

NEW RECORD OF *CATOESSA GRUNERI* BOWMAN AND TAREEN (ISOPODA, CYMOTHOIDAE) INFESTING WILD FISH AND A LIST OF PREVIOUSLY RECORDED PARASITIC ISOPODS FROM PAKISTAN

Quddusi, B. Kazmi

Department of Zoology, University of Karachi, Karachi-75270, Pakistan

Abstract

13 specimens of *Catoessa gruneri* Bowman and Tareen, 1983 were found infesting *Alepes melanoptera*, *Alepes djedaba* and *Scomberoides tala* collected on 15 January, 1994 and 14 February, 1994 from Ibrahim Hyderi Fish Harbour, Karachi. Fish samples were analyzed for parasitic infections. Besides other isopods *Catoessa gruneri* Bowman and Tareen, 1983 was recorded from the gill pouch, from Pakistan proposing the fish as new hosts for this isopod. The present description of the male represents the second report of male around the world and first record from Pakistan.

Keywords: Parasitic isopod, Fish, Pakistan, New record.

INTRODUCTION

The parasitic group isopod continues to be interesting for scientists in many countries, both regarding wild and culture fish populations, for taxonomic knowledge and economic application. Isopods associate with many species of commercially important fishes around the world and cause significant economic losses to fisheries by stunting, killing or damaging these fishes. Of the 95 known families of the order Isopoda, only a few families are parasitic namely, Cryptoniscidae, Bopyridae, Cymothoidae, Dajidae, Gnathiidae, Entoniscidae and Tridentellidae. Most parasitic isopods are ecto-parasites. The Cymothoids are parasites of fish, both as immature forms and adults, seen on teleost fishes of marine and freshwaters in tropics and sub-tropics (Lester, 2005). To a large extent cymothoids are highly host and location specific. The Gnathiidae are larval ecto-parasites of fish, the adults being free living and non-feeding; on marine and estuarine teleosts and elasmobranchs (Smit and Davies, 2004). They are blood-feeding; several of the species settle in the buccal cavity of fish, others remain alive in the gill chamber or on the surface of body including the fins.

The family Cymothoidae consists of 46 valid genera (WoRMS). The parasite dealt herewith is a cymothoid, determined as belonging to *Catoessa* which is a branchial parasite. Only 4 marine species of the cymothoid isopod genus *Catoessa* occur in the world, they are, *Catoessa gruneri*, *Catoessa scabricauda*, *Catoessa ambassae* and *Catoessa boscii* (Rameshkumar *et al.*, 2013).

The studies in Pakistan dealing with parasitic isopods on fish include Karim (1975), Ghani and Tirmizi (1993), Ghani and Ali (1998, 2003), Ghani and Shireen (1995, 2000), Ahmed and Khan (2012), Javed and Yasmeen (1999), Shireen (2001) and Ghory *et al.* (2010).

CHECKLIST: A checklist of the parasitic Cymothoidea parasitizing Pakistani fish was compiled from records published between 1975 and 2022. This list of parasitic isopod species on fish pertains to two families Cymothoidae and Gnathidae from Pakistan, all were collected from Sindh coast, Karachi. Several parasites not identified to species level and species without the host data are also included in this checklist.

Anilocra dimidiata Bleeker, 1857

Host: Not known



Anilocra cavicauda Richardson, 1910

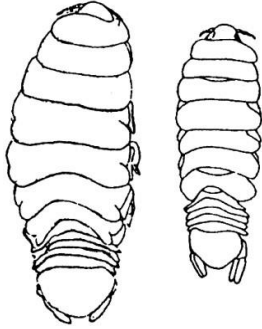
Host: *Nematolosa nasus*



(After Shireen, 2001)

Catoessa ambassae Bruce, 1990

Hosts: *Crangoides malabaricus*, *Chorinemus tala* and *Chorinemus lysan*



(After Ghani and Ali, 1998)

