



Family Ampithoidae (Peracarida: Amphipoda) from the Egyptian Coast of the Red Sea, provided with keys to genera and species

Yasmine A.E. Hassan^{1*}, Reem O. A. Kamel¹, Mahmoud M. Maaty², Amr F. Zeina³,
Fatma E. A. Bayaomy¹

¹Department of Zoology, Women College for Art, Science and Education, Ain Shams University Egypt

²National Institute of Oceanography and Fisheries, NIOF, Egypt

³Laboratory of Marine Biology, Zoology Department, Faculty of Science, Al-Azhar University, Cairo, Egypt

*Corresponding Author: omeryasmine41@gmail.com

ARTICLE INFO

Article History:

Received: May 31, 2023

Accepted: June 30, 2023

Online: Aug. 2, 2023

Keywords:

Biodiversity,
Amphipoda,
Cymadusa setosa,
Biancolina sp.,
New records

ABSTRACT

Family Ampithoidae is considered one of the most famous and cosmopolitan amphipods worldwide since its early definition in 1888; however, information about this family from the Red Sea is still scarce so far. Hence, the purpose of this study was to revise all previously recorded and newly collected materials of Ampithoidae species in the Red Sea. Samples were collected for one year, beginning in the summer of 2019, from seven sites covering the Egyptian Red Sea coast from Hurghada to Halayeb with depths up to 35m. The results of this research revealed the species diversity of this family, which was represented by 8 genera and 9 species. The first evidence of the genus *Biancolina* Della Valle, 1893 was recorded from the Red Sea in addition to the recording of *Cymadusa setosa* Haswell, 1879, provided with the identification keys for each genus and species. This study concluded that the family Ampithoidae in the Red Sea is represented by 9 species: *Ampithoides longicornis* Kossmann, 1880; *Ampithoe ramondi* Audouin, 1826; *Biancolina* sp.; *Cymadusa filose* Savigny, 1816; *Cymadusa setosa* Haswell, 1879; *Paradusa bilobata* Ruffo, 1969; *Paragrubia vorax* Chevreux, 1901; *Pleonexes kava* Myers, 1985 and *Sunamphitoe falsa* Barnard, 1932.

INTRODUCTION

Ampithoids are algal-associated amphipods represented with great species abundance in the temperate and tropical marine shallow-water environments (Peart & Hughes, 2014). Zeina (2012) referred to the previously conducted studies and marine surveys on the Red Sea benthic habitats, particularly the macro-algal related amphipods among intertidal algal communities. Moreover, family Ampithoidae has been reported in association with a high abundance of macro-algal against the presence of other families.

Ampithoidae was first well-defined by Stebbing (1888, 1899, 1906) which has been followed by many researchers (Barnard, 1965a, b, 1969a, b, 1970; Bousfield, 1982; Barnard & Karaman, 1991). Ampithoids are member of a group in amphipods

that are identified by possessing entire and dorsoventrally thickened telson, belonging to an infra-order Corophiida (**Myers & Lowry, 2003**). Uropod 3 has inner ramus which is as short as the outer ramus, apically setose and wide. The outer ramus of uropod 3 contains 1 to 2 re-curved robust setae arising from the ramus axis. Usually, the lower lip's outer lobe has a notch (**Barnard & Karaman, 1991**). Ampithoidae taxonomy has recently been extensively studied (**Poore & Lowry, 1997; Peart, 2004, 2007a, b, 2014; Kim *et al.*, 2012**). Over 230 species of Ampithoidae have been recognized worldwide in 16 genera (**WoRMS, 2023**).

The genus *Ampithoe* and its most associated congeners was considered a species group of *Ampithoe*, which is abstruse. Many workers recognized *Ampithoe* Leach, 1814 and *Pleonexes* Bate, 1856 as a separate genus (**Bate, 1856, 1857, 1858; Sars, 1895; Chevreux, 1901; Stebbing, 1906; Chevreux & Fage, 1925; Gurjanova, 1951; Barnard, 1969c; Krapp-Schickel, 1969, 1978; Kensley, 1971**). While **Conlan (1982)** and **Poore and Lowry (1997)** considered *Pleonexes* as a subgenus of *Ampithoe*, considering *Pleonexes* as a junior synonym of *Ampithoe* and its members as an ambiguous species group (**Peart, 2007b**). The paraphyletic genus *Cymadusa*, on the other hand, is closely related to *Paragrubia* and *Ampithoe*, and it is similar to the genera *Amphithoides* and *Paradusa*. *Cymadusa* and *Paragrubia* can be distinguished from one another by the shape of the uropod 3 rami and the size of the accessory flagellum on antenna 1, respectively. Compared to the peduncle, *Cymadusa's* 3 uropod rami is wide and short. Additionally, *Cymadusa* differs from *Paradusa* in terms of the uropod's 3 rami, which are broad and short in *Cymadusa*; whereas in *Paradusa*, it is narrow (**Peart & Hughes, 2014**).

Records of the family Ampithoidae in the Red Sea were started by **Kossmann (1880)**, where only two species of the family were recorded; *Cymadusa filosa* Savigny, 1816 and *Amphithoides longicornis* Kossmann, 1880. *C. filosa* was reported again by many researchers, including **Schellenberg (1928)** during the Cambridge Expedition to the Suez Canal 1924 then by **Barnard (1965a, b), Ruffo (1969), Lyons and Myers (1990), Zeina (2012), Gabr *et al.* (2020)** and **Attallah *et al.* (2021)**.

For the first time, *Ampithoe ramondi* (Audouin, 1826) was recorded in the Red Sea by Mr. Stanley Gardiner's Expedition to the Maldives (**Walker, 1905**), and then *A. ramondi* was reported several times as mentioned in **Zeina (2012)**. On the other side, Sandro Ruffo worked on materials collected during the Israel Expedition to the southern Red Sea; he recorded *Paragrubia vorax* Chevreux, 1901 and *Sunamphitoe falsa* Barnard, 1932 for the first time and described *Paradusa bilobata* Ruffo, 1969 as a new species from the Red Sea (**Ruffo, 1969**).

Pleonexes kava (Myers, 1985) belonging to genus *Ampithoe* was described originally three centuries ago by Myers from materials collected from Viti Levu southern Pacific Ocean, Fiji. This species was first recorded from the Gulf of Aqaba, the Red Sea by **Lyons and Myers (1990)**. Then, this species was also recorded from Hurghada, the Red Sea (**Zeina, 2012**).

Hence, the present recognized Ampithoidae species that are well known so far from the Red Sea are: *Amphithoides longicornis* Kossmann, 1880; *Ampithoe ramondi* Audouin, 1826; *Cymadusa filosa* Savigny, 1816; *Paradusa bilobata* Ruffo,

1969; *Paragrubia vorax* Chevreux, 1901; *Pleonexes kava* (Myers, 1985) and *Sunamphitoe falsa* (Barnard, 1932).

The aim of the present study was to examine the Red Sea's habitats and to record all the recognized amphitoid species within the targeted habitat, as well as revising the taxonomical characters of all assigned species.

MATERIALS AND METHODS

1. Study areas and samples collection

Seven sites from north to south along the coast of the Egyptian Red Sea provided the material for this investigation. This study extended for one year beginning in summer 2019. The total distance between sites from Hurghada (1st site) to Halayeb (7th site) was about 640km long. The samples were manually obtained during SCUBA diving and snorkeling down to a depth of 35m. The research team tried to collect samples by resampling most marine habitats that are associated with marine amphipods. The position of each site was determined using GPS (Global Positioning System), dropping down locations on a satellite map, as shown in Fig (1).

A total of 285 individuals of family Ampithoidae were collected and sorted from different habitats associated with amphipods. Between 0.5 and 35m, five different depths were used to collect the sample. 0.5mm mesh nylon net bags with an internal diameter of 15x15 cm were used to manually collect samples. Each specimen was transferred into plastic box *in situ* containing 70% ethanol. The collected samples were transferred to the Microscopic Taxonomy of Aquatic Invertebrates Laboratory (MiTAIn Lab), Faculty of Science, Al-Azhar University for further investigations.

St #	Sampling Sites	Longitude E	Latitude N
I	Hurghada	33° 51' 2,88"	27° 14' 28,32"
II	Safaga	33° 56' 42"	26° 46' 30"
III	Quseer	34° 02' 16,8"	26° 33' 25,92"
IV	Abu- dabbab	34° 42' 18"	25° 23' 42"
V	Lahmy	35° 16' 30"	24° 22' 48"
VI	Shalateen	35° 29' 32,64"	23° 28' 58,08"
VII	Halayeb	36° 25' 42,24"	22° 24' 10,08"




Fig. 1. The longitude and latitude of each sampling site on the Egyptian Red Sea coast

2. Laboratory techniques

2.1. Separation of associated fauna in the collected samples

For algal habitats, the contents of the nylon bag were transferred to a 2L container; the algae were washed on a sieve of 0.5ml with tap water; this step was repeated three to five times. All fauna on the sieve were washed with 70% ethanol. Hydroids and sea-grass were achieved in the same manner. In addition to the associated amphipods on the sea-grass, branched algae and hydroids; these were removed by using forceps or a fine dissecting needle. In the case of sand and coral rubble samples, the amphipods associated fauna were extracted by captured and flotation using a 200µm net.

