66	0.82–1.65						v	i/o	E
Temora stylifera (Dana, 1849)	1.19–2.05	1.01–1.88		v	v	v	v	v	i/o	E
Temora turbinata (Dana, 1849)	0.95–1.70	0.89–1.56		v	v	v	v	v	i/o	E

THARYBIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Neoscolecithrix japonica Ohtsuka, Boxshall & Fosshagen, 2003	3.23–3.33	3.31–3.41			v				o	Hb
Neoscolecithrix koehleri Canu, 1896	3.00–4.00	3.50–4.00			v		v		o	E
Tharybis elongata sp. nov.	3.91–0.94	0.96				v			I	E
Undinella spinifer Tanaka, 1960	2.78	unknown				v			i	E

TORTANIDAE

Taxon	♀size mm	♂size mm	BS	YS	ES	ET	TS	SS	i/o	depth
Tortanus (*Atortus*) *brevipes* Scott A., 1909	2.30	unknown						v	i	E
Tortanus (*Atotus*) *digitalis* Ohtsuka & Kimoto, 1989	2.74–2.84	1.82–1.96			v	v			i	Bn
Tortanus (*Atotus*) *erabuensis* Ohtsuka, Fukura & Go, 1987	2.42–2.44	2.04–2.20			v				i	Bn
Tortanus (*Atotus*) *murrayi* Scott A., 1909	2.50–2.65	2.25						v	i	E
Tortanus (*Atotus*) *recticaudus* (Giesbrecht, 1889)	2.00	1.85						v	i	E
Tortanus (*Atotus*) *ryukyuensis* Ohtsuka & Kimoto, 1989	2.08–2.26	1.66–1.88			v					
Tortanus (*Atotus*) *scaphus* Bowman, 1971	2.25–2.80	1.98–2.40						v	o	E
Tortanus (*Atotus*) *sinicus* Chen, 1983	1.57	1.46						v	o	E
Tortanus (*Atotus*) *taiwanicus* Chen & Hwang, 1999	2.00–2.10	1.40–1.75			v	v		v	i	E
Tortanus (*Atotus*) *tumidus* Chen, Hwang & Yin, 2004	2.65–2.75	2.25–2.40			v			v	i	E
Tortanus (*Atotus*) *vietnamicus* Nishida & Cho, 2005	2.12–2.22	1.82–1.95						v	i	E
Tortanus (*Eutortanus*) *derjugini* Smirnov, 1935	1.71–2.36	1.40–2.09		v	v		v	v	i/e	E
Tortanus (*Eutortanus*) *dextrilobatus* Chen & Zhang, 1965	1.74–2.25	1.53–2.05			v		v	v	b	E
Tortanus (*Eutortanus*) *sheni* Hulsemann, 1988	1.57	1.46						v	i/e	E
Tortanus (*Eutortanus*) *spinicaudatus* Shen & Bai, 1956	1.44–2.17	1.30–1.80	v	v	v		v	v	i	E
Tortanus (*Eutortanus*) *vermiculus* Shen, 1955	1.83–2.40	1.85–2.00		v	v		v	v	i/e	E
Tortanus (*Tortanus*) *barbatus* (Brady, 1883)	1.32–2.10	1.05–1.12			v		v	v	i	E
Tortanus (*Tortanus*) *forcipatus* (Giesbrecht, 1889)	1.09–2.00	0.94–1.17	v	v	v		v	v	i	E
Tortanus (*Tortanus*) *gracilis* (Brady, 1883)	1.52–2.10	1.35–1.80		v	v		v	v	o	E

Conflict of interest

There is no conflict of interest.

References

[1] Dana JD. Notice of some genera of Cyclopacea. Annals and magazine of natural history 18: 181-185. Am J Sci 1846;1(2): 225–30.

[2] Giesbrecht W. Die freilebenden copepoden der Kieler föhrde. VI. Bericht Commission zur wissenschaftlichen Untersucheng der Deutschen Meere in Kiel, für 1877-1881 Abt. 1 1882: vols. 87–168, pls. 1-12. [In Germen)]

[3] Sars GO. An account of of the Crustacea of Norway with short descriptions and figures of all the species. In: Copepoda Calanoida (Calanidae, Eucalanidae, Paracalanidae, Pseudocalanidae, Aetideidae (part)). 4; 1901. 1–28, pls 1-16.

[4] Sars GO. An account of of the Crustacea of Norway with short descriptions and figures of all the species. In: Copepoda Calanoida (Aetideidae (concluded), Euchaetidae, Phaennidae). 4; 1902. p. 29–48. pls. 17-32.

[5] Sars GO. An account of of the Crustacea of Norway with short descriptions and figures of all the species. In: Copepoda Calanoida (Scolecithricidae, Diaixidae, Stephidae, Tharybidae). 4; 1902. p. 49–72. pls. 33-48.

[6] Sars GO. An account of the Crustacea of Norway with short descriptions and figures of all the species. In: Copepoda Calanoida (Centropagidae, Diaptomidae). 4; 1902. p. 73–96. pls. 49-64.

[7] Sars GO. An account of the Crustacea of Norway with short descriptions and figures of all the species. In: Copepoda Calanoida (Temoridae, Metridiidae, Heterorhabdidae (part)). 4; 1902. p. 97–120. pls. 65-80.

[8] Sars GOd. An account of the Crustacea of Norway with short descriptions and figures of all the species. In: Copepoda Calanoida (Heterorhabdidae (continued), Arietellidae, Pseudocyclopidae, Candaciidae, Pontellidae). 4; 1902. p. 121–44. pls. 81-96.

[9] Sars GO. An account of of the Crustacea of Norway with short descriptions and figures of all the species. In: Copepoda Calanoida (Parapontellidae, Acartiidae, Supplement). 4; 1903. p. 145–72. pls. 97-102, suppl. pls. 1-6.

[10] Huys R, Boxshall GA. Copepod evolution. Ray Soc 1991;159: 468.

[11] Andronov VN. Phylogenetic relationships of the large taxa within the suborder Calanoida (Crustacea, Copepoda). Zool Zh 1974;53:1002–12 (in Russian with English summary) (English translation is available from the U.S. Department of Commerce and the National Science Foundation, Washington D.C. by the Al-Ahram Center for Scientific Translations.).