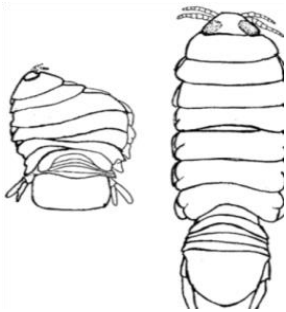
Cymothoa eremita Brünnich, 1783

Host: *Parastromateus niger*



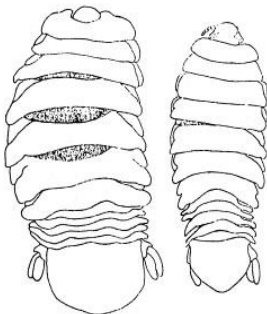
Elthusa raynaudii Milne Edwards, 1840

Host: *Nematalosa nasus*



Joryma engraulidis Barnard, 1936

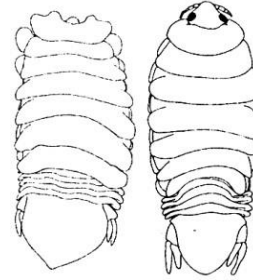
Host: *Sardinella fimbriata* and *Sardinella albella*



(After Shireen, 2001)

Joryma sawayah Bowman and Tareen, 1983

Hosts: *Sardinella fimbriata* and *Sardinella albella*



(After Ghani and Ali, 1998)

Mothocya karobran Bruce, 1986

Host: *Strongylura leirua*



Mothocya renardi Bleeker, 1857

Host: Mackerel



(Photo courtesy Moazzam)

Nerocila barramundae Bruce, 1987

Hosts: *Pseudarius jella*, *Aroides dussumieri* and *Arius thalassinus*



(After Shireen and Ghani, 2000)

Nerocila depressa Milne Edwards, 1840
Host: *Lumbrina dussumeri*



Nerocila kisra Bowman and Tareen, 1983
Hosts: *Otolithus argenteus*, *Pomadasyx maculatus*,
Johnius axillaries



(After Shireen and Ghani, 2000)

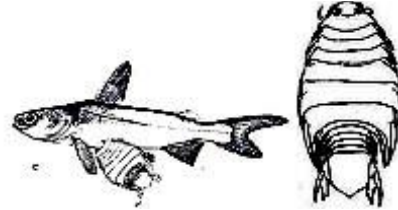
Nerocila phaioleura Bleeker, 1857
Host: *Chiracentrus nudus*



Nerocila orbigny Guerin-Meneville, 1832
Hosts: *Tachysurus maculatus*, *Pseudarius jella* and
Netuma thalassinus



Nerocila serra Schioedte and Meinert, 1881
Hosts: *Mugil dussumeri maculates*, *Pseudorius jella*,
Netuma thalassinus, *Hexanematchthy sona* and
Osteogeneiosus sthenocephalus



(After Shireen and Ghani, 2000)

Nerocila sigani Bowman and Tareen, 1983
Host: *Netuma thalassinus*



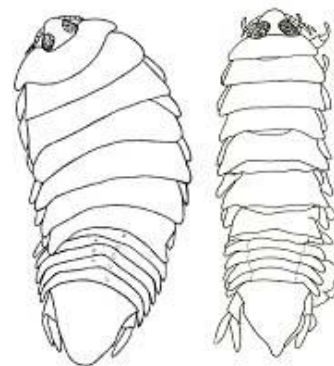
(After Ghani, 2003)

Norileca borealis Javed and Yasmeen, 1999
Host: *Rastrelliger kanagurta*



(After Javed and Yasmeen, 1999)

Norileca indica Milne Edwards, 1840
Host: *Rastrelliger kanagurta* and *Decapterus russelli*



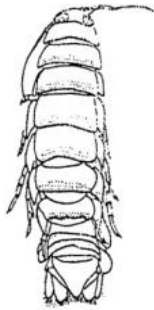
(After Ghani and Shireen, 1995)

Nerocila triangulata Richardson, 1910

Host: *Rastrelliger kanagurta*

Argathona muraeneae Bal and Joshi, 1959

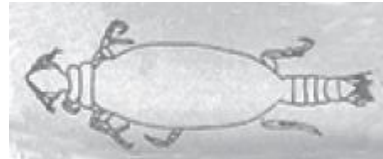
Hosts: *Epinephelus chlorostigma* and *Argyropsis spinifera*



(After Ghani and Shireen, 1995)

Praniza Larva of *Paragnathia* sp.

Host: Unknown (multispecific fish sample)



MATERIALS AND METHODS

Fish collections were carried out at fish landing sites at Ibrahim Hyderi fish harbor. It was impossible to acquire a broad range of parasitic isopod genera in a single survey through direct collecting. Fish examination started by checking the external surface to detect any parasitic crustaceans. Mouth and gills cavities were also discovered. Isopods were removed using fine pointed forceps and kept in 80% alcohol. They were dissected, their appendages were separated. Illustrations were prepared with the help of camera Lucida.

