DOI: 10.2478/s11686-012-0052-3
© W. Stefański Institute of Parasitology, PAS
Acta Parasitologica, 2012, 57(4), 397–401; ISSN 1230-2821

VERSITA

A new species of *Aspidophryxus* G.O. Sars, 1883 (Crustacea, Isopoda, Dajidae) from Caribbean mysid shrimp

Christopher B. Boyko[1,2]* and Jason D. Williams[3]

[1]Department of Biology, Dowling College, 150 Idle Hour Boulevard, Oakdale, NY 11769, USA;
[2]Division of Invertebrate Zoology, American Museum of Natural History, Central Park West@79th St., New York, NY 10024, USA;
[3]Department of Biology, Hofstra University, Hempstead, NY 11549, USA

Abstract

A new species of dajid isopod in the genus *Aspidophryxus* G.O. Sars, 1883 is described from three females and one male found infesting the lateral carapace of *Heteromysis* (*Olivemysis*) *actiniae* Clarke, 1955 (Mysidae: Heteromysinae) associated with the corkscrew anemone *Bartholomea annulata* (Lesuer, 1817) (Anthozoa: Aiptasiidae) from the British Virgin Islands. This is the first record of the genus from the western Atlantic; three other species are known from northern European waters, the central Atlantic and Japan, all on mysid hosts. The new species is the first dajid recorded from tropical Caribbean waters. A key to species in the genus and a list of all known hosts with parasite orientation are provided.

Keywords

British Virgin Islands, Dajidae, Mysidae, new species, parasite

Introduction

The genus *Aspidophryxus* G.O. Sars, 1883 previously was known to contain three species: *A. peltatus* G.O. Sars, 1883, *A. frontalis* Bonnier, 1900, and *A. japonicus* Shimomura et Ohtsuka, 2011 (Schotte *et al*. 2008 onwards). Examination of dajid-infested mysids from the British Virgin Islands revealed the presence of a new species in the genus, the first in the western Atlantic Ocean and the first dajid known from Caribbean waters.

Materials, methods and results

Camera lucida sketches made of specimens were scanned into a Macintosh™ computer. Images were then prepared using the programs Adobe Photoshop™ and Adobe Illustrator™. Carapace length (CL) is provided as an indicator of size for the host mysids. Isopod size is given as total body length (TL = anterior margin of head to posterior margin of pleotelson). Measurements were made to 0.01 mm using an ocular micrometer. The host mysids and dajids are deposited in the collection of the Crustacea Department, Natural History Museum of Los Angeles County (LACM CR).

Family Dajidae Giard et Bonnier, 1887
Aspidophryxus G.O. Sars, 1883
Aspidophryxus G.O. Sars, 1883: 72–73.
Type species: *Aspidophryxus peltatus* G.O. Sars, 1883; by original designation.
Species included: *A. discoformis* sp. nov.; *A. frontalis* Bonnier, 1900; *A. japonicus* Shimomura et Ohtsuka, 2011; *A. peltatus* G.O. Sars, 1883.

***Aspidophryxus discoformis* sp. nov.** (Figs 1–3)

Description of female

Body (Fig. 2A, B) semicircular, approximately 1.1 times as long as maximum width, moderately vaulted dorsally, with pair of broad lateral lamellae filled with numerous embryos; lateral lamellae not reaching beyond frontal margin of cephalon. Cephalon (Fig. 2A, B) ventrally located, semicircular, without eyes; frontal part short, approximately 0.12 times as long as wide; anterior margin rounded; posterior margin not visible in dorsal view. Pereon (Fig. 2A) with few faint transversal and longitudinal folds in cuticle. Medioventral edge of lamellae produced into 2 digitiform extensions anterior to insertion of pleon (Fig. 2F). Pleon (Fig. 2B, F) seg-