The isolation process of specimens was done by using the EUROMEX-RZT, Italy, Netherlands, and OPTIKA-SLX-3, dissecting stereo-microscope devices. Finally, 70% ethyl alcohol was used to preserve the isolated amphipods in another sealed scrolling plastic vial. All amphipods were isolated in a separating tray with ethanol 70% using a stereo microscope.

The Ampithoidae individuals were isolated, based on the family's characters, as reported in many previous studies (Ruffo, 1969; Conlan & Bousfield, 1982; Moore, 1984; Lyons & Myers, 1990; Barnard & karaman, 1991; Freewater & Lowry, 1994; Poore & Lowry, 1997; Peart 2007a, b; Lowry & Myers, 2009; Peart, 2017).

All examined materials were deposited in the collections of the laboratory of Microscopic Taxonomy of Aquatic Invertebrates (MiTAIn Lab) and the collection of Al-Azhar Animal Museum in Cairo.

RESULTS

Key to Genera of Family Ampithoidae from Red Sea

- | | | |
|---|--|------------------------|
| 1 | Gnathopod 1 is longer than Gnathopod 2..... | 2 |
| | Gnathopod 1 is smaller than Gnathopod 2..... | 3 |
| 2 | A well-developed molar, three narrow rami of the uropod, and a five-article accessory flagellum..... | <i>Paragrubia</i> |
| | Molar is reduced, rami of uropod 3 broad, lower lip without notches | <i>Exampithoe</i> type |
| 3 | Palm oblique, Gnathopod 1 article 6 broad | 4 |
| | Palm transverse, Gnathopod 1 article 6 narrow, mandibular palp missing... | <i>Sunampithoe</i> |
| 4 | The third uropod's outer ramus is topped by two sizable up-curved hook-spines..... | 5 |
| | The third uropod's outer ramus, each with one tiny, straight, or slightly weakly spine at the apex | <i>Amphithoides</i> |

5	Spur on the peduncle of uropod 1 is absent.....	<i>Ampithoe</i>
	Spur on the peduncle of uropod 1 is existing.....	6
6	Reduced and rounded spur on uropod 1's peduncle, and a reduced accessory flagellum.....	<i>Pleonexes</i>
	long and sharp on uropod 1's peduncle, accessory flagellum existing	7
7	Gnathopod 2 is longer and more diversified than gnathopod 1, and it has an accessory flagellum 2+articulate and a thick, highly setose mandibular palp.....	<i>Cymadusa</i>
	Gnathopods 1-2 are similar in shape and size	8
8	Gnathopods 1-2 are similar in size and shape, with accessory flagellum 1 being articulate and a thin, weakly setose mandibular palp.....	<i>Paradusa</i>
	Gnathopods 1 and 2 are similar, antenna 1 slightly longer than 2, without accessory flagellum, uropod 1 outer ramus of male transformed to ductular structure.....	<i>Biancolina</i>

Family Ampithoidae Stebbing, 1899
Genus *Amphithoides* Kossmann, 1880
***Amphithoides longicornis* Kossmann, 1880**

Amphithoides longicornis Kossmann, 1880: 135. – Stebbing, 1906: 645. – Barnard, 1969: 143. – Barnard & Karaman, 1991: 100. – Poore & Lowry, 1997: 898. – Peart, 2014: 886.

Type species: *Amphithoides longicornis* Kossmann, 1880, by original designation of German Expedition to The Red Sea coastal areas.

Examined material: No materials have been collected during our sampling scheme.

Generic characters: Antenna 2 has articulated accessory flagella. A well-developed mandibular molar is present; it has 3 articles, which is thin; article 3 is smooth distally. Maxilla 2 has established palp. Gnathopod 1 is smaller than gnathopod 2. Merus is not anteriorly enlarged; the basis of pereopods 3 and 4 are thin. They have simple pereopods from 5 to 7 while, in pereopods from 6 to 7 the propodus are sub-rectangular, and the distal articles are thin. Small acute distoventral tooth is found on epimeron 3. In uropods 1, *in situ* reaches the apices of uropod 2 rami. Moreover, its peduncle has a long, acute distoventral spur, and the setal fringe is absent. The lateral setal fringe and laterodistal protrusion of the uropod 2 peduncle are missing. Uropod 3 has a robust seta on the outer ramus, while both denticles and lateral setal fringe are missing. Additionally, it has 2 small rami, one of them is reduced re-curved, while the other one is straight. The telson is sub-triangular; cusps, denticles and apical setae are absent.

Diagnosis: The following characteristics set of *Amphithoides* Kossmann, 1880 apart from its congeners are as follows: The mandible has a palp; antenna 1 has an accessory

flagellum, and gnathopods are large and sub-chelate. While, gnathopod 2 is equal to or larger than gnathopod 1. Article 6 of pereopods from 3 to 5 is not apically expanded, and the telson is flat and unarmed.

Remarks: The closest species to *Paragrubia* is *Amphithoides*, which is identical to the other amphithoids. Both *Amphithoides* and *Paragrubia* are similar in the design of the uropod 3 rami and the distal setae on the outer ramus of the uropod 3. Also, *Paragrubia* and *Amphithoides* have narrow uropod 3 rami and reduced non-curved distal robust setae on the outer ramus of uropod 3; whereas in the other amphithoids, broad uropod 3 rami and significantly recurved distal robust setae are present. *Amphithoides* and *Paragrubia* are related to *Cymadusa* and genus *Paradusa*. There is an accessory flagellum on antenna 1 of each member of these four families. Some *Cymadusa*, *Paragrubia* and *Amphithoides* species have a tooth on the posteroventral corner of epimeron 3.

Distribution: Red Sea and Western Indian Ocean.

Genus *Ampithoe* Leach, 1814

***Ampithoe ramondi* Audouin, 1826**

Ampithoe ramondi Audouin, 1826: 93. Krapp-Schickel, 1978: 1, (Figs 1-2). Myers, 1985b: 27, fig. 17. Myers, 1986b: 1381.

Ampithoe ramondi Ruffo, 1938: 171-172. Ruffo, 1959: 19. Ruffo 1969: 56-57.

Ampithoe erythraea Kossman, 1880: p. 134. pl. 44 (Figs. 12, 13).

Ampithoe vaillanti Stebbing, 1906: 639.

Ampithoe vaillanti: K.H. Barnard, 1916.

Ampithoe ramondi: J.L. Barnard, 1970 and – Lyons & Myers 1990.

Type locality: Egypt.

Examined material: 54 mature ♂♂ and 10 mature ♀♀, was collected from Hurghada, Safaga, Lahmy and Shalateen areas at intertidal macro-algae (*Laurencia obtusa*, *Palisada Perforata* and *Padina Pavonica*) during the study period.

Generic characters: *Ampithoe* is a genus with antennae that are of varying lengths, frequently sub-equal or with one longer than the other, no accessory flagellum, well-developed mandibular molars, and a three-articulated palp. With a notch on the outer plate, the inner lobe of the lower lip is shorter than the outer lobe. Gnathopod 1 is smaller than Gnathopod 2 in size. In pereopods, 3 and 4 both the base and the anterior merus are narrow. Pereopods from 5 to 7 are simple. The Propodus of pereopods 6, 7 and 8 are sub-rectangular in shape and have thin distal articles. While, in epimeron 3 the distoventral tooth is absent, Uropod 1 lacks a distoventral spur. Uropod 2 has no latero-distal projection. The outer ramus of the uropod 3 has two large, strong and recurved setae. The telson is subtriangular and the cusps are small; and there are no denticles.

Diagnosis: The followings are the characteristics set of *Ampithoe ramondi* apart from the other congeners: The propodus of pereopods from 5 to 7 bears a simple spine. The uropod 1 peduncular spur is absent, the bases and meri of pereopods 3 and 4 are

narrow. While, pereopods from 5 to 7 are simple. The flagellum of antenna 2 is longer than peduncular article 5. The propodus of gnathopod 2 in male, the tooth on the posterior margin is separated by a U-shaped excavation.

Remarks: The genus *Ampithoe* is complicated. *Ampithoe* is one of the largest genus of ampithoid; it is paraphyletic according to previous studies. *Pleonexes*, which was earlier regarded as a junior synonym of *Ampithoe*, is now treated separately as a genus.