RESULTS

Catoessa gruneri Bowman and Tareen, 1983

(Fig. 1A-L)

Previous world records: *Catoessa gruneri* Bowman and Tareen, 1983: 18-21, Figs. 14n, 15.; Bruce, 1990: 251.; Aneesh *et al.*, 2016: 1270-1277, Fig. 1f.; Ravichandran *et al.*, 2019: 15, Figs. 1d-f; *Joryma brachysoma* Kumar *et al.*, 2017: 55-60, Fig. 2f.

Specimens studied: 15 January, 1994, 1 female TL 20 mm, 1 male TL 14 mm, Host: *Alepes djedaba*; 2 females TL 15-21 mm, 1 male TL 12 mm, Host: *Scomberoides tala*; 2 females TL 20-21, 5 mm, 2 males 12-16 mm, Host: *Alepes melanoptera*; 14 February 1994, 3 females TL 15-21 mm, Host: *Scomberoides tala*; 1 female TL 18.5 mm, 1 male TL 13.5 mm, Host: *Alepes melanoptera*.

DESCRIPTION: The description is based on male and female specimens. In males (Figs. 1A, 1B) the body being smaller than body of female, about 3 times as long as wide, widest at pereonite 4. Body vaulted, weakly twisted to right side, a rounded rostral point. Cephalon weakly immersed in pereonite similar in both sexes. Pereonites 1-6 subequal in length, pereonites 6-7 decreasing abruptly in length, pereonite 7 shorter than others; posterior margin of pereonite 7 evenly indented; all pleonites visible, pleonite 1 distinctly shorter than pleonite 2, pleonites 2-5 subequal in width. Antenna 1 (Fig. 1C) subequal to, or longer than antenna 2 composed of 8 articles (Fig. 1D), always more robust than antenna 2, antenna 2 with 10 articles. Mandible (Fig. 1E), incisor, elongate, palp articles all elongate, article 3 narrowing distally, with 4 distolateral spines. Maxillule (Fig. 1F) with 3 terminal spines, 2 of which distally recurved. Maxilla (Figs. 1G) with single spine on lateral lobe, 2 on medial lobe. Maxilliped (Fig. 1H) without oostegital lobe. Pereopods (Figs. 1I, 1J) without carina on basis, articles not dilated or expanded. Pleopod 2 (Fig. 1K) lamellar, rami rounded. Female pleotelson (Fig. 1L).