[12] Andronov VN. On renaming of some taxa in Calanoida (Copepoda). Zool Zh 1991;70(6):133–4 [In Russian with English Summary)].

[13] Boxshall GA, Halsey SH. An introduction to copepod diversity. Parts I and II. Ray Soc 2004;166:966.

[14] Markhaseva EL, Schulz K. A new family and genus of calanoid copepods (Crustacea) from the abyss of the Atlantic Ocean. Zootaxa 2009;2304:21–40.

[15] Wilson CB. Contributions to the biology of the philippine archipelago and adjacent regions. Copepods gathered by the United States fisheries steamer "albatross" from 1887 to 1909, chiefly in the Pacific Ocean. Bulletin of the United States National Museum 1950;100(14) (4):i-ix, 141-461, pls. 2-36.

[16] Tanaka O. The pelagic copepods of the Izu region, middle Japan. Systematic account. VIII. Family Scolecithricidae (Part 2)vol. 10. Publications of the Seto Marine Biological Laboratory; 1962. p. 35–90.

[17] Tanaka O. The pelagic copepods of the Izu region, Middle Japan. Systematic account, VII. Family Scolecithricidae (Part I). Publs. Seto mar. biol. Lab. 1961;9(1):139–90.

[18] Park TS. Taxonomy and distribution of the marine calanoid copepod family Euchaetidae. Bull. Scripps Inst. Oceanogr.vol. 29. Univ. CA San Diego; 1995. p. 129. Figure 19i.

[19] Abraham S. A new species of Acartia (Copepoda, Calanoida) from Cochin Harbour, India, and adjacent areas. Crustaceana, Leiden 1970;l8(1):49–54. Figure 14.

[20] Tanaka O. The pelagic copepods of the Izu region, middle Japan. Systematic account. X. Family Heterorhabidaevol. 12. Publications of the Seto Marine Biological Laboratory; 1964. p. 85. Figure 216g.

[21] Park T. Taxonomy and distribution of the calanoid copepod family Heterorhabdidae. Bulletin of the Scripps Institution of Oceanography 2000;31:165. Figure 13e.

[22] Park T. Calanoid Copepods of the Family Phaennidae from Antarctic and Subantarctic Waters39; 1983. p. 332. Fiure 8.

[23] Park T. Calanoid copepods from the Caribbean Sea and Gulf of Mexico. 2. New species and new records from plankton samples. Bull Mar Sci 1970;20(2):472–546. fis. 1-402. Fiure 137.

[24] Shen CJ, Lee FS. Guang Dong Zhan Jiang Kou de Zuo Zu Lei. Acta Zootaxonomica Sin 1966;3(3):217. Fiure 9-17.

[25] Park T. Taxonomy and distribution of the calanoid copepod family Heterorhabdidae. Bulletin of the Scripps Institution of Oceanography 2000;31:161. Figure 9g.

[26] Bradford JM, Jillett JB. The marine fauna of New Zealand: pelagic calanoid copepods: family Aetideidaevol. 86. New Zealand Oceanographic Institute Memoir; 1980. p. 5–102.

[27] Sars GO. Copepodes particulierement bathypelagiques provenant des Campagnes scientifiques du Prince Albert 1er de Monaco. Resultats des Campagnes scientifiques accomplies sur son Yacht par Albert 1er Prince Souverain de Monaco 1925 (plates 1924;69:1–408. pls. 1-127. [In French)].

[28] Breemen PJ van. Copepoden, nordisches plankton. Zoologischer Teil 1908;4(8):1–264 [In German)].

[29] With C. Copepoda I. Calanoida Amphascandria. 8. The Danish Ingolf Expedition; 1915. p. 1–248. pls. 1-8.

[30] Rose M. Faune Fr 1933;26:1–374 [In French)].

[31] Giesbrecht W. Systematik und Faunistik der pelagischen Copepoden des Golfes von Neapel und der angrenzenden Meeres-Abschnitte. Fauna und Flora des Golfes von Neapel 1893;19(i-ix). 1–831, pls. 1-54.[In Germen)].

[32] Vives F, Shmeleva A. Crustacea, Copepodos marinos I. Calanoida. Fauna Iberica 2007;29:1–1152 [In Portuguese)].

[33] Vervoort W. Pelagic copepoda. Part I. Copepoda Calanoida of the families Calanidae up to and including Euchaetidae. Atlantide Report 1963;7:77–194.

[34] Vervoort W. Pelagic Copepoda. Part II. Copepoda Calanoida of the families Phaennidae up to and including Acartiidae, containing the description of a new speces of Aetideidae. Atlantide Report 1965;8:9–216.

[35] Harding G. Key to the adult pelagic calanoid copepods found over the continental shelf of the Canadian Atlantic coast. Marine environmental science. Dartmouth, Canada: Bedford Institute of Oceanography; 2004. p. 68.

[36] Wilson CB. The copepod crustaceans of Chesapeake Bay (2915) Proc U S Natl Mus 1932a;80(15):1–54. pls. 1-5.

[37] Wilson CB. The copepods of the Woods Hole region, Massachusetts158. Bulletin of the United States National Museum; 1932b. p. 1–635. figs.1-316, pls. 1-41.

[38] Owre HB, Foyo M. Copepods of the Florida current. Fauna caribaea 1. Copepoda 1967:1–137.

[39] Campos Hernández A, E Suárez Morales. Copépodos pelágicos del Golfo de Mexico y Mar Caribe. I. Biología y Sistematica, i-vii 1994: 1-360. [In Spanish)]

[40] Bradford-Grieve JM, Markhaseva L, Rocha CEF, Abiyahi B. Copepoda. In: Boltovskoy D, editor. South Atlantic Zooplankton. 2; 1999. p. 869–1098.

[41] Gardner GA, Szabo I. British Columbia pelagic marine Copepoda: an Identification manual and annotated bibliographyvol. 62. Canadian Special Publication of Fisheries and Aquatic Science; 1982. p. 1–536.