Habitat: The species lives among seaweed, residing alongside red, green and brown algae as well as a tropical coral reef.

Distribution:

Red Sea: The Gulf of Aqaba ((**Ruffo, 1959; Lyons & Myers, 1990**), Suez Canal (**Schellenberg, 1928**) and Hurghada (**Zeina, 2012**).

Globally: The Mediterranean (**Krapp-Schickel, 1978**) and the central Pacific (**Myers, 1985b, 1986b**).

Genus *Biancolina* Della Valle, 1893
***Biancolina* sp. (New recorded genus)**

Generic characters: In antenna 1, the peduncular article 1 is spherically, somewhat or significantly longer than antenna 2, and the accessory flagellum is absent. No gland cone on antenna 2. Labrum that is emarginate or slightly rounded. The mandibles are stoutness and lack both molars and palps also, the spine row is weak or absent. The presence of lacinia mobilis are found on either the left or the right side. Gnathopods 1 and 2 are parachelate, feeble and similar. The pereopods from 3 and 4 are similar, glandular and have a broad article 2 like pereopods from 5 to 7. The periospods from 5 to 7 have prehensile, articles 5 and 6 are elongate and have a posterior lobe on article 2. In male uropod 1, the outer ramus has grown into a ductular structure and has a strong peduncle with long plumose setae along the lateral margin. The peduncle of rami is short and clavate with setae in its apices. While, in uropod 3 has two apical spines on the outer ramus. The telson is not strongly fleshy, and not cleft to one-third of its length.

Examined material: 10 mature ♂♂, 13 mature ♀♀ were collected from all study sites except Shalateen from intertidal and shallow sub-tidal depths among sandy areas.

Habitat: Lives on the algal hold-fast and sandy substrates.

Genus *Cymadusa* Savigny, 1816

Genus character: Antenna 1 is longer than antenna 2. In antennal, an accessory flagellum has one to two articles. The mandibular palp consists of 3 articles. The outer lobe of the lower lip has a notch. Gnathopod 1 is smaller than or equal to gnathopod 2. Propodal palm of gnathopod is acute. The pereopods 3 and 4, both the basis and the non-glandular merus, are quite small. In epimeron 3, the distoventral tooth may be found or not. Distoventral spur is long and sharp on uropod 1. The uropod's peduncle 2 has a setal fringe, and without later-distal protrusion. Broad and short rami present in the uropod 3.

In uropod 3, the outer ramus has two robust and recurved setae. The telson is sub-triangular in shape, has small cusps, and no denticles.

Red Sea species composition: *Cymadusa* contains 2 species: *C. filosa* Savigny, 1816 and *C. setosa* (Haswell, 1879).

Key to species of *Cymadusa* from the Red Sea

In the male, gnathopod 2's midpalmar tooth is missing, and antenna 2 is smaller than antenna 1.....	<i>C. filosa</i>
Antenna 2 on Gnathopod 2 is shorter than antenna 1 in the male, and it has a midpalmar tooth.....	<i>C. setosa</i>

Cymadusa filosa Savigny, 1816

- *Cymadusa filosa* Savigny, 1816: 51, 109, pl. IV, Figure 1a, b, e, i, o, u. – **Monod, 1971**: 176–184, Figures 66–78. – **Krapp-Schickel, 1982**: 106–108, Figs. (71, 72), key. – **Ledoyer, 1982**: 130–135, Figs. (44–46). – **Ledoyer, 1984**: 15–18, Figs. (5, 6). – **Lyons & Myers, 1990**: 1203, Figs. (7, 8).
- *Ampithoe filosa* **Audouin, 1826**: pt 4: 93, pl. XI, Figs. (4, 5).
- *Grubia hirsuta* **Chevreaux, 1900**: 95–101, Figs. (1–5). – **Chevreaux & Fage, 1925**: 339–340, Fig. (347). – **Schellenberg, 1925**: 186–187.
- *Grubia coei* **Kunkel, 1910**: 97, Fig. (38).
- *Grubia filosa*: **Ruffo, 1938**: 147, 172. – **Ruffo, 1947**: 169–173, Figs. (1–3). – **Ruffo, 1959**: 19. – **Ruffo, 1969**: 62–63. – **Oliveira, 1953**: 358–364, Figs. (22, 23).
- *Grubia sardenta* **Oliveira, 1953**: 365, pls 25, 26.
- *Cymadusa sardenta* **Sivaprakasam, 1970**: 153–156, Fig. (13).

Type locality: Sardinia, the Mediterranean Sea.

Diagnosis: The following characteristics set of *Cymadusa filosa* apart from other cognures: Accessory flagellum of antenna 2 has 1 article. Gnathopod 1 is smaller than gnathopod 2. In case of gnathopod 1, the propodal palm has a posterodistal defining tooth that is tiny and acute, the mid-palmar tooth does not exist, and the dactylus is sub-equal to the palm. Both gnathopodos 1 and 2 have densely setose edges. The distoventral spur on the uropod 1 peduncle is long and sharp. Uropod 3 has 2 rami both of them are broad and short. The outer ramus of uropod 3 has two sizable, strong and recurved setae.

Examined material: 143 mature ♂♂ and 8 mature ♀♀ were collected from Hurghada, Safaga, Quseer, Lahmy, Halayeb and Shalateen at intertidal macro-algae (*Palisda perforate*; *Galaxaura* sp.; *Dichotomaria obtusata*; *Padina pavonica*; *Cystosera crinite*; *Digenea simplex*; *Laurencia obtuse*; *Turbinaria triquetra*; *Hydroclathrus clathratus* and *Dictyota dichotoma*).

Remarks: The paraphyletic genus *Cymadusa* is similar to *Ampithoides*, *Paradusa*, *Paragrubia* and *Amphithoe*. The design of the uropod 3 rami and the length of the accessory flagellum on antenna 1 are used to differentiate between *Cymadusa* and *Paragrubia*. For the uropod 3 rami in *Cymadusa* and *Amphithoides*, they are short and

broad (relative to the peduncle) in *Cymadusa* and long and narrow (relative to the peduncle) in *Amphithoides*. The mandibular palp is thin in *Paradusa* and thick in *Cymadusa*.

Habitat: This species is widespread on several types of algae and is typically present in a variety of substrates. Additionally, this species was non-selective and more prevalent on *Turbinaria triquetra* Lamouroux, 1825, *Sargassum latifolium* Agardh, 1820, and *Colpomenia sinuosa* (Derbès & Solier, 1851).

Distribution:

Red Sea: The Gulf of Aqaba (Lyons & Myers 1990), Suez Canal (Schellenberg, 1928), the Gulf of Aqaba, Sinai Peninsula coasts and general Egyptian Red Sea coasts (Ruffo, 1959) and Hurghada (Zeina, 2012).

Globally: extends to the Indian Ocean (Madagascar) and the Pacific Ocean (New Caledonia). Madagascar (Ledoyer, 1982); India (Sivaprakasam, 1970); Mauritius (Appadoo & Myers, 2004); South China Sea (Ren, 2001); New Caledonia (Ledoyer, 1984) and Bermuda (Kunkel, 1910).

***Cymadusa setosa* (Haswell, 1879) new record**

Ampithoe setosa Haswell, 1879: 338.

Grubia setosa: Stebbing, 1906: 644.

Grubia compta: Pearse, 1912: 376, Figure 6.

Amphithoides compta: Stebbing, 1906: 645.

Cymadusa compta: Bousfield, 1973: 182–183, pl. LV.2. – Nelson, 1980 (ecology).

Grubia filosa: Schellenberg, 1928: 666, Fig. (206). – K.H. Barnard, 1937: 171–172. – Shoemaker, 1935: 245–249, Figs. (4, 5).

Cymadusa filosa: J. L. Barnard, 1955: 29–30, Fig. (15) (with references). – J.L. Barnard, 1965: 3 (key). – Rabindranath, 1972: 173–175, Figs. (8, 9). – Griffiths, 1973: 277–278. – Griffiths, 1974a: 225. – Griffiths, 1974b: 274. – Griffiths, 1975: 106. – Griffiths, 1976: 25 (key). – Ledoyer, 1984: 15–18, Figs. (5, 6) (Group II *setose*).

Type locality: Kurnell, Botany Bay, New South Wales, Australia.

Examined material: 12 mature ♂♂ were collected from Safaga at intertidal macro-algae (*Galaxaura* sp.) during the study period.

Diagnosis: The following features distinguish *Cymadusa setosa* from its congeners: Antenna 1 has a two-articulated accessory flagellum and is equivalent to antenna 2. Antenna 2 has a peduncle with strongly setose margins. Gnathopod 1 is longer and thinner with less setose than gnathopod 2. In gnathopod 2 has highly setose margins, and the propodal palm has a distinctive posterodistal, small, sub-acute tooth as well as a sub-quadrate mid-palmar tooth. The shortened telson has lateral setae, apical cusps, and apical slender setae grouped in oblique rows.