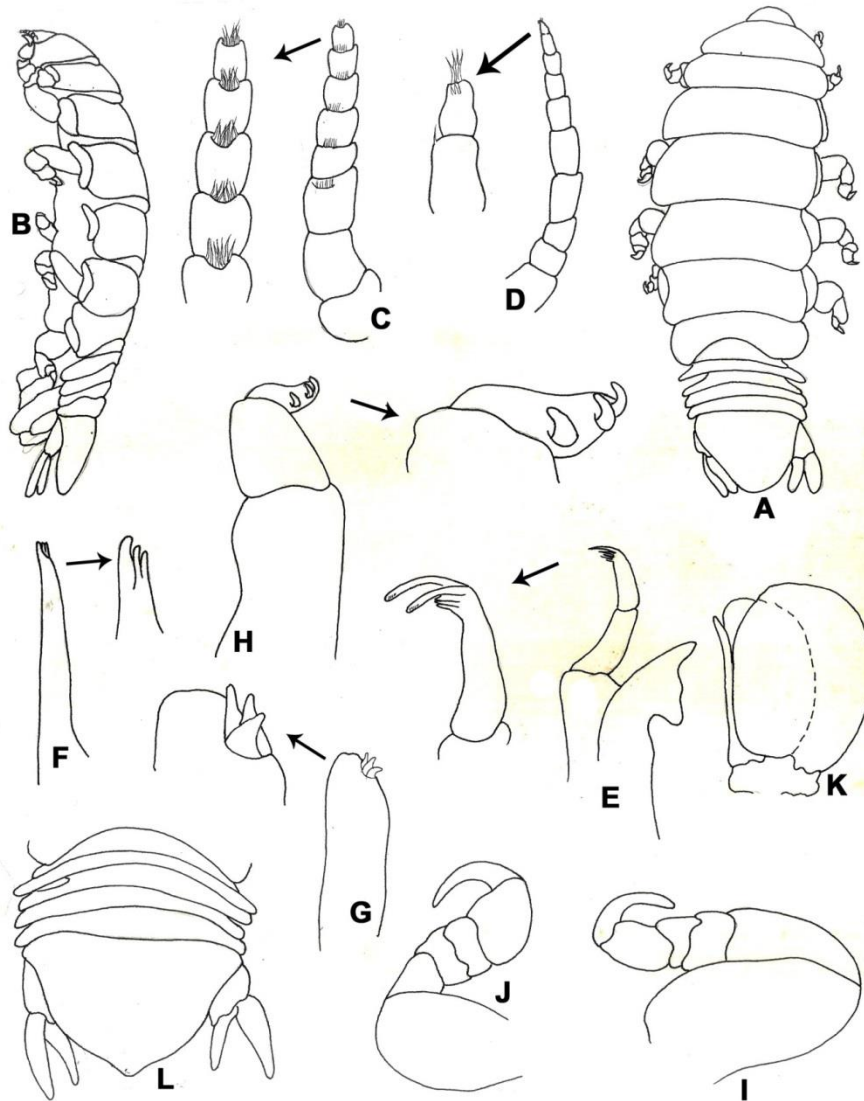


Fig. 1A-L: *Catoessa gruneri*. Figures of male (TL 14 mm) except where indicated. **A,B.** habitus, dorsal and lateral views; **C.** antenna; **D.** antenna 2; **E.** mandible; **F.** maxillule; **G.** maxilla; **H.** maxilliped; **I,J.** pereopod 1 and pereopod 7; **K.** pleopod 2; **L.** female (TL 21mm) pleotelson.

DISCUSSION

The specimens at hand were very similar with those described by Bowman and Tareen (1983) and added here are extra descriptive information and figures.

This particular study focuses on the new occurrence of this harmful isopod *Catoessa gruneri* Bowman and Tareen, 1983, which may affecting the salability of the fish. The largest fish parasites are these isopods, which may cause significant harm to their hosts; inhabiting their buccal cavities and branchial chambers; inflicting harm to gill through attachment and feeding. The extent of damage is directly proportional to the size of the parasite and period of settlement. The workers like Avdeev (1983), Horton and Okamura (2003), Panakkool-Thamban *et al.* (2016), Abdel-Latif (2016), Rajaram *et al.* (2018) and others have found that infestation causes serious problem to host fish either indirectly or directly affecting the physiological status of host. The parasite dose not lead to the death of the host but it still causes loss of weight and this is important in fishes industry, cases of parasitizing the cultured larvae under laboratory conditions have also been reported (Rajkumar *et al.*, 2005). Hosts infested with *C. gruneri* are also given according to their taxonomical status.

World record of host fishes preferences: *Catoessea gruneri* has been reported from the gills of *Aurigequula fasciata*, *Karalla daura*, *Illisha*, *Melastoma*, *Therapon puta*, *Photopectoralis bindus* and *Eubleekeria splendens* collected from different areas, the Arabian Gulf, Malaysia and India (Bowman and Tareen, 1983; Al-Daraji, 1995; Aneesh *et al.*, 2016; Kumar *et al.*, 2017; Ravichandran *et al.*, 2019) and now for the first time collected from Pakistan adding a new host fish *Alepes melanoptera*.

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CONCLUSION

Cymothoids sampling presents certain problems. Different free-living isopods, where specific groups can be collected with appropriate success, it is simply impossible to collect a wide range of parasitic genera through direct collecting, it is therefore expected that more collections at the fish harbours may reveal more new records.

