Zootaxa 2876: 57–68 (2011)
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

Cymothoa hermani sp. nov. (Isopoda, Cymothoidae, Crustacea), a parasitic isopod, collected off the Zanzibar coast, Tanzania from the mouth of a parrotfish (Scaridae)

KERRY A. HADFIELD[1], NIEL L. BRUCE[1,2] & NICO J. SMIT[1,3,4]

[1]*Department of Zoology, University of Johannesburg, P.O. Box 524, Auckland Park, 2006 South Africa. E-mail: ecology@uj.ac.za*
[2]*Museum of Tropical Queensland, Queensland Museum and School of Marine and Tropical Biology, James Cook University; 70–102 Flinders Street, Townsville, Australia 4810. E-mail: niel.bruce@qm.qld.gov.au*
[3]*Current address: School of Environmental Sciences and Development, Potchefstroom Campus, North-West University, Private Bag X6001, Potchefstroom, 2520 South Africa. Email: Nico.Smit@nwu.ac.za*
[4]*Corresponding author*

Abstract

Cymothoa hermani sp. nov., a buccal fish-parasitic isopod is described from off Unguja Island, Zanzibar, from the buccal cavity of the marbled parrotfish, *Leptoscarus vaigiensis*. *Cymothoa hermani* sp. nov. is characterised by the unique bulbous ornamentation on pereonite 1, anterolateral angles on pereonite 1 rounded and produced past frontal margin of cephalon, and pereopods with long and slender dactyli. There are no other species of *Cymothoa* known from parrotfishes. This description increases the number of known *Cymothoa* from the southwestern Indian Ocean to four.

Key words: *Leptoscarus vaigiensis*, fish parasites, Africa, Indian Ocean, Cymothoidae, *Cymothoa*, buccal cavity

Introduction

Cymothoid isopods are permanent ectoparasites of marine and freshwater fishes, surviving primarily on a hematophagous diet (Trilles 1991). They attach to the external surfaces, gills or in the buccal cavity of their fish host. Those cymothoid isopods that attach in the buccal cavity of hosts belong to a number of different genera and are commonly referred to as tongue-replacement or tongue-biter isopods due to the large female almost always found attached to the host's tongue. Two of the most common genera of tongue-biters in the south-western Indian Ocean are *Ceratothoa* Dana, 1852 and *Cymothoa* Fabricius, 1793. These isopods are potentially economically important parasites as they have been shown to cause detrimental effects on fish in captivity including growth inhibition, anaemia and death in smaller fish (Adlard & Lester 1994, Horton & Okamura 2001, Mladineo 2002, Ravi & Rajkumar 2007).

There is little known about the Cymothoidae in the southwestern Indian Ocean (Bruce 1986, Kensley 2001, Richmond 2002) with the most recent contribution being a review of the monotypic genus *Cinusa* Schioedte and Meinert, 1884 from this area (Hadfield *et al.* 2010). *Cymothoa* itself is correspondingly also very poorly documented in this region, though records from Australia (Poore 2002), Caribbean (Kensley & Schotte 1989) and East Pacific (Brusca 1981) indicate the wide range of this genus and the potential for new species to be found in the southern Africa region. This contribution records one new species in this region. To facilitate further collections of these isopods we provide a detailed description for this species and a few notes on the genus.

Material and methods

Appendages were dissected with the aid of dissecting needles and forceps, stained with lignin pink and observed with the aid of a Lecia MZ125 stereomicroscope, Olympus BX41 light microscope and a WILD Heerbrugg TYP

Accepted by J. Svavarsson: 29 Nov. 2010; published: 12 May 2011

308700 dissection microscope with camera lucida. Drawings of each appendage were made and compared to other known species of *Cymothoa*. Descriptions were prepared in DELTA (Descriptive Language for Taxonomy, see Coleman *et al*. 2010) using a general Cymothoidae character set. The host was identified by Dr Ofer Gon, Senior Marine Scientist, South African Institute for Aquatic Biodiversity (SAIAB), Grahamstown, South Africa and nomenclature and distribution data were obtained from *FishBase* (Froese & Pauly 2010).