*Corresponding author: cboyko@amnh.org

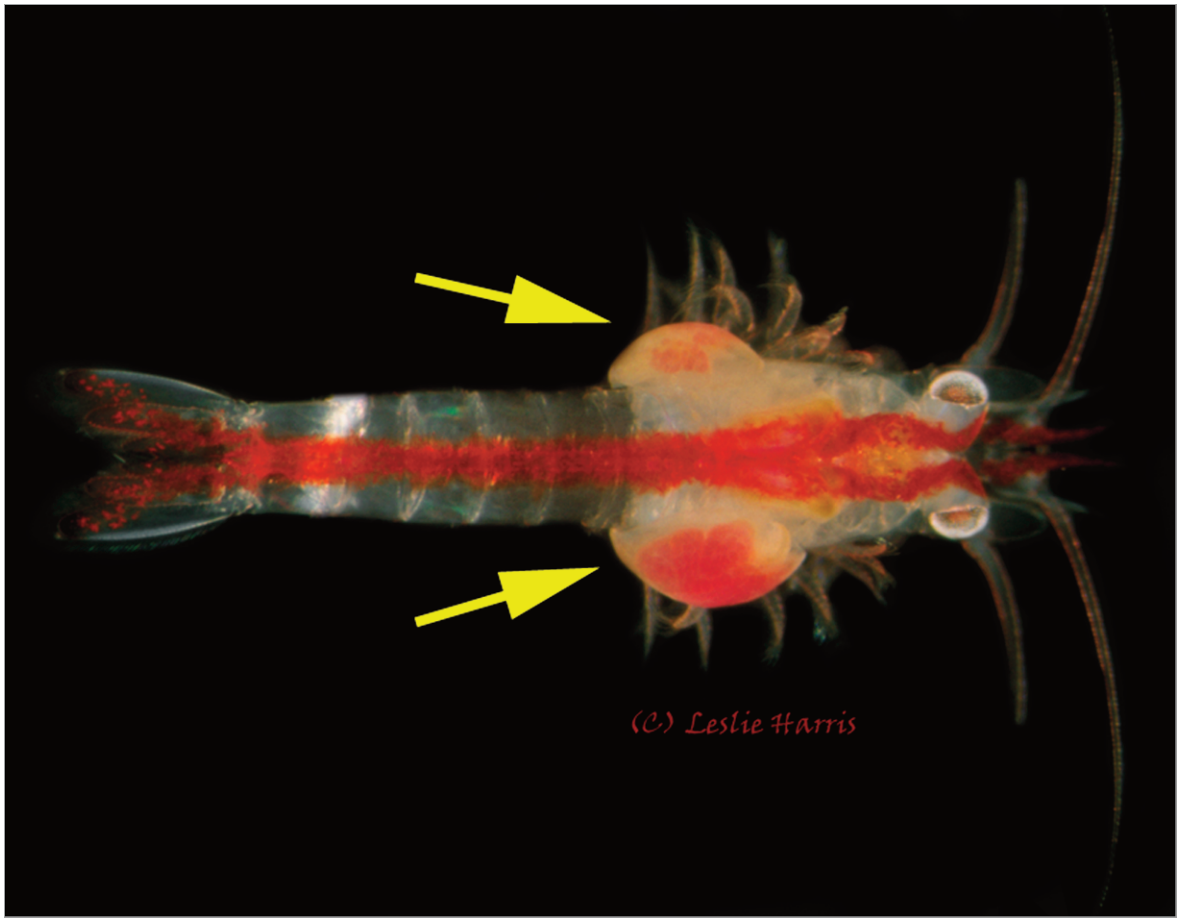

Fig. 1. Photograph of live *Heteromysis* (*Olivemysis*) *actiniae* Clarke, 1955 with dual infestation of *Aspidophryxus discoformis* sp. nov. Arrows indicate immature female paratype on left side (LACM CR 2000-073.3) and mature specimen (lost) on right side. Photograph© Leslie Harris

ments fused, vermiform, without lateral plates or pleopods. Antennule (Fig. 2B, C) composed of plate-like single article with 1 stout ventral seta. Antenna (Fig. 2B, D) composed of 1 globular article with 2 stout, medially directed setae. Oral cone (Fig. 2B, D) triangular. Pereopods 1–5 (Fig. 2B, D, E) similar in shape, first pair slightly smaller than others, without setae; carpus and merus fused; propodus cylindrical; dactylus recurved. Medioventral tubercle located just posterior to and subequal in size to last pair of pereopods (Fig. 2E).