[42] Esterly CO. The pelagic copepoda of the san Diego region. Univ Calif Publ Zool 1905;2(4):113–233. fis. 1-62.
[43] Esterly CO. Addition to the copepod fauna of the San Diego region. Univ Calif Publ Zool 1906;3(5):53–92. pls. 9-14.
[44] Esterly CO. Third report on the copepoda of the san Diego region. Univ Calif Publ Zool 1911;6(14):313–52. pls. 26-32.
[45] Esterly CO. Fourth taxonomic report of the copepoda of the san Diego region. Univ Calif Publ Zool 1913;11(10):181–96. pls. 10-12.
[46] Palomares R, E Suárez, Herández-Trujillo S. Catálogo delos Copépodos (Crustacea) Pelágicos del Pacífico Mexicano. Centro Interdisciplinaria de Ciencias Marinas (CICIMAR-IPN), El Colegio de la Frontera Sur (ECOSUR), Mexico City. 1998. p. 352 [In Spanish)].
[47] Brodsky KA. Calanoida of the far eastern seas and polar basin of the USSR. In: Keys to the Fauna of the USSR, the Zoological Institute of the Academy of Sciences of the USSR. 35. Israel Program for Scientific Translations; 1950. p. 440. 1st ed., 1967.
[48] Mori T. The pelagic copepoda from the neighbouring waters of Japan. Privately published 1937;150:80 [pls].
[49] Tanaka O. The pelagic copepods of the Izu region, middle Japan. Systematic account. I. Families Calanidae and Eucalanidaevol. 5. Publications of the Seto Marine Biological Laboratory; 1956. p. 251–72.
[50] Tanaka O. The pelagic copepods of the Izu region, middle Japan. Systematic account. II. Families Paracalanidae and Pseudocalanidaevol. 5. Publications of the Seto Marine Biological Laboratory; 1956. p. 364–406.
[51] Tanaka O. The pelagic copepods of the Izu region, middle Japan. Systematic account. III. Families Aetideidae (Part 1) vol. 6. Publications of the Seto Marine Biological Laboratory; 1957. p. 31–68.
[52] Tanaka O. The pelagic copepods of the Izu region, middle Japan. Systematic account. IV. Families Aetideidae (Part 2) vol. 6. Publications of the Seto Marine Biological Laboratory; 1957. p. 169–207.
[53] Tanaka O. The pelagic copepods of the Izu region, middle Japan. Systematic account. V. Family Euchaetidae6. Publications of the Seto Marine Biological Laboratory; 1958. p. 327–67.
[54] Tanaka O. The pelagic copepods of the Izu region, middle Japan. Systematic account. VI. Family Phaennidae and Tharybidae8. Publications of the Seto Marine Biological Laboratory; 1960. p. 85–135.
[55] Tanaka O. The pelagic copepods of the Izu region, middle Japan. Systematic account. VII. Family Scolecithricidae (Part 1)vol. 9. Publications of the Seto Marine Biological Laboratory; 1960. p. 139–90.
[56] Tanaka O. The pelagic copepods of the izu region, middle Japan. Systematic account. IX. Family Centropagidae, Pseudodiaptomidae, Temoridae, metridiidae and Lucicutiidaevol. 11. Publications of the Seto Marine Biological Laboratory; 1963. p. 7–55.
[57] Tanaka O. The pelagic copepods of the Izu region, middle Japan. Systematic account. X. Family Heterorhabidae12. Publications of the Seto Marine Biological Laboratory; 1964. p. 1–37.
[58] Tanaka O. The pelagic copepods of the Izu region, middle Japan. Systematic account. XI. Family Augaptilidaevol. 12. Publications of the Seto Marine Biological Laboratory; 1964. p. 39–91.
[59] Tanaka O. The pelagic copepods of the izu region, middle Japan. Systematic account. XII. Family Arietellidae, Pseudocyclopidae, Candaciidae, Pontellidaevol. 12. Publications of the Seto Marine Biological Laboratory; 1964. p. 231–71.
[60] Tanaka O. The pelagic copepods of the Izu region, middle Japan. Systematic account. XIII. Family Parapontellidae, Acartiidae, Tortanidaevol. 12. Publications of the Seto Marine Biological Laboratory; 1965. p. 379–408.