Remarks: The most morphologically similar species to *Cymadusa setosa* is *Cymadusa filosa*. In both species the gnathopod 1 is elongated and the merus is long with acute antero-ventral lobe. Additionally, both gnathopod 2 of the two species are similar in shape. The two species are different in the following characters: Male *C. setosa* has

antennae 1 and 2 that are roughly equal in length; whereas in male *C. filose*, antennae 1 is longer than 2. In *C. setosa*, the male mandibular palp is strongly setose, with three to five setae on article 2 and 20 setae on article 3 (instead of two setae on article 2 and 11 on article 3 in case of *C. filosa*). The first maxilla inner plate is more setose with 11 setae in *C. Setosa*, whereas in *C. Filosa* with six setae; 1.4 is the length of the coxa. The male gnathopod 2 propodal palm has a large, wide sub-quadrate mid-palmar tooth in *C. Setosa*; while in *C. Filosa*, there is no mid-palmar tooth. The male gnathopod 1 basis is twice the length of the coxa in *C. Setosa*; while in *C. Filosa*, it is 1.4×the length of the coxa. The margins of the basis are only lightly fringed in *C. Setosa*, but in *C. Filosa*, they have long plumose and thick fringe.

Habitat: In shallow water, *Cymadusa setosa* is found on brown algae, particularly *Sargassum* sp. (Agardh, 1820).

Distribution

Red Sea: New record to the Red Sea, Safaga.

Globally: Florida, the United States; Puerto Rico, the Caribbean Sea; the Hawaiian Islands and New Caledonia, the Pacific Ocean; Botany Bay, New South Wales, Australia; and the southern tip of India, the Indian Ocean.

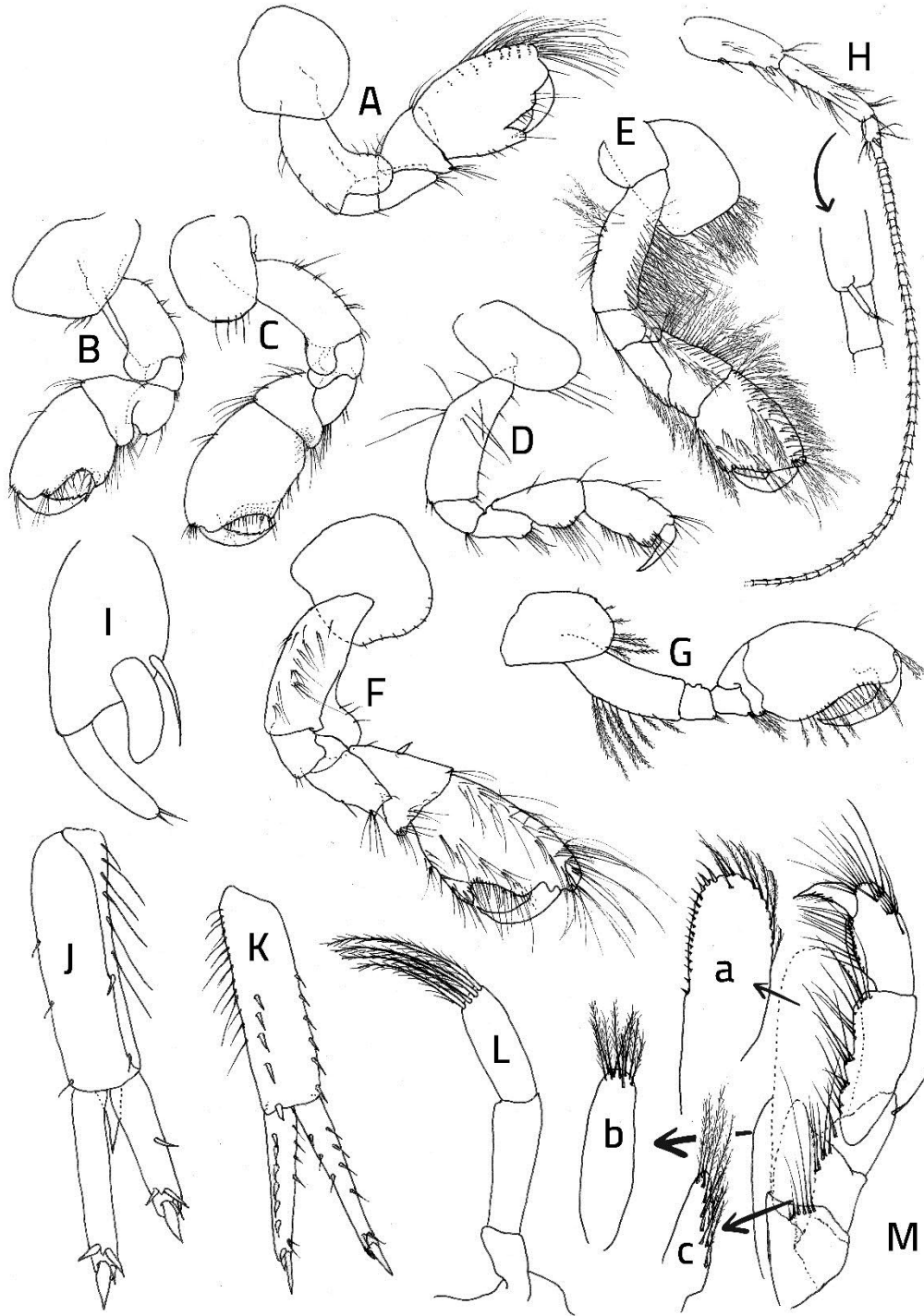


Fig. 2. Ampithoidae: *Ampithoe* Leach, 1814, **F&K** modified after Lyons and Myers, 1990; *Biancolina* Della Valle, 1893, **I** modified after Barnard and Karaman, 1991; *Cymadusa* Savigny, 1816, **H&E** modified after Peart, 2004; *Paradusa* Ruffo, 1969, **B** and **C** modified after Ruffo, 1969; *Paragrubia* Chevreux, 1901, **M**, **a**, **b** & **c** modified after Zeina, 2012; *Pleonexes* Spence Bate, 1857, **A&J** modified after Myers, 1985; *Sunamphitoe* Bate, 1857, **D**, **L**&**G** modified after Ruffo, 1969.

Genus *Paradusa* Ruffo, 1969
***Paradusa bilobata* Ruffo, 1969**

Paradusa bilobata Ruffo, 1969: 63, Fig. 21-23

Type locality: Egypt.

Examined material: 2 mature ♂♂ were collected from Quseer at intertidal macro-algae during the study period.

Generic characters: Antenna 1 is longer than antenna 2, both of them are thin with scale-like accessory flagellums. Normal mandible palp is extremely thin and weak. Article 3 of mandible is recto-linear, nearly as long as article 2. Gnathopods 1 and 2 are similar, equal in size and enormous. Gnathopod 2 is slightly larger than gnathopod 1, especially in article 6, and both sub-chelate and palms are oblique. Article 5 of both gnathopods is extremely short and lobed and shorter than article 6. Pereopods from 3 to 4 are common and similar. The pereopods from 5 to 7 are dissimilar to each other and long. While, the pereopods from 6 to 7 have a slender and unlobed article 2. The pereopod 5 is slightly prehensile and shorter, and has a bigger article 2 than pereopods from 6 to 7. The dactyl of the pereopods from 5 to 7 is short and bended. In uropod 1, the setal border is reduced or absent, and the distoventral spur is broad and sharp. The position of uropod 1 reaches the rami's apices of uropod 2. The peduncle of uropod 2 doesn't have both setal border and laterodistal projection. The outer ramus of uropod 3 has strong setae and large broad rami. Lateral denticles and lateral setal fringe of uropod 3 are missing. The telson is sub-triangular, with small cusps, and the denticles are absent.

Diagnosis: *Paradusa bilobata* Ruffo can be distinguished from the other congeners by the followings: Antenna 1 is longer than antenna 2. Accessory flagellum of antenna 1 is vestigial and contains only one article and is provided at its apex by 3 very elongated bristles. In gnathopodo 2, a lobate process is found on the distal external margine of the ischium. The dorsal edge of the carpus and propodus of gnathopod 2 is remarkably hairy (pilipes).

Remarks: **Barnard and Karaman (1991)** elucidated that, there are three features that separate *Cymadusa* from *Paradusa*: The I-articulate accessory flagellum of antenna 1, the weak mandibular palp, and gnathopods 1 and 2 in both sexes are similar in size and structure. *Paradusa* can be differentiated from *Ampithoe*; the peduncular process in the uropod 1 is long and pointed; whereas in *ampithoe*, it is short, blunt and maybe absent. In addition, in *ampithoe*, the I-articulate accessory flagellum of antennal 1 is unclear.