Description of male

Body (Fig. 3A) strongly curved ventrally with few small setae laterally; all pereomeres with dorsal and lateral cuticular striations (Fig. 3B). Cephalon (Fig. 3A, B) lacking eyes, medially fused with pereomere 1; anterior margin tapered and rounded. Pereomeres 2–7 (Fig. 3B) distinct, subequal in width. Pleon (Fig. 3B, C, F) segments fused, tapering posteriorly with pair of small distal protrusions ("uropods") surrounding anal slit. Antennule (Fig. 3A, B, D) of 9 articles, 1–3 relatively short and stout, 4–9 elongate and narrow; articles 5–9 with few (2–3) distolateral moderately long simple setae. Antenna (Fig. 3C, D) composed of 4 filamentous projections arising from common bulbous basal region, setae lacking. Oral cone (Fig. 3C, D) with pair of bladelike mandibular gnathobases protruding from opening. Pereopods (Fig. 3C-E) similar in shape; first pair smallest, second pair slightly larger, 3–7 subequal in length with elongate bases and ischia; propodus with ridge of small stout setae along margins opposite insertion of recurved dactylus.

Taxonomic summary

Type host: *Heteromysis* (*Olivemysis*) *actiniae* Clarke, 1955 (Mysidae: Heteromysinae) (Fig. 1).

Type locality: Long Point, Guana Island, British Virgin Islands, 18.486°N 64.583°W, coral reef, 5–35 ft (= 1.52–10.67 m), by hand, SCUBA, T. Zimmerman, R. Ware, T. Haney, J. Martin, 19 July 2000.

Site of attachment: Lateral cephalothorax of host.

Type specimens: 1 mature female holotype (2.0 mm, LACM CR 2000-073.1) with embryos and 1 mature male allotype (0.47 mm, LACM CR 2000-073.2); 1 immature female (1.7 mm, LACM CR 2000-073.3), Fig. 1 shows immature