[61] Tanaka O, Omori M. Additional report on calanoid copepods from the Izu region. Part 1. Euchaeta and Pareuchaeta16. Publications of the Seto Marine Biological Laboratory; 1968. p. 219–61.
[62] Tanaka O, Omori M. Additional report on calanoid copepods from the Izu region. Part 2. Euchiriella and Pseudochiriella17. Publications of the Seto Marine Biological Laboratory; 1969. p. 155–69.
[63] Tanaka O, Omori M. Additional report on calanoid copepods from the Izu region. Part 3A. Euaetideus, Aetideopsis, Chridius, Gaidius, and Gaetanusvol. 18. Publications of the Seto Marine Biological Laboratory; 1969. p. 109–41.
[64] Tanaka O, Omori M. Additional report on calanoid copepods from the Izu region. Part 3B. Chirundina, Undeuchaeta, Pseudeuchaeta, Valdiviella, and Chiridiellavol. 18. Publications of the Seto Marine Biological Laboratory; 1970. p. 143–55.
[65] Tanaka O, Omori M. Additional report on calanoid copepods from the Izu region. Part 4. Haloptilus, Augaptilus, Centraugaptilus, Pseudaugaptilus, and Pachyptilusvol. 19. Publications of the Seto Marine Biological Laboratory; 1971. p. 249–68.
[66] Tanaka O, Omori M. Additional report on calanoid copepods from the Izu region. Part 5. Euaugaptilus21. Publications of the Seto Marine Biological Laboratory; 1974. p. 193–267.
[67] Tanaka O, Omori M. Additional report on calanoid copepods from the Izu region. Part 6. Phaennidae35. Publications of the Seto Marine Biological Laboratory; 1992. p. 253–71.
[68] Chihara M, Murano M. An illustrated guide to marine plankton of Japanxxxvi+. Tokai University Press; 1997. p. 1574 (Calanoida: 660-931. Acartiidae by H. Ueda, 669-680; Aetideidae by S. Nishida, 681-718; Arietellidae by S. Ohtsuka, 719-726; Augaptilidae by S. Nishida, 727-736; Calanidae by H. Toda, 937-948; Calocalanidae by H. Ueda, 749-751; Candaciidae by S. Ohtsuka, 752-764; Centropagidae by S. Ohtsuka, 765-774; Clausocalanidae by H. Ueda, 775-786; Eucalanidae by H. Toda, 787-796; Euchaetidae by S. Ohtsuka, 797-815; Heterorhabdidae by S. Ohtsuka, 816-828; Lucicutiidae by H. Hatori, 829-832; Mecynoceridae by H. Ueda, p. 833; Megacalanidae by S. Nishida, 834-836; Metridinidae by H. Hatori, 837-843; Paracalanidae by H. Ueda, 844-851; Phaennidae by H. Toda, 852-861; Phyllopodidae by S. Ohtsuka, 862-864; Pontellidae by S. Ohtsuka, 865-890; Pseudocyclopidae by S. Ohtsuka, p. 891; Pseudocyclopiidae by S. Ohtsuka, p. 892; Pseaudodiaptomidae by Mirakawa, 893-897; Ryocalanidae by S. Ohtsuka, p. 898; Scolecitrichidae by S. Nishida, 899-912; Stephidae by S. Ohtsuka, 913-915; Temoridae by H. Itoh, 916-919; Tharybidae by S. Nishida,920-923; Tortanidae by S. Ohtsuka, 924-931).(In Japanese).
[69] Scott A. The Copepoda of the Siboga Expedition29; 1909. p. 1–323.
[70] Greenwood JG. Calanoid copepods of Moreton bay (Queensland) I. Families Calanidae, Eucalanidae, and Paracalanidae. Proc Roy Soc Queensl 1976;87:1–28.
[71] Greenwood JG. Calanoid copepods of Moreton bay (Queensland) II. Families calocalanidae and Centropagidae. Proc Roy Soc Queensl 1977;88:49–67.
[72] Greenwood JG. Calanoid copepods of Moreton bay (Queensland) III. Families Temoridae to Tortanidae, excluding Pontellidae. Proc Roy Soc Queensl 1978;89:1–21.
[73] Greenwood JG. Calanoid copepods of Moreton Bay (Queensland) IV. Family Pontellidaevol. 90. Proceedings of Royal Society of Queensland; 1979. p. 93–111.
[74] Greenwood JG. Calanoid copepods of Moreton bay (Queensland) V. Ecology of the dominant species93. Royal Society of the Royal Society of Queensland; 1982. p. 49–64.
[75] Bradford-Grieve JM. The marine fauna of New Zealand: pelagic copepods: families Megacalanidae, Calanidae, Paracalanidae, mecynoceridae, Eucalanidae, Spinocalanidae, Clausocalanidaevol. 102. New Zealand Oceanographic Institute Memoir; 1994. p. 1–160.