LITERATURE CITED

- Abdel-Latif, H. M. 2016. Cymothoid parasite, *Nerocila orbigni* inflicts great losses on *Tilapia zilli* in lake Qarun at Fayoum province. *International Journal of Innovative studies in Aquatic Biology and Fisheries*, 2(3): 1-9.
- Ahmed, F. and Khan, M. A. 2012. Ectoparasite, *Norileca indica* (Milne Edwards, 1840) (Crustacean, Isopoda, Cymothoidae) from the mouth cavity and branchial chamber of *Rastrelliger kanagurta* (CUV, 1817) from Karachi coast, Pakistan. *Int. J. Biol. Biotech.*, 9 (1-2): 93-97.
- Al-Daraji, S. A. M. 1995. Taxonomical and ecological studies on the metazoan parasites of some marine fishes of Khor Al-Zubair estuary, north-west of the Arabian Gulf. Ph. D. Thesis, Coll. Agric., Univ. Basrah: pp. 182.
- Aneesh, P. T., Helna, A. K. and Sudha, K. 2016. Branchial cymothoids infesting the marine food fishes of Malabar coast. *Journal of Parasitic Diseases*, 40(4): 1270-1277.
- Avdeev, V. V. 1983. On the formation of zoocidium in fishes under the influence of parasitic isopods of the family Cymothoidae. *Parazitologiya Leningrad*, 17: 420-422.
- Bal, D. V. and Joshi, U. N. 1959. Some new isopod parasites on fishes. *Journal of the Bombay Natural History Society*, 56: 563-369.
- Barnard, K. H. 1936. Isopods collected by the R.I.M.S. Investigator. *Records of the Indian Museum Calcutta*, 38: 147-191.
- Bleeker, P. 1857. Recherches sur les Crustacés de l'Inde archipelagique. II. Sur les Isopodes Cymothoadiens de l'archipel Indien. *Natuurkundige Vereeniging in Nederlandsch-Indië, Batavia, Verhandelingen*, 2: 20-40.
- Bowman, T. E. and Tareen, I. U. 1983. Cymothoidae from fishes of Kuwait Arabian Gulf (Crustacea: Isopoda). *Smith. Contrib. Zoo.*, 382: 1-30.
- Bruce, N. L. 1986. Revision of the Isopod crustacean genus *Mothocya* Costa, in Hope 1851 (Cymothoidae: Flabellifera), parasitic on marine fishes. *J. Nat. Hist.*, 20: 1089-1192.
- Bruce, N. L. 1987. Australian species of *Nerocila* Leach, 1818, and *Creniola* n. gen. (Isopoda: Cymothoidae), crustacean parasites of marine fishes. *Records of the Australian Museum*, 39: 355-412.
- Bruce, N. L. 1990. The genera *Catoessa*, *Elthusia*, *Enispa*, *Ichthyoxenus*, *Idusa*, *Livoneca* and *Norileca* n.gen. (Isopoda, Cymothoidae), crustacean parasites of marine fishes, with descriptions of Eastern Australian species. *Rec. Australian Mus.*, 42(3): 247-300.
- Brünnich, T. 1783. *Spicilegia Zoologica e Museis Naturae Curiosorum in itineribus apud exteros reportata. fol. 1765-99*. World Register of Marine Species. Available from: <https://www.gbif.org/fr/species/15556794/verbatim> (accessed 3 June 2019).
- Ghani, N. 2003. Isopod parasites of marine fishes of Pakistan. *Proc. Pak. Congr. Zool.*, 23: 217-221.
- Ghani, N. and Ali, Q. M. 2003. Crustacean Parasites of *Pampus argenteus* Euphrasen from Karachi Waters. *Pakistan J. Bio. Sci.*, 6: 626-628.
- Ghani, N. and Shireen, S. B. 2000. Subsequent record of *Joryma sawayah* Bowman and Tareen 1983. *Pakistan J. Mar. Bio.*, 6(1): 37-42.
- Ghani, N. and Tirmizi, N. M. 1993. Occurrence of *Bopyrella saronae* Bourdon and Bruce, 1979 (Isopoda, Epicaridea) in Karachi waters, northern Arabian Sea. *Crustaceana*, 65(1): 117-120.
- Ghani, N. and Ali, Q. M. 1998. Two representatives of parasitic Isopods. *Catoessa ambassae* Bruce 1990 and *Norileca triangulata* Richardson, 1910 (Cymothoidae) from Marine fishes of Karachi coast. *Proc. Parasitol.*, 26: 55-62.
- Ghani, N. and Shireen, S. B. 1995. Two new records of parasitic isopods from Karachi coast. *Proc. Parasitol.*, 20: 19-30.
- Ghory, F. S., Kazmi, Q. B. and Baloch, A. B. 2010. First report of larval forms of *Paragnathia* sp. (Crustacea: Isopoda: Gnathidae) from Pakistani waters (Makri Creek). *Pakistan J. Mar. Sci.*, 19: (1&2): 45-54.
- Guerin, F. E. 1832. I.re Classe. Crustacés. In: Brullé, A., *Expédition Scientifique de Morée. Section des Sciences Physiques. Tome III.-I.re Partie. Zoologie. Deuxième Section.-Des animaux articulés: 30-50*. Paris.