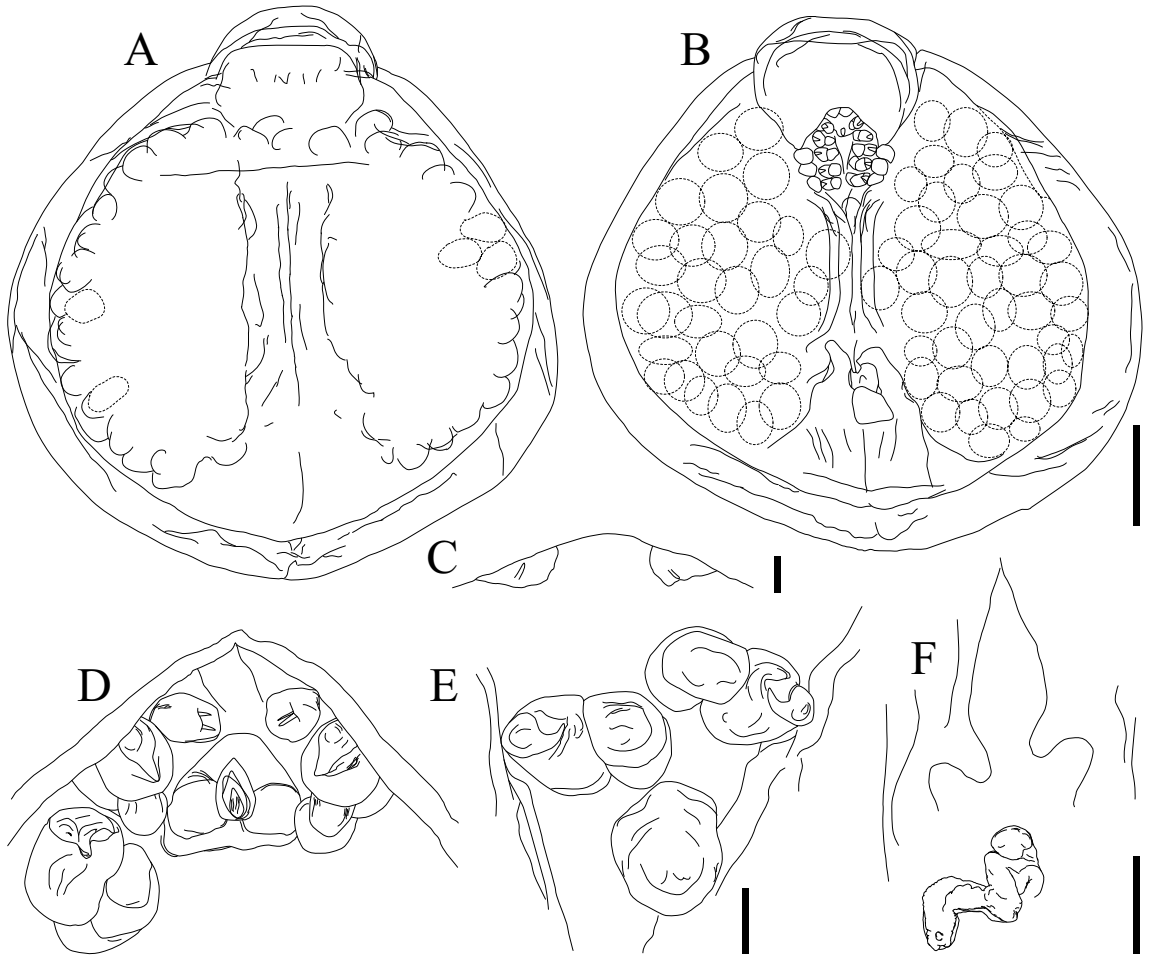

Fig. 2. *Aspidophryxus discoformis* sp. nov., paratype female (LACM CR 2000-073.4) (**A**, **B**, **D-F**), holotype female (LACM CR 2000-073.1) (**C**). **A.** Dorsal view; **B.** Ventral view; **C.** Antennule; **D.** Antenna, mouthparts and pereopods 1–2; **E.** Fifth pereopods and midventral protuberance; **F.** Pleon and digitate extensions of oostegites. Scale bars: A, B = 0.4 mm; C = 0.01 mm; D, E = 0.02mm; F = 0.1mm

specimen on left side and mature specimen (lost) on right; 1 mature female paratype (2.2 mm, LACM CR 2000-073.4) with embryos.

Etymology: The specific name is formed from a combination of disco- and -formis (forms a dish) in reference to the nearly circular outline of the body of the females. The gender is masculine.

Remarks

Three valid species have been described in *Aspidophryxus* prior to the present work. Below are the hosts for these three species, the position of the dajids on the host body, and their geographic distributions, as well as notes on nomenclatural and taxonomic issues.

Aspidophryxus peltatus G.O. Sars, 1883
On dorsal cephalothorax of *Erythrops erythrophthalma* (Goes, 1864), *E. elegans* (G.O. Sars, 1863), *E. microps* (G.O. Sars, 1864), *E. serrata* (G.O. Sars, 1863) (Mysidae: Erythropinae) and *Mysidopsis didelphys* (Norman, 1863) (Mysidae: Leptomysinae), from Norway, Iceland, Ireland and Scotland (G.O. Sars 1883; Scott 1897; Stephensen 1937; Tattersall 1905).

Stephensen (1913) also listed *Parerythrops obesa* (G.O. Sars, 1864) (Mysidae: Erythropinae), but from his wording it is unclear if he definitely obtained the parasite from this host. *Aspidophryxus sarsi* Giard et Bonnier, 1889 is a synonym (see Sars 1898).

Aspidophryxus frontalis Bonnier, 1900
On dorsal cephalon between eyes of *Siriella norvegica* G.O. Sars, 1869 (Mysidae: Siriellinae), from 34°N, 8°10´W, central North Atlantic Ocean, surface (Bonnier 1900; Koehler 1911).