[76] Vervoort W. The Bathypelagic copepoda Calanoida of the snellius expedition 1. Families Calanidae, Eucalanidae, Paracalanidae, and pseudocalanidae. Temminckia 1946;8: 1–181.
[77] Mulyadi. The pelagic calalnoid copepods of the families Acartiidae, Aetideidae, Augaptilidae, Calanidae, Calocalanidae, Candaciidae, Centropagidae, Clausocalanidae, Eucalanidae, Euchaetidae, Heterorhabdidae, Metridinidae, Paracalanidae, Phaennidae, Pseudodiaptomidae, Scolecitrichidae, and Tortanidae in Indonesian waters195. Bogor: Research Center for Biology, Indonesia Institute of Sciences; 2004.
[78] Sewell RBS. The copepoda of Indian seas. Memoires of the Indian Museum 1929;10:1–220.
[79] Sewell RBS. The copepoda of Indian seas. Memoires of the Indian Museum 1932;10:221–407.
[80] Sewell RBS. The free-swimming planktonic Copepoda. Scientific Reports of the John Murray Expedition, 1933-34. Zoology 1947;8:1–303.
[81] Vervoort W. Planktonic copepods from the Atlantic sector of the Antartic. In: Koninklijke Nederlandse Akademie van Wetenschappen, Afdeeling Natuurkunde, Section 2. 47; 1951. p. 1–156 (4).
[82] Vervoort W. Copepods from Antarctic and Sub- Antarctic plankton samples. In: B.A.N.Z. Antarctic Research Expedition Reports- Series. 3; 1957. p. 1–160.
[83] Wolfenden RD. Die marinen Copepoden der Deutschen Sudpolar-Expedition 1901-1903. II. Die pelagischen Copepoden der Westwinddrift und des Sudlichen Eismeers. Deutsche Sudpolar-Expedition, 1901-19034. Zoologie; 1911. p. 183–380. pls. 22-40. [In German)].
[84] Razouls C, Desreumaux N, Kouwenberg J, de Bovée F. Biodiversity of Marine Planktonic Copepods (morphology, geographical distribution and biological data). Sorbonne University, CNRS; 2005. Available at, http://copepodes.obs-banyuls.fr/en [Accessed July 12, 2022].
[85] Chen Q-C. Studies on marine copepods by Chinese scientists during the last 35 years. Syllogeus 1986;58:524–9.
[86] Shih C-t, Young S-S. A checklist of free-living copepods, including those associated with invertebrates, reported from the adjacent seas of Taiwan. Acta Zool Taiwanica 1995; 6(2):65–81.
[87] Shen C-j, o Bai S-. The marine Copepoda from the spawning ground of Pneumatophores japonicus (Houttuyn) off Chefoo, China. Acta Zool Sin 1956;8:177–234 [In Chinese with English abstract)].
[88] Shen C-j, Lee F-s. The estuarine copepoda of Chiekong and Zaikong rivers, Kwangtung province, China. Acta Zool Sin 1963;15:571–96 [In Chinese with English abstract)].
[89] Chen Q-C, Zhang S-Z. The planktonic copepods of the Yellow Sea and the east China sea I. Calanoida. Stud Mar Sin 1965;7:20–131 [In Chinese with English abstract)].
[90] Zheng Z, Zhang SZ, Li S, Fang JC, Lai RQ, Zhang SL, Li SQ, Xu ZZ. Marine Planktonic copepods of China1. Shanghai: Shanghai Science and Technology Press; 1965. ii+209pp. [In Chinese)].
[91] Chen Q-C, Shen C-J. The pelagic copepods of the South China Sea II. Stud Mar Sin 1974;9:125–37 [In Chinese with English abstract)].
[92] Chen Q-C, Zhang S-Z. The pelagic copepods of the South China Sea I. Stud Mar Sin 1974;9:101–16 [In Chinese with Chinese abstract)].
[93] Lian GS, Lin JM. Studies on the calanoid copepods of the South Yellow Sea and the east China sea. Oceanic Science and Technology 1978;11(10):59–112 [In Chinese with English abstract)].
[94] Zheng Z, Li S, Li SG, Chen BY. Marine Planktonic copepods of China2. Shanghai: Shanghai Science and Technology Press; 1982a. ii+162pp.[In Chinese)].
[95] Zhang W, Zhao N, Tao Z, Zhang C. An illustrated guide to marine planktonic copepods in China seas. Beijing: Science Press; 2010. vii+468pp.
[96] Lian G, Wang Y, Sun R, Hwang J. Species diversity of marine Planktonic copepods in China's seas1. Beijing: China Ocean Paress; 2018. p. 647.
[97] Chen B-Y. Preliminary study on the distribution system of marine copepods in the China seas. Acta Oceanol Sin 1984; 5(suppl):914–22 [In Chinese with English abstract)].
[98] Chen Q-C. Copepoda. In: Liu R, editor. Checklist of marine biota of China seas. Beijing, China: Science Press; 2008. p. 608–35 [In Chinese)].
[99] Lian GS, Lin JM. Copepoda. In: Huang Z-g, editor. Marine species and their distribution in China's seas. 2nd ed. Beijing: China Ocean Press; 2008. p. 549–77 [In Chinese)].
[100] Song X, Liu A, Ma Y, Sun G, Liu L. Study on the plankton community in the sea area of Dongying in dry season. Trans Oceanol Limnol 2010;1:95–102.
[101] Lian GS, Lin JM. On the taxonomy of the pelagic copepods in the south Yellow Sea and the East China Sea. Coll Ocean Works 1983;6:127–48 [In Chinese with English abstract)].
[102] Wang R, Gao S-w, Wang K, Zuo T. Zooplankton indication of the Yellow Sea warm current in winter. J Fish China 2003; 27(Supp):39–48.
[103] Zuo T, Wang R, Chen Y, Gao S, Wang K. Autumn net copepod abundance and assemblages in relation to water masses on the continental shelf of the Yellow Sea and East China Sea. J Mar Syst 2006;59:159–72.
[104] Zhu L-Y, Kou J-S, Qi B-J, Li X-Y, Xu X-F. Study on the community characteristics of planktonic copepods and influential factors in coastal waters south of Qingdao. Period Ocean Univ China 2011;41(10):52–60 [In Chinese with English abstract)].
[105] Chen H, Liu G, Zhu Y, Jiang Q. Spatial and temporal variations of pelagic copepods in the north Yellow Sea. J Ocean Univ China 2015;14:989–98 [In Chinese)].
[106] Chen H, Liu G. Zooplankton community structure in the Yellow Sea and east China Sea in autumn. Braz J Oceanogr 2015;63:455–68.
[107] Tan T-H. A list of pelagic Copepoda from the surrounding waters of Taiwan (with a key to genera). Rep Inst Fish Biol Minist Econ Aff Natl Taiwan Univ 1969;2(3):45–55.
[108] Tan T-H. Tseng, Souissi et al, 2008; on distribution of biomass and abundance of zooplankton in waters surrounding Taiwan. Acta Oceanol Taiwanica 1971;1:127–36.
[109] Tseng W-y, Hu S-h, Chen T-s, Chen C-h. Observation on the 24 hour changes in environment, plankton production and their relationships of ocean water at point "S" off the Yu- Tieu Tao. In: Bulletin of Taiwan Provincial Fisheries Research Institute. 18; 1971. p. 35–44.
[110] He D, Yang G. Distribution of the pelagic copepods in Kuroshio upstream area and adjacent waters in spring, 1986. 1. Horizontal distribution. In: Su JL, editor. Selected papers on Kuroshio investigation. Beijing, China: Science Press; 1990. p. 249–65 (In Chinese with English abstract).
[111] Meng F, Huang F-P, Li Q-L, Ma Z-D. Zooplankton in the Kuroshio region of the east China Sea in the summer of 1987. [In Chinese with English summary. In: Su JL, editor. Selected Research Papers on Kuroshio Investigation. 2. Beijing: Science Press; 1990. p. 92–8 [In Chinese with English abstract)].
[112] Meng F, Huang F-P, Ma Z-D, Li F-P. On the composition and distribution of zooplankton species in the Kuroshio region in the north of East China Sea. [In Chinese with English summary. In: Su JL, editor. Selected Research Papers on Kuroshio Investigation. 3. Beijing: Science Press; 1991. p. 150–60 [In Chinese with English abstract)].
[113] Meng F, Zhao J, Li Q-L, Ma Z-D. The ecological structure of the zooplankton in the Kuroshio frontal eddy in the northern East China Sea. [In Chinese with English summary. In: Su JL, editor. Selected Research Papers on Kuroshio Investigation. 4. Beijing: Science Press; 1992. p. 142–50 [In Chinese with English abstract)].
[114] Meng F, Huang F-P, Ma Z-D, Li F-P. A preliminary report of zooplankton in the Kuroshio and adjacent waters [In Chinese with English summary. In: Su JL, editor. Selected