Habitat: Marine

Distribution:

Red Sea: Entedebir **Ruffo, 1969.**

Globally: Indo-Pacific from New Caledonia.

Genus: *Paragrubia* Chevreux, 1901*Paragrubia vorax* Chevreux, 1901

Paragrubia vorax **Chevreux, 1901**: 427–431, Figs. (50–55). – **Walker, 1905**: 930. – **Walker, 1909**: 343. – **Schellenberg, 1938**: 90. – **Ruffo, 1938**: 173–174, Fig. v. – **Ruffo, 1969**: 63. – **J.L. Barnard, 1955**: 31–34, Fig. (17) (with references). – **J.L. Barnard, 1970**: 61, Fig. (32). – **Griffiths, 1973**: 278, Fig. 5. – **Griffiths, 1976**: 25 (key). – **Ledoyer, 1967**: 135, Fig. (23). – **Ledoyer, 1982**: 138–140, Fig. (48). – **Myers, 1986a**: 287. – **Myers, 1989**: 66. – **Myers, 1990**: 153. – **Myers, 1995a**: 38. – **Myers, 1997**: 108. – **Appadoo & Steele, 1998**: 639. – **Appadoo & Myers, 2004**: 347–348. – **Ren, 2001**: 72. – **Ren, 2006**: 232–234, Fig. (89).

Not *Paragrubia vorax* **Myers, 1985**: 33, Figs. (24–25). – **Ren, 2006** (accepted as *P. latipoda*)

Type locality: Mahe, Seychelle Islands, Indian Ocean.

Examined material: 1 mature ♂ was collected from Hurghada at intertidal macro-algae during the study period.

Generic characters: Antenna 2 is smaller than antenna 1, both are thin, and there is a 5-articulated accessory flagellum. Maxilla 1 palp is fully formed. The size of gnathopods 1 is greater than or equal to gnathopod 2. The basis of pereopods from 3 to 4 is narrow. And their Merus are not anteriorly enlarged. The pereopods from 5 to 7 are simple. Epimeron 3 has small acute distoventral tooth. Uropods 1 *in situ* reach the apices of uropod 2 rami. In addition, its peduncle has a long, acute distoventral spur, and the setal fringe is absent. The peduncle of uropod 2 lacks both laterodistal projection and setal fringe. Rami of uropod 3 are thin, and both the lateral setal fringe and denticles are missing. The telson is sub-triangular and has short cusps; the denticles are absent, and setae are arranged in medial oblique rows.

Remarks: *Cymadusa* and *Amphithoides* are similar to *Paragrubia*. In the family Ampithoidae, these three genera are basal. One of the distinguishing features that differentiate between *Paragrubia* and *Cymadusa* is the large size of gnathopod 1, compared to gnathopod 2. In addition, the multi-articulate accessory flagellum is 5, while, the outer rami setae of the uropod 3 are reduced and bended. Furthermore, the notch found of the outer plate in the lower lip is equal in size.

Habitat: The specimens were collected from sub-tidal areas and are usually found in high densities on about 18 species of brown, red, and green algae, such as *Colpomenia sinuosa* and *Palisada perforata*.

Distribution:

Red Sea: Hurghada **Ruffo (1969)**.

Globally: Indo-Pacific warm waters: Madagascar (**Ledoyer, 1967**), Seychelles Islands (**Chevreux, 1901**), Maldive and Laccadive Archipelagoes (**Walker, 1905**), Island Fiji (**Schellenberg, 1938**), Hawaii Island (**Barnard, 1955**), Caroline Island (**Barnard, 1965**), southern Africa (**Griffiths, 1973, 1976**); South China Sea (**Ren, 2001, 2006**), Society Island (**Myers, 1989**); Kosrae: Micronesia (**Myers, 1995b**); Cook Islands (**Myers, 1990**); Tonga (**Myers, 1986b**); Western Samoa (**Myers, 1997**).

Genus *Pleonexes* Spence Bate, 1857
***Pleonexes Kava* Myers, 1985**

Ampithoe ramondi J.L. Barnard, 1970, p. 50, Figs. (18, 19). – Ledoyer, 1984, p. 13, Fig. (4). – Lowry, 2007, p. 282 (checklist).

Ampithoe kava Myers, 1985, pp. 21–22, Fig. (15).

Ampithoe kava Myers, 1986b. – Lyons & Myers, 1990, p. 1200, Figs. (3, 4). – Poore & Lowry, 1997, p. 909, Figs. (6–9). – Myers, 1997. – Lowry & Stoddart, 2003, p. 60 (catalogue). – Appadoo & Myers, 2004, p. 333 (key). – Peart, 2007b: 42–44, Figs. (30, 31) (key). – Hughes & Lowry, 2009, pp. 161–164, Figs. (5, 6).

Type locality: Taunovo Bay, Viti Levu, Fiji.

Examined material: 47 mature ♂♂ and 6 mature ♀♀ were collected from Hurghada, Safaga, Quseer, Lahmy and Halayeeb areas at intertidal macro-algae (*Palisda perforata*, *Galaxaura* sp, *Dichotomaria obtusata*, *Halimeda macroloba*, *Laurencia obtuse* and *Dictyota dichotoma*).

Generic characters: The flagellum of antenna 1 is missing. Well-developed mandibular molars with three-articulated palp are observed. Gnathopod 2 is greater than gnathopod 1. Merus has a small anterior expansion. The basis of pereopods from 3 to 4 is slightly enlarged. Pereopods from 5 to 7 are prehensile. Pereopods from 6 to 7 has sub-rectangular propodus with slender distal articles. The distoventral tooth of epimerons 3 is absent. Uropod 1 in males has a shortened and rounded distoventral spur. While, the spur in females is absent. In uropod 2 laterodistal protrusion is absent. Uropod 3 has broad rami in which the outer ramus has two large and strong setae at the distal end. The denticles are present in uropod 3. The setal fringe is missing in uropod 3. The telson is sub-triangular in shape; it has small cusps and no denticles.

Diagnosis: The flagellum of antenna 2 is shorter than peduncular article 5. The propodus of gnathopod 2 in male, the tooth on the posterior margin is separated by a V-shaped excavation. The propodus of pereopods from 5 to 7 bears a recurved, striate and palmar locking spine. The uropod 1 peduncular spur is rounded and reduced. These features distinguish *Pleonexes Kava* from its congeners.

Remarks: Previously, *Pleonexes* was regarded as *Ampithoe*'s junior synonym. Rounded and reduced spur in peduncule of uropod 1 are present. The telsonic cusps are large. The pereopods from 3 and 4 have both expanded bases and meri. The pereopods from 5 to 7 are prehensile. These characters separate it from *Ampithoe*.

Habitat: Found in red alga, seagrass, coral rubble, sponges, branching coral *Pocillopora* sp. Linnaeus (1758), green calcareous alga *Halimeda* sp. Lamouroux (1825), brown algae *Turbinaria* sp. Lamouroux (1825), and *Sargassum* sp. Agardh (1820).

Distribution:

Red Sea: The Gulf of Aqaba, (Lyons & Myers 1990), Hurghada (Zeina, 2012).

Globally: Fiji (Myers, 1985a). Tonga (Myers, 1986a). Western Samoa (Myers, 1997). Hawaii (Barnard, 1970). Australia: Great Barrier Reef; Port Jackson (Hughes & Lowry, 2009; Poore & Lowry 1997; Peart 2007b). New Caledonia (Ledoyer, 1984).

Indian Ocean: Mauritius (**Appadoo & Myers, 2004**); Cocos (Keeling) Islands. Australia. Western Australia: Kimberley. Queensland: Magnetic Island.

Genus *Sunamphitoe* Bate, 1857
***Sunamphitoe falsa* (K.H. Barnard, 1932)**

Ampithoe brevipes **K. H. Barnard, 1916**: (nec DANA), pp. 255-256, tav. xxvvn, fig. 34.

Ampithoe Falsa **K. H. Barnard, 1932**: p. 340.

Ampithoe Falsa **K. H. Barnard, 1937**: pp. 170-171, fig. 16.

Ampithoe Falsa **K. H. Barnard, 1940**: p. 480.

Type locality: Buffel's Bay (False Bay).

Examined material: No materials have been collected during our sampling scheme.