- Horton, T. and Okamura, B. 2003. Post-haemorrhagic anaemia in sea bass, *Dicentrarchus labrax* (L.), caused by blood feeding of *Ceratothoa oestroides* (Isopoda: Cymothoidae). *Journal of Fish Diseases*, 26(7): 401-406.
- Javed, W. and Yasmeen, R. 1999. A new Parasitic isopod of the genus *Norileca* (Crustacea, Cymothoidae) from the Arabian Sea. *Pakistan J. Mar. Sci.*, 8(1): 55-60.
- Karim, S. I. 1975. Isopod parasites of fishes of Karachi coast. *Rec. Zool. Sur. Pak.*, 5(1-2): 62-72.
- Kumar, A. A., Rameshkumar, G., Ravichandran, S., Nagarajan, R., Prabakaran, K. and Ramesh, M. 2017. Distribution of isopod parasites in commercially important marine fishes of the Miri coast, East Malaysia. *J. Parasit. Dis.*, 41(1): 55-61.
- Lester, R. J. G. 2005. Isopoda (isopods). In: Rohde, K. editor. *Marine Parasitology*. Victoria: CSIRO Publishing. pp. 138-144.
- Milne Edwards H. M. 1840. *Histoire Naturelle des Crustacés comprenant l'anatomie, la physiologie et la classification de ces animaux III*. Paris: Librairie Encyclopédique de Roret; pp. 605.
- Panakkool-Thamban, A., Kottarathil, H. A. and Kappalli, S. 2016. Branchial cymothoids infesting the marine food fishes of Malabar coast. *J. Parasit. Dis.*, 40(4): 1270-1277.
- Rajaram, R., Kumar, K. R., Vinothkumar, S. and Metillo, E. B. 2018. Prevalence of cymothoid isopods (Crustacea, Isopoda) and proximate analysis of parasites and their host fishes, Southeastern India. *J. Parasit. Dis.*, 42(2): 259-268.
- Rajkumar, M., Perumal, P. and Trilles, J. P. 2005. *Cymothoa indica* (Crustacea, Isopoda, Cymothoidae) parasitizes the cultured larvae of the Asian sea bass *Lates calcarifer* under laboratory conditions. *Dis. Aquat. Org.*, 66: 87-90.
- Rameshkumar, G., Ramesh, M., Ravichandran, S. and Trilles, J-P. 2013. Parasitic isopods from marine fishes off Nagapattinam coast, India. *Journal of Parasitic Diseases*, 40(3): 940-944.
- Ravichandran, S., Vigneshwaran, P. and Rameshkumar, G. 2019. A taxonomic review of the fish parasitic isopod family Cymothoidae Leach, 1818 (Crustacea: Isopoda: Cymothoidea) of India. *Zootaxa*, 4622: 001-099.
- Richardson, H. 1910. Marine isopods collected in the Philippines by U. S. Fisheries steamer "Albatross" in 1907-1908. Department of Commerce and Labor (USA) Bureau of Fisheries Document, 736: 1-44.
- Schioedte, J. C. and Meinert, F. W. 1881. *Symbolae ad Monographiam Cymothoarum Crustaceorum Isopodum Familiae 2. Anilocridae*. *Naturhistorisk Tidsskrift*, 13: 1-166.
- Shireen, S. B. 2001. Description of four parasitic isopods belonging to the genera *Elthusa*, *Anilocra* and *Norileca* from Karachi coast. *Pak. J. Mar. Biol.*, 7(1): 81-104.
- Shireen, S. B. and Ghani, N. 2000. Three new enlistment of parasitic isopods from marine fishes of Karachi coast. *Proc. Parasitol.*, 29: 67-82.
- Smit, N. J. and Davies, A. J. 2004. The curious life-style of the parasitic stages of gnathiid isopods. *Adv. Parasit.*, 58: 289-39.
- WoRMS. Isopoda: World List of Marine, Freshwater and Terrestrial Isopod Crustaceans. Schotte, M., Boyko, C. B., Bruce, N. L., Poore, G. C. B., Taiti, S. and Wilson, G. D. F. (eds), 2010-10-05.

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