Research Papers on Kuroshio Investigation. 1. Beijing: Science Press; 1993. p. 97−105 [In Chinese with English abstract)].
[115] Lin Y, Nakamura Y. Distribution of planktonic copepods in the Kuroshio of the east China sea southwest off Kyushu, Japan. Acta Oceanol Sin 1992;2:91−8 [In Chinese)].
[116] Shih C-t, Chiu TS. Copepod diversity in the water masses of the southern East China Sea north of Taiwan. J Mar Syst 1998;15:533−42.
[117] Yang G, He D, Wang C, Miao Y, Yu H. Study on the biological oceanography characteristics of planktonic copepods in the waters north of Taiwan Island. II. Community characteristics. Acta Oceanol Sin 1999;21(6):72−80 [In Chinese with English abstract)].
[118] Yang G, He D, Wang C, Miao Y, Yu H. Study on the biological oceanographic characteristics of planktonic copepods in the waters north of Taiwan Province. III. Indiator species. Acta Oceanol Sin 2000;22:93−101 [In Chinese with English abstract)].
[119] Hwang J-S, YY Tu L-C Tseng, Fang L-S, Souissi S, H Fang T-, T Lo W-, Twan W-H, Hsiao S-H, Wu C-H, Peng S-H, Wei T-P, Chen Q-C. Taxonomic composition and seasonal distribution of copepod assemblages from waters adjacent to nuclear power plant I and II in northern Taiwan. J Mar Sci Technol 2004;12:380−91.
[120] Lo W-T, Shih C-t, Hwang J-S. Diel vertical migration of the planktonic copepods at an upwelling station north of Taiwan, western North Pacific. J Plankton Res 2004;26: 89−97.
[121] Hwang J-S, Wong CK. The China Coastal Current as a driving force for transporting Calanus sinicus (Copepoda: Calanoida) from population centers to waters off Taiwan and Hong Kong during the winter northeast monsoon period. J Plankton Res 2005;27:205−10.
[122] Hwang J-S, Soussi S, Tseng L-C, Seuront L, Schmidt FG, Fang L-S, Peng SS, Wu C-H, Hsiao S-H, Twan W-H, Wei T-P, Kumar R, H Fang T-, Chen Q-C, Wong C-K. A 5-year study of the influence of the northeast and southwest monsoons on copepod assemblages in the boundary coastal waters between the East China Sea and the Taiwan Strait. J Plankaton Res 2006;28:943−58.
[123] Dur G, Hwang J-S, Souissi S, Tseng L-C, Wu C-H, Hsiao S-H. An overview of the influence of hydrodynamics on the spatial and temporal patterns of calanoid copepod communities around Taiwan. J Plankton Res 2007;29:997−1116.
[124] Lan Y-C, Lee M-A, Chen W-Y, Hsieh F-J, Pan J-Y, Liu D-C, Su W-C. Seasonal relationships between the copepod community and hydrographic conditions in the southern East China Sea. ICES (Int Counc Explor Sea) J Mar Sci 2008; 65:462. 458.
[125] Lan Y-C, Lee M-A, Liao C-H, Chen W-Y, Lee D-A, Liu D-C, Su W-C. Copepod community changes in the southern East China Sea between the early and late northeasterly monsoon. Zool Stud 2008;47:61−74.
[126] Tseng L-C, Souissi S, U Dahms H-, Chen Q-C, Hwang J-S. Copepod communities related to water masses in the southwest East China Sea. Helgol Mar Res 2008;62:153−65.
[127] Wang J-Y, Tang J-L, Hu H-Y, Huang B, Wei BN. Ecological distributional characteristics of zooplankton in Zhejiang sea area estuary. J Zhejiang Ocean Univ (Nat Sci) 2008;27: 384−9.
[128] Zhang J, m Yang G-, Wang C-s, Zhang D-s. Ecological study of zooplankton in the waters near the Zhoushan Archipelago. I. Species composition ad quantitative distribution. J Marine Sci 2008;26(45):20−8.
[129] Jin H-w, Xu H-x, Wang W-d, Pan G-l, Yu B-c. Distribution features of zooplankton in the Zhejiang coastal waters. J Marine Sci 2009;27:55−62.
[130] Tseng LC, U Dahms H-, Chen Q-C, Hwang J−S. Mesozooplankton and copepod community structures in the southern East China Sea: the status during the monsoonal transition period in September. Helgol Mar Res 2012;66: 621−34.
[131] Tseng L-C, Hung J-J, Chen Q-C, Hwang J-S. Seasonality of the copepod assemblage associated with interplay waters off northeastern Taiwan. Helgo Marine Sci 2013;67:507−20.
[132] Luo X, Zeng J, Xu X, Liao Y, Liu J. Distribution of zooplankton in the Zhoushan Sea and its relationship with environmental factors in summer and autumn. Acta Ecol Sin 2016;36:8194−204 [In Chinese with English abstract)].
[133] Wong C-K, Hwang J-S, Chen Q-C. Taxonomic composition and grazing impact of calanoid copepods in coastal waters near nuclear power plants in northern Taiwan. Zool Stud 1998;37:330−9.
[134] Hsiao SH, Lee CY, Shih C-t, Hwang JS. Calanoid copepods of the Kuroshio Current east of Taiwan with notes on the presence of Calanus jashnovi Hulsemann. Zool Stud 1994; 43:323−31. 2004.
[135] Liao C-H, Chang W-J, Lee M-A, T Lee K-. Summer distribution and diversity of copepods in upwelling waters of the southeastern East China Sea. Zool Stud 2006;45:378−94.
[136] Lin J-h. Ecological characteristics on macro-medium planktonic copepods in the subtropical circulation zone east of Taiwan Island. Acta Oceanol Sin 2007;29:92−7 [In Chinese with English abstract)].
[137] Lee C-Y, Shih C-t, Hsu CC. Community structure of planktonic copepods in I-Lan Bay and the adjacent Kuroshio waters off northeastern Taiwan. Crustaceana 2006;79: 1223−40.
[138] Lee C-Y, Liu D-C, Su W-C. Seasonal and spatial variations in the planktonic copepod community of Ilan Bay and adjacent Kuroshio waters off northeastern Taiwan. Zool Stud 2009;48:151−61.
[139] Hsiao SH, Fang T-S, Shih C-t, Hwang JS. Effects of the Kuroshio current on copepod assemblages in Taiwan. Zool Stud 2011;50:475−90.
[140] Hsiao SH, Ka S, Fang T-S, Hwang JS. Zooplankton assemblages as indicators of seasonal changes in water masses in the boundary waters between the East China Sea and the Taiwan Strait. Hydrobiologia 2011;666:317−30.
[141] Ka S, Hwang J-S. Mesozooplankton distribution and composition on the northeastern coast of Taiwan during autumn: effects of the Kuroshio Current and hydrothermal vents. Zool Stud 2011;50:155−63.
[142] Tseng W-Y. The zooplankton community in the surface waters of Taiwan Strait. In: Sugawara, editor. Proceedings of the second symposium on the results of the cooperative study of the Kuroshio and adjacent regions. Tokyo, Japan: Saikon Publ. Co; 1972. p. 261−8. September 28-October 1, 1970.
[143] Tseng W-Y. Planktonic copepods from the waters off Tansui. Bull Taiwan For Res Inst 1975;24:1−44.
[144] Zheng Z, Li SG, Li S, Chen BY. On the distribution of planktonic copepods in Taiwan Strait. Taiwan Strait 1982;1: 73−8 [In Chinese with English abstract)].
[145] Li S, Huang J. On two new species of planktonic Copepoda from the estuary of Jiulong River, Fujian, China. J Xiamen Univ 1984;23:380−90 [In Chinese with English abstract)].
[146] Huang J, Chen B. Species composition and distribution of planktonic copepods in the Jiulong Jiang estuary, Fujian. Taiwan Strait 1985;3:79−88 [In Chinese with English abstract)].
[147] Lin Y, Lian G. Ecology of planktonic copepods in the Taiwan Strait. Taiwan Strait 1988;7:248−55 [In Chinese with English abstract)].
[148] Zhu C-S, Wu J-Z, Lin Y-S, Su M, Huang CJ. Species composition and quantity distribution of plankton; Appendix: a list of marine organism in the central and northern part of the Taiwan Strait. In: A Comprehensive Oceanographic Survey of the Central and Northern Part of the Taiwan Strait, Fujian Institute of Oceanology. 259−305. Beijing: Kexuei Zhubanzhe (Science Press); 1988. p. 395−416.
[149] Lin Dai YJ, Lin M, Chen L, Huang Y. An ecological study of the zooplankton in western Xiamen Harbour, China. Asian Mar Biol 1991;8:45−56.