The name *Aspidophryxus frontalis* was made available by Bonnier (1900), but most of the characters given in the text and all the figures were for the cryptoniscus stage. The description was expanded upon by Koehler (1911) with more

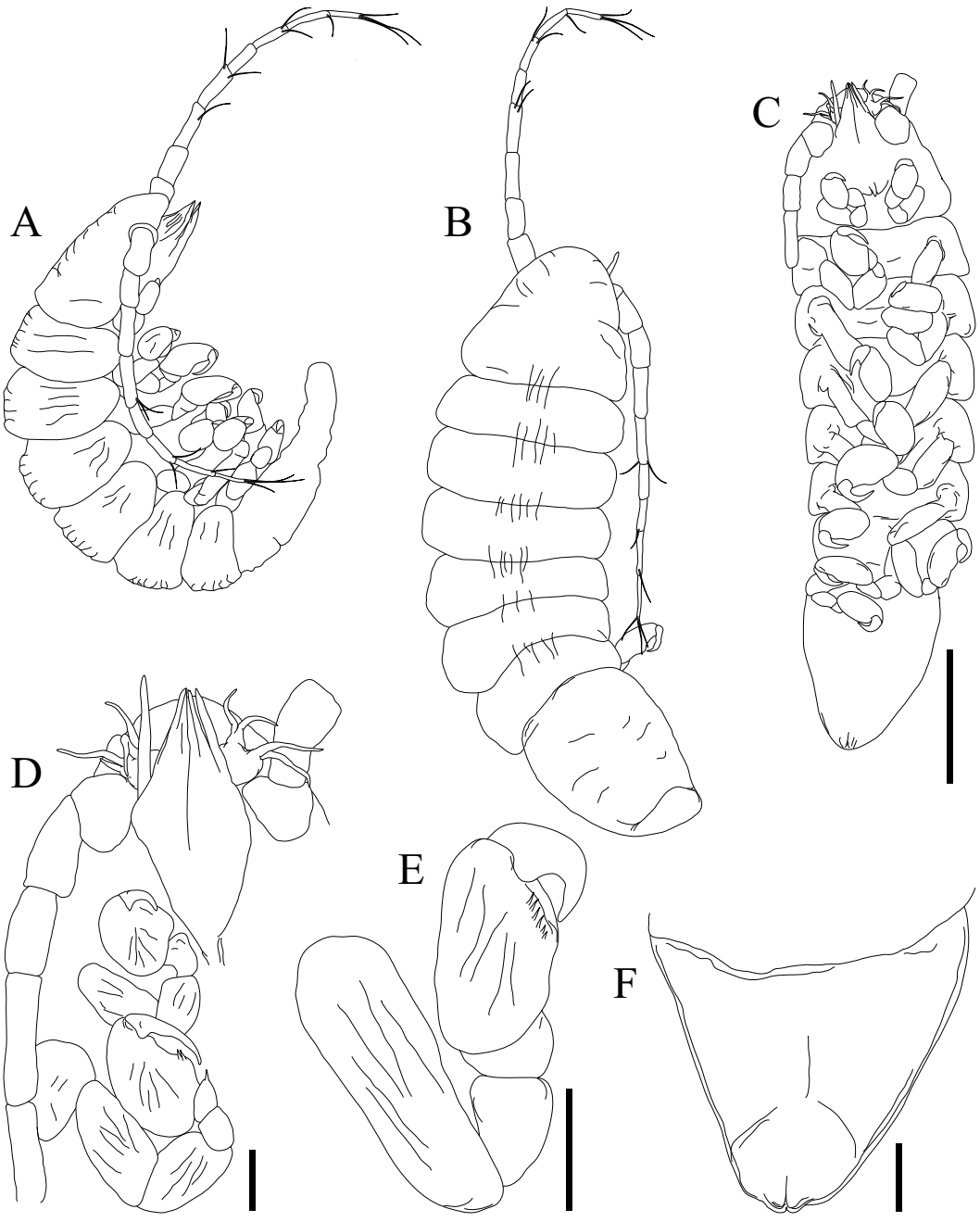

Fig. 3. *Aspidophryxus discoformis* sp. nov., allotype male (LACM CR 2000-073.2). **A.** Lateral view; **B.** Dorsal view; **C.** Ventral view; **D.** Antennae, mouthparts and pereopods 1–2; **E.** Pereopod 7; **F.** Pleon. Scale bars: A-C = 0.1 mm; D-F = 0.2mm