Taxonomy

Suborder Cymothoida Wägele, 1989

Superfamily Cymothooidea Leach, 1814

Family Cymothoidae Leach, 1814

Genus *Cymothoa* Fabricius, 1793

Restricted synonymy
Cymothoa.– Kussakin, 1979: 289.– Brusca, 1981: 185.– Trilles, 1994: 137.

Diagnosis of adult female. Body elongate, bilaterally symmetrical. Cephalon immersed in pleonite 1. Antennae slender, basal articles widely separated and not expanded, antennule more stout than antenna. Pereonites with lateral margins rounded. Pereonite 1 with anterolateral angles produced to some extent around cephalon. Pereonite 7 laterally encompassing pleon. Coxae 5–7 not extending beyond posterior margin of pereonite. Pereopods 1–3 shorter than 4–7 with no carina, pereopods 4–7 each with carina on basis. Pleon narrowest at pleonite 1, pleonites increasing in length and width from anterior to posterior. Pleotelson without median point. Pleopods without setae, exopod larger than endopod. Pleopods with exopod and endopods generally distally broadly rounded, peduncle without retinaculae.

Type species: *Oniscus oestrum* Fabricius, 1793, by subsequent designation (Kussakin 1979).

Remarks. Brusca (1981) considered *Cymothoa* to be one of the most poorly understood genera in the Cymothoidae with only two or three of the then thirty known species that could be regarded as being fully described at the time of writing. Only five more species of *Cymothoa* have been described since the 1980s, and thus Brusca's (1981) statement is still relevant as no attempt has yet been made to revise this genus.

The other common buccal cavity inhabiting genera in the south-western Indian Ocean are *Ceratothoa* Dana, 1852 and *Cinusa* Schioedte and Meinert, 1884. *Cymothoa* has widely seperated antenna bases, while *Cinusa* has narrowly separated bases; *Ceratothoa* has contiguous antennal bases and the antennae are also conspicuously expanded (Hadfield *et al*. 2010).

Of the current 48 known *Cymothoa* species (see Schotte *et al*. 2010) only three have been reported from the south-western Indian Ocean namely *C. borbonica* Schioedte & Meinert, 1884, *C. eremita* (Brünnich, 1783) and *C. rotundifrons* Haller, 1880 (Kensley 2001). *Cymothoa borbonica* has been recorded from Reunion Island (Schioedte and Meinert 1884, Monod 1934), Maldives (Stebbing 1904), South Africa (Barnard 1920), Mozambique (Barnard 1926), Madagascar (Barnard 1960, Trilles 1975, Trilles 1979) and Mauritius (Trilles 1975). *Cymothoa eremita* has been recorded from Mauritius (Leach 1818), the Seychelles Islands (Milne Edwards 1840), and Zanzibar (Stebbing 1910), and *C. rotundifrons* is known only from the type locality, Mauritius (Haller 1880).

Cymothoa hermani sp. nov.
Figures 1–7

Material examined. *Holotype*. ♀ 28 mm, Miwi Island, Kiwani Bay, Unguja Island, Zanzibar, Tanzania, 06°21'S, 39°20'E, 26 April 2008, coll. H. Van der Bank (SAMC A47890).

Paratypes. ♀ 23 mm (mouthparts dissected), 2 ♂ 14 mm, 15 mm, same data as holotype (SAMC A47891).

Type host. Removed from the buccal cavity of *Leptoscarus vaigiensis* (Quoy & Gaimard, 1824) Host held in the South African Institute for Aquatic Biodiversity (SAIAB 96718).

Ovigerous female. Length 28.0 mm, width 17.0 mm.

Body 1.9 times as long as greatest width, dorsal surfaces rugose; widest at pereonite 3, most narrow at pereonite 7, lateral margins subparallel. *Cephalon* twice as long as wide, triangular and not visible from dorsal view. *Frontal margin* rounded, forming blunt rostrum. *Eyes* absent. *Pereonite 1* anterolateral angle rounded and produced past frontal margin of cephalon, with unique bulbous orientation; posterior margins of pereonites smooth and straight. Coxae 2–3 with posteroventral angles rounded; coxae 4–7 with small, distinct points. Pereonites 1–3 increasing in length and width posteriorly; pereonites 4–7 decreasing in length and width posteriorly; pereonites becoming progressively more rounded posteriorly. *Pleon* visible in dorsal view, pleonites posterior margin concave; posterolateral angles of pleonite 2 forming acute point, not posteriorly produced; pleonites 3–5 similar in form to pleonite 2; pleonite 5 with posterolateral angles free, not overlapped by lateral margins of pleonite 4, posterior margin slightly concave. *Pleotelson* 0.5 times as long as anterior width, dorsal surface with 2 submedial depressions, lateral margins concave, posterior margin truncate.