[150] Zhu C.-S, J Huang, S Li. Studies on the ecology of copepods in Minnan-Taiwan Bank fishing ground. In: Minnan-Taiwan bank fishing ground upwelling ecosystem study 1991: 440-455, Science Press, Beijing.
[151] Huang JQ, Li SQ, Ho HB. Community characteristics of planktonic copepods in Luoyuan bay, Fujian. Mar Sci 2000; 24:1–4 (in Chinese with English abstract).
[152] Lo WT, Hwang JS, Chen QC. Identity and abundance of surface-dwelling, coastal copepods of southwestern Taiwan. Crustaceana 2001;74:1139–57.
[153] Hsieh C-H, Chiu T-S. Summer spatial distribution of copepods and fish larvae in relation to hydrography in the northern Taiwan Strait. Zool Stud 2002;41:85–98.
[154] Hwang JS, Chen QC, Wong CK. Taxonomic composition, density and biomass of free-living copepods in the coastal waters of southwestern Taiwan. Crustaceans 2003;76: 193–206.
[155] Hsieh C-H, Chiu T-S, Shih C-t. Copepod diversity and composition as indicators of intrusion of the Kuroshio Branch Current into the northern Taiwan Strait in spring 2000. Zool Stud 2004;43:393–403.
[156] Lan Y-C, Shih C-t, Lee M-A, Shieh H-Z. Spring distribution of copepods in relation to water masses in the northern Taiwan Strait. Zool Stud 2004;43:332–43.
[157] Lo W-T, Hwang J-S, Chen QC. Spatial distribution of copepods in surface waters of the southwestern Taiwan Strait. Zool Stud 2004;43:218–28.
[158] Hsieh C-h, Chen C-S, Chiu T-S. Composition and abundance of copepods and ichthyoplankton in Taiwan Strait (western North Pacific) are influenced by seasonal monsoons. Mar Freshw Res 2005;56:153–61.
[159] Tseng L-C, Kumar R, U Dahms H-, Chen Q-C, Hwang J-S. Monsoon-driven succession of copepod assemblages in coastal waters of the northeastern Taiwan Strait. Zool Stud 2008;47:46–60.
[160] Hwang J-S, Soussi S, Hu Dahms, Tseng L-C, Schmidt FG, Chen Q-C. Rank-abundance allocations as a tool to analyze planktonic copepod assemblages off the Danshuei River estuary (northern Taiwan). Zool Stud 2009;48:49–62.
[161] Hwang J-S, R Kumar, Hsieh C-W, Kuo A-Y, Souissi S, Hsu M-H, Wu J-T, Liu W-C, Wang C-F, Chen Q-C. Patterns of zooplankton distribution along the marine, estuarine, and riverine portions of the Danshuei ecosystem in northern Taiwan. Zool Stud 2010;49:335–52.
[162] Lan Y-C, Lee M-A, Liao C-H, Lee K-T. Copepod community structure of the winter frontal zone induced by the Kuroshio branch current and the China coastal current in the Taiwan Strait. J Mar Sci Technol 2009;17:1–6.
[163] Dahm H-U, Tseng L-C, Hsiao S-H, Chen Q-C, Kim B-R, Hwang J-S. Biodiversity of planktonic copepods in the Lanyang River (northeastern Taiwan), a typical watershed of Oceania. Zool Stud 2012;51:160–74.
[164] Rose M. Quelques notes sur le plancton marine recuelli en 1953 par M. G. Ranson, dans la baie de Nhatrang-Cauda. Bulletin du Museum, ser.2 1955;17:387–93 [In French)].
[165] Rose M. Les copepodes pelagiques de la baie de Cauda. Viet-Nam) 1956;28:458–65 [In French)].
[166] Chen Q-C. The marine zooplankton of Hong Kong. In: Proceedings of the first international marine biological workshop: the marine flora and fauna of Hong Kong and southern China; 1982. p. 789–99.
[167] Chen Q-C, Zhang G-X, Yun J-Q. Species, quantity and biology of zooplankton. In: Zao X, Lee B, editors. Zengmu ansha - reports on the comprehensive investigations of the southern territory of China. Beijing: Science Press; 1987. p. 132–46 (In Chinese).
[168] Chen RS, Zhou ZC, Chen SQ, Jiang JS. Zooplankton. In: Report of the comprehensive investigations on environmental resources in the central part of the south China sea (national bureau of oceanology. Beijing, China: Science Press; 1988. p. 230–51 (In Chinese).
[169] Hwang JS, Chen Q-C, Lo W-Z, Chen M-P. Taxonomic composition and abundance of the copepods in the northeastern South China Sea. Natl Taiwan Mus Spec Publ 2000;10:101–8.
[170] Chen Q-C, Wong CK, Tam PF, Lee CNW, Yin JQ, Huang LM, Tam YH. Variations in the abundance and structure of the planktonic copepod community in the Pearl River estuary, China. In: Morton B, editor. Proceedings of an international workshop reunion conference, Hong Kong 21-26 october 2001. Hong Kong University Press; 2003. p. 389–400.
[171] Lee CNW. Seasonal changes in the planktonic copepod community of the southeastern coastal waters of Hong Kong. In: Morton T, editor. Proceedings of an international workshop reunion conference, Hong Kong 21-26 october 2001. Hong Kong: Hong Kong University Press; 2003. p. 367–87.
[172] Lee CNW, Chen Q-C. A historical and biogeographical analysis of the marine planktonic copepod community in Hong Kong: a record of change. In: Morton B, editor. Proceedings of an international workshop reunion conference, Hong Kong 21-26 october 2001. Hong Kong: Hong Kong University Press; 2003. p. 433–57.
[173] Tan Y, Huang L, Chen Q, Huang S. Seasonal variation in zooplankton composition and grazing impact on phytoplankton standing stock in the Pearl River estuary, China. Continent Shelf Res 2004;24:1949–68.
[174] Hwang J-S, Dahms H-U, Tseng L-C, Chen Q-C. Intrusions of the Kuroshio current in the northern South China sea affect copepod assemblages of the Luzon Strait. J Exp Mar Biol Ecol 2007;352:12–27.
[175] Hsu PK, Lo WZ, Shih C-t. The coupling of copepod assemblages and hydrography in a eutrophic lagoon in Taiwan: seasonal and spatial variations. Zool Stud 2008;47: 172–84.
[176] Tseng LC, Dahms H-U, Chen Q-C, Hwang J–S. Copepod assemblages of the northern South China sea. Crustaceana 2008;81:1–22.
[177] Yun J-Q, Huang H, Huang L-M, Kz Li, Lian U-S. Summer zooplankton in coral reef area of Leizhou Peninsula, China. Oceanol Limnol Sinica 2008;39:131–8 [In Chinese with English abstract)].
[178] Zhang W, Tang D, Yang B, Gao S, Sun J, Tao Z, Sun S, Ning X. Onshore-offshore variations of copepod community in northern Sout China Sea. Hydrobiologia 2009;636: 257–69.
[179] Chang W-B, Dahms H-U, Tseng L-C. Copepods assemblages in an enbayment of Taiwan during monsoonal transitions. Zool Stud 2010;49:735–48.
[180] Zhang G-T, Wong CK. Changes in the planktonic copepod community in a landlocked bay in the subtropical coastal water of Hong Kong during recovery from eutrophication. Hydrobiologia 2010;666:277–88.
[181] Lin D, Li XQ, Fang HD, Dong ZH, Huang ZX, Chen JH. Calanoid copepods assemblages in Pearl River estuary of China in summer: relationships between species distribution and environmental variables. Estuar Coast Shelf Sci 2011;93:259–67.
[182] Lo W-T, Dahms H-U, Hwang J-S. Water mass transport through the northern Bashi Channel in the northeastern South China Sea affects copepod assemblages of the Luzon Strait. Zool Stud 2014;53:66.
[183] Li KZ, Wu XJ, Tan YH, Huang H, Dong JD, Huang LM. Spatial and temporal variability of copepod assemblages in Sanya Bay, northern South China Sea. Reg Stud Marine Sci 2016;7:168–76.
[184] Qiu B, Rudnick DL, Cerovecki I, Cornuelle BD, Chen S, Schönau MC, McClean JL, Gopalakrishnan G. The pacific North Equatorial current. New insights from the origins of the Kuroshio and Mindanao currents (OKMC) project. Oceanography 2015;28(4):24–33.
[185] Lie H-J, Cho C-H. Seasonal circulation patterns of the Yellow and East China seas derived from satellite-tracked drifter trajectories and hydrographic observations. Prog Oceanogr 2016;146:121–41.
[186] Hu JY, Kawamura H, Hong H, Qi Y. A review on the currents in the south China sea: seasonal circulation, south