complete descriptive information on mature females and males, although he inexplicably cited Bonnier's earlier work as being published in 1890. Shimomura & Ohtsuka (2011) cited Bonnier (1887) as the source of the name *Aspidophryxus frontalis*. Bonnier's work was published in parts but Shimomura and Ohtsuka (2011) cited all three parts as a single work. Only the part cited here contains listings of any isopod taxa, and neither the genus *Aspidophryxus* nor the species *frontalis* appears in its pages.

Aspidophryxus japonicus Shimomura et Ohtsuka, 2011
On upper surface of thorax of *Holmsiella affinis* Ii, 1937 (Mysidae: Erythropinae), from 31°26.40′N 131°28.70′E, 129 m, off Cape Toi-misaki, Japan (Shimomura and Ohtsuka 2011).

Females of *Aspidophryxus discoformis* are most similar in overall shape to *A. frontalis*, but differ in having a strongly produced frontal margin of the cephalon (that of *A. frontalis* does

not exceed the anterior margins of the lateral lamellae). They differ from females of *A. peltatus* in having a rounded anterior margin of the cephalon (rectangular in *A. peltatus*, and in having a subcircular body shape (that of *A. peltatus* is longer than wide). They differ from females of *A. japonicus* in having a subcircular body (body longer than wide in *A. japonicus*), in having a single plate-like antennal segment (antenna of 5 segments in *A. japonicus*), and in having a vermiform pleon (pleon of 3 segments in *A. japonicus*). Females of *Aspidophryxus discoformis* differ from all previously described species in the presence of the digitiform extensions on the medioventral edge of the lamellae, although this feature should be re-examined in the other species where it appears to be lacking.

The males of *A. discoformis* show the peculiar filamentous lobes on the antennule (normal antennules in *A. japonicus*, not described in the other two species). The putative uropods of the males are well developed in *A. peltatus* and *A. frontalis* but weakly produced in *A. japonicus* and nearly absent in *A. discoformis*.

Key to the females of *Aspidophryxus* species

1a. Frontal margin of cephalon exceeding anterior margins of lateral lamellae 2
1b. Frontal margin of cephalon not exceeding anterior margins of lateral lamellae 3
2a. Body longer than wide, antenna segmented, pleon segmented ..... *A. japonicus*
2b. Body length and width subequal, antenna a single lobe, pleon unsegmented, vermiform ..... *A. discoformis*
3a. Frontal margin of cephalon rectangular and subequal to mouth/pereopod region in size, body longer than wide ..... *A. peltatus*
3b. Frontal margin irregular shaped, much smaller than mouth/pereopod region, body length and width subequal ..... *A. frontalis*

Surprisingly, no dajids have ever been recorded from Caribbean waters. *Oculophryxus bicaulis* Shields et Gómez-Guiérrez, 1996, occurring on the euphausiid *Stylocheiron affine* Hansen in the Gulf of Mexico, is the only other species which might occur in the Caribbean as the three other recorded species from the western Atlantic (*Colophryxus novangeliae* Richardson, 1908 and *Prodajus bigelowiensis* Schultz et Allen, 1982, *Zonophryxus dodecapus* Holthuis, 1949) are known from cooler waters along the northeastern United States seaboard (Richardson 1908, Schultz and Allen 1982, Thoma and Heard, undated).

Acknowledgements. Thanks to Leslie Harris (LACM) for letting us know about these dajids and for providing her beautiful photographs of the living specimens. Adam Wall (LACM) kindly made the loan of specimens.

References

Bonnier J. 1887. Catalogue des crustacés malacostracés recueillis dans la baie de Concarneau (suite et fin). *Bulletin Scientifique du Département du Nord et des Pays Voisins*, 18, 361–422. DOI: 10.5962/bhl.title.10130.