Generic characters: Antenna 2 is smaller than antenna 1. No accessory flagellum. Normal mandible palp may be missed or consists of three-segments. If present, the segment of number 3 is stout and smooth distally. Gnathopods 1 and 2 are varied, in which, gnathopod 2 is significantly larger than 1. Expanded pereopods from 3 to 4. Simple pereopods from 5 to 7. Propodus of pereopods from 6 and 7 are sub-rectangular and distal articles range from being thin to very broad. In epimeron 3, the ventral tooth is absent. Peduncle of uropod 1 possesses a long and sharp distoventral spur. The peduncle of uropod 1 reaches the apices of rami on uropod 2. The setal fringe may be present or absent in uropod 1. Peduncle of uropod 2 doesn't have either setal edge or laterodistal projection. Uropod 3 has broad rami and two huge, robust and recurved setae. Both distal setae and denticles may be present or absent. The telson is sub-triangular, with short cusps. No denticles and lateral setae are found.

Diagnosis: Antenna 1 is remarkably longer than the half of the body. Besides, the first and second articles of the peduncle are almost equal, while the third article is considerably shorter than the first. Furthermore, the fifth peduncle article is slightly longer than the fourth. Antenna 2 is nearly half the length of antenna 1. The outer lobe of the maxillipeds extends to the half of the distal article of the palp. Besides, it has six long bristles emerging from deep indentations of the margin. While, on the inner edge of the maxillipeds, a series of a short flattened spines on the apices are setose, while the distal spines are serrated on both sides. The branches of the uropods of the first and second pairs are clearly unequal. The telson is sub-triangular, distally provided with two groups of bristles and a pair of groups of short bristles on each side.

Remarks: *Macropisthopous* and *Ampithoe* are morphologically related to *Sunamphitoe*. *Sunamphitoe* differs from *Macropisthopous* by having simple pereopods from 5 to 7; while in the case of *Macropisthopous*, it is prehensile. Whereas, the peduncle of the uropod 1 is long with pointed spur in *sunamphithoe*. The features that differ *Sunamphitoe* from *Ampithoe* is the presence of a transverse palm of gnathopod 1. Additionally, the bases of pereopods from 3 to 4 are elongated, and a long acute spur on the peduncle of uropod 1 is noticed. In *Sunamphitoe*, the mandibular palp may exist with three segments or may be missing. Originally, the mandibular palp's presence or absence was used to distinguish between *Sunamphitoe* and *Peramphithoe*.

Distribution:

Red Sea: David Bay, Entedebir (**Ruffo, 1969**).

Globally: The Central Arabian Sea and the Gulf of Aden (**Barnard, 1937**), the coasts of South Africa (**Barnard, 1916 & 1940**).

CONCLUSION

Family Ampithoidae in the Red Sea is represented by nine species: *Amphithoides longicornis* **Kossmann, 1880**, *Ampithoe Ramondi* **Audouin, 1826**, *Biancolina* sp., *Cymadusa filosa* **Savigny, 1816**, *Cymadusa setosa* (**Haswell, 1879**), *Paragrubia vorax* **Chevreaux, 1901**, *Paradusa bilobata* **Ruffo, 1969**, *Pleonexes kava* (**Myers, 1985**), and *Sunamphitoe falsa* (**K.H. Barnard, 1932**).

ACKNOWLEDGEMENTS

The Academy of Scientific Research and Technology (ASRT), the Science, Technology, and Innovation Funding Authority (STIFA), project number 30198/2019, and the Egyptian government have all provided financial support for this work. Additionally, we would like to express our gratitude to the sampling crew, Ahmed Nofal for his kind efforts in sample collecting, and the anonymous referees for their insightful criticism, which allowed us to enhance the quality of the text.

REFERENCES

- Agardh, C.A. (1820).** *Species Algarum* rite cognitae, cum synonymis, differentiis specificis et descriptionibus succinctis. Volumen primum. Pars prima. Pp. [i-iv], [1]-168. Lundae [Lund]: ex officinal Berlingiana.
- Appadoo, C. and Myers, A.A. (2004).** Corophiidea (Crustacea: Amphipoda) from Mauritius. *Records of the Australian Museum*, **56**(3): 331-362.
- Appadoo, C. and Steele, D.H. (1998).** Shallow-water marine gammaridean amphipods of Mauritius Island. *Crustaceana*, **71**: 633–645.
- Attallah, M.A.; Hellal, A.; Abdelrazek, F.; Abdel-Gaid, S.E.; Gabr, M.KH. and Zeina, A. (2021).** Soft-bottom exploration of assemblage patterns of the Red Sea amphipods at multiple spatial and vertical scales. *The Egyptian Journal of Aquatic Research*, **47**(4): 365 – 371.
- Audouin, V. (1826).** Explication sommaire des planches de Crustacés de l'Égypte et de la Syrie, publiées par Jules-César Savigny, Membre de l'Institut; offrant un exposé des caractères naturels des genres, avec la distinction des espèces. *Histoire naturelle*, **1**(4): 77-98.
- Barnard, J.L. (1965a).** Marine Amphipoda of the family Ampithoidae from Southern California. *Proc. U.S. nat. Mus.*, **118** (3522): 1-46.
- Barnard, J.L. (1965b).** Marine Amphipoda of atolls in Micronesia. *6W.*, **117** (3516): 459-552.
- Barnard, J.L. (1969a).** A Biological Survey of Bahia de Los Angeles, Gulf of California, Mexico, IV. Benthic Amphipoda. *Trans. San Diego Soc. nat. Hist.*, **15**: 175-2
- Barnard, J.L. (1969b).** Gammaridean Amphipoda of the Rocky Intertidal of California: Monterey Bay to La Jolla. *Bull. U.S. Mt. Mus.*, **258**: 1-230.

-
- Barnard, J.L. (1969c).** The families and genera of marine gammaridean Amphipoda. Bulletin of the United States National Museum., **271**: 1–535.
- Barnard, J.L. (1970).** Sublittoral Gammaridea (Amphipoda) of the Hawaiian Islands. Smithsonian Contributions to Zoology, **34**: 1–286.
- Barnard, J.L. and Karaman, G.S. (1991).** The families and genera of marine gammaridean Amphipoda (except marine gammaroids). Records of the Australian Museum, **13**: 1–866
- Barnard, K.H. (1916).** Contributions to the crustacean fauna of South Africa. Annals of the South African Museum, **15**: 105-302.
- Barnard, K.H. (1932).** Amphipoda. Discovery Reports 5: 1-326. Berge, J., G. Boxshall, and W. Vader. 2001. Phylogenetic analysis of the Amphipoda, with special emphasis on the origin of the Stegocephalidae. Polskie Archiwum Hydrobiologii., **47**: 379-400.
- Barnard, K.H. (1937).** Amphipoda. Sci Rep John Murray Expedition, **4**: 131–201.
- Barnard, K.H. (1940).** Contributions to the crustacean fauna of South Africa, 12 i Further additions to the Tanaidacea, Isopoda and Amphipoda, together with keys for the identification of the recorded marine and freshwater species. Ann. S. Afr. Mus., **32**: 381-543.
- Barnard, J. L. (1955).** Notes on the amphipod genus *Aruga* with the description of a new species. Bulletin of the Southern California Academy of Science, **54**: 97–103.
- Bate, C. S. (1856).** On the British Edriophthalma. In Report of the twenty-fifth Meeting of the British Association for the Advancement of Science, **1855**: 18-62.
- Bate, C.S. (1857).** XII- A synopsis of the British edriophthalmous Crustacea —Part. 1. Amphipoda. Annals and Magazine of Natural History, **19**(110): 135-152.
- Bate, C.S. (1858).** XXXV- On some new genera and species of Crustacea Amphipoda, Annals and Magazine of Natural History, **1**(5): 361-362.
- Bousfield, E.L. (1973).** Shallow-water gammaridean Amphipoda of New England. Cornell University Press, Ithaca, NY, 312 pp.
- Bousfield, E.L. (1982).** Gammaridea: Amphithoidae in Parker, S.B. ed. Synopsis and Classification of Living Organisms. Vol. II. McGraw-Hill, New York, pp. 254-285.
- Chevreaux, E. (1901).** Mission scientifique de M. Ch. Alluaud aux Iles Séchelles (Mars, Avril, Mai 1892). Crustacés amphipodes. Mem Acad Sci Inst Fr., **14**: 388–438.
- Chevreaux, E. and Fage, L. (1925).** Amphipodes. Faun Fr., **9**:1–488.
- Conlan, K.E. (1982).** Revision of the gammaridean amphipod family Ampithoidae using numerical analytical methods. Canadian Journal of Zoology, **60**(8): 2015-2027.
- Conlan, K.E. and Bousfield, E.L. (1982).** The amphipod superfamily Corophioidea in the Northeastern Pacific region. Family Ampithoidae: Systematics and distributional ecology. Publ. Biol. Oceanogr., Nat. Mus. Canada, **10**: 41-75.
- Della Valle, A. (1893).** Gammarini del Golfo di Napoli. -Fauna und Flora des Golfes von Neapel und der angrenzenden Meeres-Abschnitte., Monographie, **20** (i-xi): 1-948.
- Freewater, P. and Lowry, J. K. (1994).** *Sunamphitoe graxon*, sp. nov. (Crustacea: Amphipoda: Ampithoidae): First record of the genus in Australian waters. Invertebrate Systematics, **8**(3): 675-682.