China Sea Warm current and Kuroshio intrusion. J Oceanogr 2000;56:607−24.
[187] Fang W, Guo Z, Huang Y. Observational study of the circulation in the southern South China Sea. Chin Sci Bull 1998;43:898−905.
[188] Hu JY, Liu MS. The current structure during summer in southern Taiwan Strait. Trop Oceanol 1992;11(4):42−7 [In Chinese with English abstract)].
[189] Jan S, Wang J, Chern C-S, Chao S-Y. Seasonal variation of the circulation in the Taiwan Strait. J Mar Syst 2002;35:249−68.
[190] Song J, Guo J, Li J, Mu L, Liu Y, Wang G, Li Y, Huan LI. Definition of water exchange zone between the Bohai Sea and Yellow Sea and the effect of winter gale on it. Acta Oceanol Sin 2017;36:17−25.
[191] Chen Q-C. Zooplankton of China seas (1)vol. 87. Beijing, New York: Science Press; 1992. iii +.
[192] Grice DG. Calanoid copepods from equatorial waters of the Pacific Ocean. Fish Bull 1962;61:171−245.
[193] Tseng L-C, Kumar R, Dahms H-U, Chen C-T, Soussi S, Chen Q-C, Hwang J-S. Copepod community structure over a marine outfall area in the north-eastern South China Sea. J Mar Biol Assoc U K 2008;88:955−66.
[194] Bradford-Grieve JM. The marine fauna of New Zealand: pelagic copepods: families Bathypontiidae, Arietellidae, Augaptilidae, Heterorhabdidae, Lucicutiidae, Metridinidae, Phyllopodidae, Centropagidae, Pseudodiaptomidae, Temoridae, Candaciidae, Pontellidae, Sulcanidae, Acartiidae, Tortanidae. NIWA Biodivers Mem 1999;111:1−268.