Bonnier J. 1900. Contribution a l'étude des épicarides. Les Bopyridae. *Travaux de la Station Zoologique de Wimereux*, 8, 1–476, pls. 1–41. DOI: 10.5962/bhl.title.10522.

Giard A., Bonnier J. 1887. Contributions a l'étude des bopyriens. *Traveaux de l'Institut Zoologique de Lille et du Laboratoire de Zoologie Maritime de Wimereux*, 5, 1–272, pls. 1–10.

Koehler R. 1911. Isopodes nouveaux de la famille des dajidés provenant des campagnes de la <<Princesse-Alice>>. *Bulletin de l'Institut Océanographique* (*Fondation Albert Ier*, *Prince de Monaco*), 196, 1–34.

Richardson H. 1908. Description of a new isopod genus of the family Dajidae. *Proceedings of the United States National Museum*, 34, 391–392. DOI: 10.5479/si.00963801.34-1618.391.

Sars G.O. 1883. Oversigt af Norges Crustaceer med foreløbige Bemaerkninger over de nye eller mindre bekjendte Arter. I. (Podophthalmata – Cumacea – Isopoda – Amphipoda). *Forhandlinger i Videnskabs-Selskabet i Christiania for 1882*, 1–124, pls. 1–6.

Sars G.O. 1896–1899. An account of the Crustacea of Norway with short descriptions and figures of all the species. Volume II. Isopoda. Bergen Museum, i-x + 1–270, pls. 1–104. (Bopyrid and dajid text and plates published in 1898.) DOI: 10.5962/bhl.title.1164.

Schotte M., Boyko C.B., Bruce N.L., Poore G.C.B., Taiti S., Wilson G.D.F. (Eds.). 2008 onwards. *World List of Marine Freshwater and Terrestrial Isopod Crustaceans*. Available online at http://www.marinespecies.org/isopoda [Accessed on 2012-01-06].

Schultz G.A., Allen D.M. 1982. *Prodajus bigelowiensis*, new species (Isopoda: Epicaridea: Dajidae) parasite of *Mysidopsis bigelowi* (Mysidacea) from coastal New Jersey, with observations on infestation. *Journal of Crustacean Biology*, 2, 296–302. DOI: 10.2307/1548010.

Scott T. 1897. The marine fishes and invertebrates of Loch Fyne. *Annual Report of the Fishery Board for Scotland*, 15, 107–174, pls. 1–3. DOI: 10.5962/bhl.title.53611.

Shields J.D., Gómez-Gutierrez J. 1996. *Oculophryxus bicaulis*, a new genus and species of dajid isopod parasitic on the euphausid *Stylocheiron affine* Hansen. *International Journal for Parasitology*, 26, 261–268. DOI: 10.1016/0020-7519(95)00126-3.

Shimomura M., Ohtsuka S. 2011. Two new species of ectoparasitic isopods (Isopoda, Dajidae) from mysids in Japan. In: (Ed. A. Asakura) *Crustacean Monographs*, *15. New Frontiers in Crustacean Biology: Proceedings of the TCS Summer Meeting*, *Tokyo*, *20–24 September 2009*. Brill, 23–30. DOI: 10.1163/ej.9789004174252.i-354.24.

Stephensen K. 1913. Report on the Malacostraca collected by the "Tjalfe"-Expedition, under the direction of cand. mag. Ad. S. Jensen, especially at W. Greenland. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening i Kjøbenhavn*, 64, 57–134.

Stephensen K. 1937. Marine Isopoda and Tanaidacea. *Zoology of Iceland*, 3(27), 1–26.

Tattersall W.M. 1905. Appendix, No. II. The marine fauna of the coast of Ireland. Part V. Isopoda. *Fisheries, Ireland, Scientific Investigations*, 1904, 2, 1–90, pls. 1–11, 2 unnumbered charts.

Thoma J.N., Heard R.W. 2010 onwards. *A key to epicaridean isopods o the SouthAtlanticBight*.http://www.dnr.sc.gov/marine/sertc/Thoma%20%20Heard%20Epicaridean%20key.pdf

(Accepted August 28, 2012)