- Gabr, M.KH., A.F. Zeina, and Hellal A.M. (2020):** Influence of algal architecture and shore exposure on population dynamics of marine amphipods at Ras Mohamed Protectorate. *Egyptian Journal of Aquatic Biology & Fisheries*, **24**(6): 59 – 72.
- Griffiths, C.L. (1973).** The Amphipoda of southern Africa. Part 1. The Gammaridea and Caprellidea of southern Moçambique. *Annals of the South African Museum*, **60**(10), 265–306.
- Griffiths, C.L. (1974).** The Amphipoda of southern Africa. Part 2. The Gammaridea and Caprellidea of South West Africa south of 20°S. *Annals of the South African Museum*, **62**(6): 169–208.
- Griffiths, C.L. (1974a).** The Amphipoda of southern Africa. Part 3. The Gammaridea and Caprellidea of Natal. *Annals of the South African Museum*, **62**(7): 209–264.
- Griffiths, C.L. (1974b).** The Amphipoda of southern Africa. Part 4. The Gammaridea and Caprellidea of the Cape Province east of Cape Agulhas. *Annals of the South African Museum*, **65**(9): 251–336.
- Griffiths, C.L. (1975).** The Amphipoda of southern Africa. Part 5. The Gammaridea and Caprellidea of the Cape Province west of Cape Agulhas. *Annals of the South African Museum*, **67**(5): 91–181.
- Griffiths, C.L. (1976).** Guide to the Benthic Marine Amphipods of Southern Africa. Cape Town, Trustees, South African Museum. 106 pp.
- Gur'janova, E.F. (1951).** Bokoplavy Morej SSSR i Sopredel'nykh Vod (Amphipoda-Gammaridea) [Amphipods of the seas of the USSR and adjacent waters (Amphipoda, Gammaridea)]. *Opredeliteli po Faune SSSR [Identification of Fauna USSR, 41: 1-1031.*
- Haswell, W.A. (1879).** On Australian Amphipoda. *Proceedings of the Linnean Society of New South Wales*, **4**(3): 245–79.
- Hughes, L.E. and Lowry, J. K. (2009).** Ampithoidae. *Zootaxa*, **2260**(1): 153-219.
- Kensley, B. (1971).** Amphipoda from Southern Angola. *Ann. S. Afr. Mus.*, **57**(8): 149-156.
- Kim, Y.H., Hong, S.S., Conlan, K.E. and Lee, K.S. (2012).** The genus *Peramphithoe* Conlan & Bousfield, 1982 from Korean waters (Crustacea: Amphipoda: Ampithoidae). *Zootaxa*, **3400**(1): 1-19.
- Kosmann, R. (1880).** Zoologische Ergebnisse einer im amfrage der K. Akademie d. Wiss. zu Berlin ausgefурten reise in die Kustengebiete des Roten Meeres, H Haffte. Lief I." *Malacostraca (Amphipoda)*, 129-137, tav. XIII-WV.
- Krapp-Schickel, G. (1969).** Zur Okologie der Amphipoden aus dem Phytal der Nordadria. *Zoologische Jahrbücher. Abteilung für Systematik, Ökologie un Geographie der Tiere.*, **96**: 265-448.
- Krapp-Schickel, G. (1978).** Die gattung Amphithoe (Crustacea, Amphipoda) im Mittelmeer, *Bijdrag tot de Dierkunde.*, **48**(1): 1-15.
- Kunkel, B.W. (1910).** The Amphipoda of Bermuda. *Transactions of the Connecticut Academy of Arts and Sciences*, **16**: 1-116
- Lamouroux, J.V.F. (1825).** Gelidie. Gelidium. In: *Dictionnaire Classique d'Histoire Naturelle.* (Audouin, I. et al. Eds) Vol. 7, pp. 190-191. Paris: Ray & Gravier.
- Ledoyer, M. (1982).** Cmstaces Amphipodes Gammariens. *Families des Acanthonotozomatidae a Gammaridae. Faune Madagascar*, **59**(1): 1-598.

- Ledoyer, M. (1984).** Les gammariens (Crustacea, Amphipoda) des herbiers de phanérogames marines de Nouvelle Calédonie (région de Nouméa). Mem. Mus. Natl. Hist. Nat. Paris (ns A. Zool.), **129**: 1-113.
- Linnaeus, C. (1758).** Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio decimal, reformata. Editio Decima Revisa. **1** [i-iv]: 1-823. Holmiae [Stockholm]: impensis direct. Laurentii Salvii.
- Lowry, J.K. and Myers, A.A. (2009).** Benthic Amphipoda (Crustacea: Peracarida) of the great barrier reef. *Zootaxa*, **2260**(1): 17-108.
- Lowry, J.K. & Stoddart, H.E. (2003).** Crustacea: Malacostraca: Peracarida: Amphipoda, Cumacea, Mysidacea. In Beesley, P.L. & Houston, W.W.K. (Eds), *Zoological Catalogue of Australia*, Vol. 19.2B, 531 pp, Melbourne: CSIRO Publishing, Australia.
- Lyons, J. and Myers, A.A. (1990).** Amphipoda Gammaridea from coral rubble in the Gulf of Aqaba, Red Sea: Families Acanthonotozomatidae, Ampeliscidae, Anamixidae, Aoridae and Colomastigidae. *J Nat Hist.*, **24**: 1197–1225.
- Monod, T. (1971).** Sur quelques crustacés de Tulear Madagascar. *Téthys. Suppl.*, **1**: 165–192.
- Moore, P.G. (1984).** The fauna of the Clyde Sea area. Crustacea: Amphipoda. -Occasional Publication No. 2, University Marine Biological Station, Millport, Isle of Cumbrae. Pp. 1-74.
- Myers, A.A. (1985a).** Shallow-water, coral reef and mangrove Amphipoda (Gammaridea) of Fiji. *Rec Aust Mus. Suppl.* **5**:1–143.
- Myers, A.A. (1985b).** Studies on the genus *Lembos* Bate. XII. Tropical Pacific Islands. *L dentischium* Myers sp. taparum nov., *L. saloteae* sp. nov., *L. waipio* Barnard, *L. aequimanus* Schellenberg, *L. virgus* sp. nov., *L. regius* sp. nov., *L. tui* sp. nov. *Boll. Mus. Civ. St. Nat. Verona*, **10**: 369-405.
- Myers, A.A. (1986a).** Amphipoda from the South Pacific: Niue Island. *J Nat Hist.*, **20**:1381–1392.
- Myers, A.A. (1986b).** Amphipoda from the South Pacific: Tonga. *Rec Aust Mus.*, **38**: 271–289.
- Myers, A.A. (1989).** Amphipoda from the South Pacific: The Society Islands. *Records of the Australian Museum*, **41**(1): 63-82.
- Myers, A.A. (1990).** Amphipoda from the South Pacific: The Cook Islands. *Records of the Australian Museum*, **42**(2): 149-157.
- Myers, A.A. (1995a).** The Amphipoda (Crustacea) of Madang Lagoon: Aoridae, Isaeidae, Ischyroceridae and Neomegamphopidae. *Records of the Australian Museum, Supplement* **22**: 25–95. <http://dx.doi.org/10.3853/j.0812-7387.22.1995.121>
- Myers, A.A. (1995b).** Marine Amphipods of Micronesia: Kosrae. *Records of the Australian Museum*, **47**(1): 27-38. <http://dx.doi.org/10.3853/j.0067-1975.47.1995.4>
- Myers, A.A. (1997).** Amphipoda from the South Pacific: Western Samoa. *Records-Australian Museum*, **49**: 99-109.
- Myers, A.A. and Lowry, J.K. (2003).** A phylogeny and a new classification of the Corophiidea (Amphipoda). *Journal of crustacean biology*, **23**(2): 443-485.
- Nelson, W. G. (1980).** A comparative study of amphipods in seagrasses from Florida to Nova Scotia., *Bulletin of Marine Science*, **30**: 80-89.

- Oliveira, P. H. (1953).** Crustacea Amphipode do Rio de Janeiro. Memorias do Instituto Oswaldo Cruz, **51**: 289-376.
- Pearse, A. S. (1912).** Notes on certain amphipods from the Gulf of Mexico, with descriptions of a new genera and new species. – Proceedings of the United States National Museum, **43**
- Peart, R.A. (2004).** A revision of the *Cymadusa filosa* complex (Crustacea: Amphipoda: Corophioidea: Ampithoidae). Journal of Natural History, **38**(3): 301-336.
- Peart, R.A. (2007a).** A review of Australian species of *Ampithoe* Leach, 1814 (Crustacea: Amphipoda: Ampithoidae) with descriptions of seventeen new species. Zootaxa, **1566**: 1–95.
- Peart, R.A. (2007b).** A review of Australian *Cymadusa* (Crustacea: Amphipoda: Ampithoidae) with descriptions of eight new species. Zootaxa, **1540**: 1–53.
- Peart, R.A. (2014).** Two new genera and four new species of ampithoids (Amphipoda: Ampithoidae) from southern Australian waters. Journal of Crustacean Biology, **34**(6): 886-907.
- Peart, R.A. (2017).** Analysis of the genus *Sunamphitoe* Spence Bate, 1857 (Amphipoda: Ampithoidae) with descriptions of eight new species. Zootaxa, **4269**(3): 301-345.
- Peart, R.A. and Hughes, L.E. (2014).** Ampithoid amphipods from the South Pacific: Papua New Guinea, French Polynesia and New Caledonia. Journal of Natural History, **48**(13-14): 739-861.
- Poore, A.G. and Lowry, J.K. (1997).** New ampithoid amphipods from Port Jackson, New South Wales, Australia (Crustacea: Amphipoda: Ampithoidae). Invertebrate Systematics, **11**(6): 897-941.
- Rabindranath, P. (1972).** Marine Gammaridea (Crustacea: Amphipoda) from the Indian region. Family Ampithoidae. Mar. Biol., **14**: 161-178.
- Ren, X. (2001).** Gammaridean shrimps of the family Ampithoidae (Crustacea: Amphipoda) from Hainan Island, South China Sea. National Science Museum Monographs, **21**: 65-74.
- Ren, X. (2006).** Crustacea, Amphipoda, Gammaridea (I). Fauna Sinica Invertebrata, **41**: 1–558. Science Press, Beijing
- Ruffo, S. (1938).** Gli Anfipodi marini del Museo Civico di Storia Naturale di Genova. b) Gli Anfipodi del Mar Rosso. Ann. Mus. Civ. St. Nat. Genova, **60**: 152-180.
- Ruffo, S. (1947).** *Hadzia minuta* n.sp. (Hacziidac') *Salentinella gracillima* n. gen. n. sp. (Gammaridae) nuovi Anfipodi troglobi dell'Italia meridionale. Bolt. Soc. Natural. Napoli, **56**: I-II.
- Ruffo, S. (1959).** Contributo alla conoscenza degli anfipodi del Mar Rosso (1). Sea Fisheries Res. Sta., Haifa, Bull., **20**: 1-36.
- Ruffo, S. (1969).** Studi sui crostacei anfipodi. LXVII. Terzo contributo alla conoscenza degli anfipodi del Mar Rosso. Memorie del Museo Civico di Storia Naturale, Verona, **17**: 1-77.
- Sars, G.O. (1895).** Amphipoda: An account of the Crustacea of Norway with short descriptions and figures of all the species, Vol. **1**, viii + 711 pp., 240 pls., 8 suppl. pls.
- Savigny, J.C. (1816).** Observations generales sur la bouche des arachnides, des crustaces et det entomostraces. Second Memorie. In 'Memories sur les animaux sans vertebres, premiere partie'. pp. 39–117, pls 1–8.

-
- Schellenberg, A. (1925).** Crustacea VIII: Amphipoda. In *Beitrage zur Kenntnis der Meeresfauna Westafrikas*. Edited by W. Michaelson. L. Friedrichsenand Co., Hamburg. Vol. **3**(4): 113-204.
- Schellenberg, A. (1928).** Report on the Amphipoda. *Trans Zool Soc Lond.*, **22**: 633–692.
- Schellenberg, A. (1938).** Litorale Amphipoden des tropischen Pazifiks nach Sammlungen von Prof. Bock (Stockholm), Prof. Dahl (Berlin) und Prof. Pietschmann (Wein). *Kungliga Svenska Vetenskapsakademiens Handlingar Series, 3*, **16** (6): 1– 105.
- Shoemaker, C.R. (1935).** The Amphipods of Porto Rico and the Virgin Islands. *Sci. Survey of Porto Rico and the Virgin Islands. N.Y. Acad. Sci.*, **15**: 229-253.
- Sivaprakasam, T.E. (1970).** Amphipods of the family Ampithoidae from the Madras coast. *J. mar. bio. Ass. India*, **12**(1 & 2): 64-80
- Stebbing, T. R. R. (1888).** Amphipoda. Vol. 29 of *Zoology in Report on the Scientific Results of the Voyage of H.M.S. Challenger during the years 1873-76*, xxiv+1737 pp., 212 pls., 1 map, text illustr. [In 3 vols.].
- Stebbing, T.R.R. (1899).** Revision of Amphipoda. *Annals and Magazine of Natural History, Series 7, 3*, 350
- Stebbing, T.R.R. (1906).** Amphipoda. I. Gammaridea. *Das Tierreich.*, **21**:1–806.
- Walker, A.O. (1905).** Marine crustaceans. XVI. Amphipoda. *Fauna Geogr Maldive Laccadive Archipelagos*, **2**: 923–932, pl. 88.
- WoRMS (2023).** Horton, T.; Lowry, J.; De Broyer, C.; Bellan-Santini, D.; Copila? -Ciocianu, D.; Corbari, L.; Costello, M.J.; Daneliya, M.; Dauvin, J.-C.; Fišer, C.; Gasca, R.; Grabowski, M.; Guerra-García, J.M.; Hendrycks, E.; Hughes, L.; Jaume, D.; Jazdzewski, K.; Kim, Y.-H.; King, R.; Krapp-Schickel, T.; LeCroy, S.; Lörz, A.-N.; Mamos, T.; Senna, A.R.; Serejo, C.; Souza-Filho, J.F.; Tandberg, A.H.; Thomas, J.D.; Thurston, M.; Vader, W.; Väinölä, R.; Vonk, R.; White, K.; Zeidler, W. (2023). *World Amphipoda Database. Ampithoidae Boeck, 1871*. Accessed through: *World Register of Marine Species* at: <https://www.marinespecies.org/aphia.php?p=taxdetails&id=101366> on 2023-05-30.
- Zeina, A.F. (2012).** Studies on the intertidal epibenthic fauna at the Red Sea coast (Hurghada) with special emphasis on order "Amphipoda". Ph.D. Thesis. Al-Azhar University, 311 pp.

الملخص العربي

عائلة (Peracarida) Ampithoidae: مزدوجات الأرجل) في ساحل البحر الأحمر المصري، مع وجود مفاتيح للتعرف على الأجناس والأنواع

ياسمين علاء الدين^{1*}، ريم كامل¹، محمود معاطي²، عمرو زينه³ وفاطمة بيومي¹

- 1- قسم علم الحيوان، كلية النبات للآداب والعلوم و التربية – جامعة عين شمس
- 2- المعهد القومي لعلوم البحار والمصايد – مصر
- 3- معمل العلوم البحرية، قسم علم الحيوان، كلية العلوم – جامعة الأزهر

تعتبر عائلة **Ampithoidae** واحدة من أشهر مزدوجات الأرجل العالمية في جميع أنحاء العالم منذ تعريفها المبكر في عام 1888 ، في حين أن المعلومات حول هذه العائلة من البحر الأحمر لا تزال نادرة حتى الآن. ومن ثم ، فإن الغرض من هذا العمل هو مراجعة جميع الأنواع المسجلة سابقا والمجمعة حديثا لأفراد **Ampithoidae** من البحر الأحمر. تم جمع العينات لمدة عام واحد بدءا من صيف عام 2019 لسبعة مواقع تغطي ساحل البحر الأحمر المصري من الغردقة إلى حلايب لأعماق تصل إلى 35 م. أظهرت نتائج هذا البحث عن تنوع أفراد هذه العائلة ، والتي تمثلت في تسعة أنواع تنتمي لثمانية اجناس. وتم تسجيل **Biancolina Della Valle, 1893** ، وتسجيل **Cymadusa setosa (Haswell, 1879)**. بالإضافة إلى مفاتيح التعريف لكل جنس ونوع. وقد خلص هذا البحث إلى أن عائلة **Ampithoidae** في منطقة الدراسة تشمل كل من الأنواع التالية:

Amphithoides longicornis **Kossmann, 1880**, *Ampithoe Ramondi* **Audouin, 1826**, *Biancolina* sp, *Cymadusa filosa* **Savigny, 1816**, *Cymadusa setosa* **(Haswell, 1879)**, *Paragrubia vorax* **Chevreaux, 1901**, *Paradusa bilobata* **Ruffo, 1969**, *Pleonexes kava* **(Myers, 1985)**; and *Sunamphitoe falsa* **(K.H. Barnard, 1932)**.