Antennule comprised of 8 articles; peduncle articles 1 and 2 distinct and articulated; article 2 as long as article 1; article 3 as long as wide, 0.4 times as long as combined lengths of articles 1 and 2. *Antenna* peduncle article 3 1.5 times as long as article 2, 1.8 times as long as wide; article 4 as long as wide, 0.6 times as long as article 3; article 5 as long as wide, as long as article 4. Antenna flagellum with 4 articles, article 4 without setae. *Labrum* lateral margins straight, diverging slightly towards anterior, anterior margin rounded, with median indentation, without small median point. *Mandibular process* ending in acute incisor, mandible palp article 2 and 3 without setae. *Maxillule* simple with 4 terminal robust setae. *Maxilla* mesial lobe partly fused to lateral lobe and covered in pectinate scales; lateral lobe with 3 recurved robust setae; mesial lobe with 3 large recurved robust setae. *Maxilliped* covered in pectinate scales, oostegite lobe lamellar. Maxilliped palp article 2 with 20 simple setae, article 3 with 9 recurved robust setae. Oostegites smooth, without setae.

Pereopod 1 basis 2.2 times as long as greatest width; ischium 1.3 times as long as basis; merus proximal margin without bulbous protrusion; carpus with rounded proximal margin; propodus 1.8 times as long as wide; dactylus slender, 1.4 as long as propodus, 3.5 times as long as basal width. *Pereopod 2* propodus 1.9 as long as wide; dactylus 1.6 as long as propodus. *Pereopod 3-6* similar to pereopod 2 and gradually increasing in size towards posterior, all without robust or simple setae. *Pereopod 7* basis 1.2 times as long as greatest width; ischium 1.4 as long as basis; merus proximal margin with slight bulbous protrusion, merus 0.3 as long as ischium, 0.6 times as long as wide, with slight bulbous protrusion; carpus 0.5 as long as ischium, 1.2 times as long as wide; propodus 0.8 as long as ischium, 1.8 times as long as wide; dactylus slender, 1.3 as long as propodus, 3.5 times as long as basal width.

Pleopods with slight depression on central dorsal surface of each pleopod ramus. *Pleopod 1* exopod 0.8 times as long as wide, lateral margin weakly convex, mesial margin weakly produced; endopod as long as wide, lateral margin straight, mesial margin slightly convex; peduncle 2.3 times as wide as long. Pleopods 2–3 simple, similar to pleopod 1, mesial margins becoming more strongly produced. Pleopods 3–5 endopods proximal borders extending below exopod to peduncle; large medial lobes present and increasing in size from pleopod 1 to 5.

Uropod half as long as pleotelson, peduncle 1.1 times as long as rami, lateral margin without setae, rami not extending beyond pleotelson, marginal setae absent, apices narrowly rounded. *Endopod* apically slightly pointed, 2.9 times as long as greatest width, lateral margin weakly convex, setae absent, mesial margin weakly convex. *Exopod* not extending to end of endopod, narrower and slightly shorter than endopod, 4 times as long as greatest width, apically rounded, lateral margin weakly convex, without setae, mesial margin weakly convex.

Male. Length 14.0–15.0 mm, width 6.0–6.2 mm.

Males similar to females but smaller. Body rectangular, 1.5 times as long as wide. Cephalon visible in dorsal view, with less obvious bulbous ornamentation on pereonite 1. Antenna with 10 articles. Setae present on mandibular palp article 3. Pleopods simple, with less folds on endopod. Pleopod 2 appendix masculina with parallel margins, as long as endopod, distally narrowly rounded.

Colour. Tan in ethanol preserved specimens.

Distribution. Currently only known from the type location, off Miwi Island, Kiwani Bay, Unguja, Zanzibar, Tanzania. The host, *Leptoscarus vaigiensis* is found from the northern Red Sea to South Africa and eastwards to Japan and New Zealand.

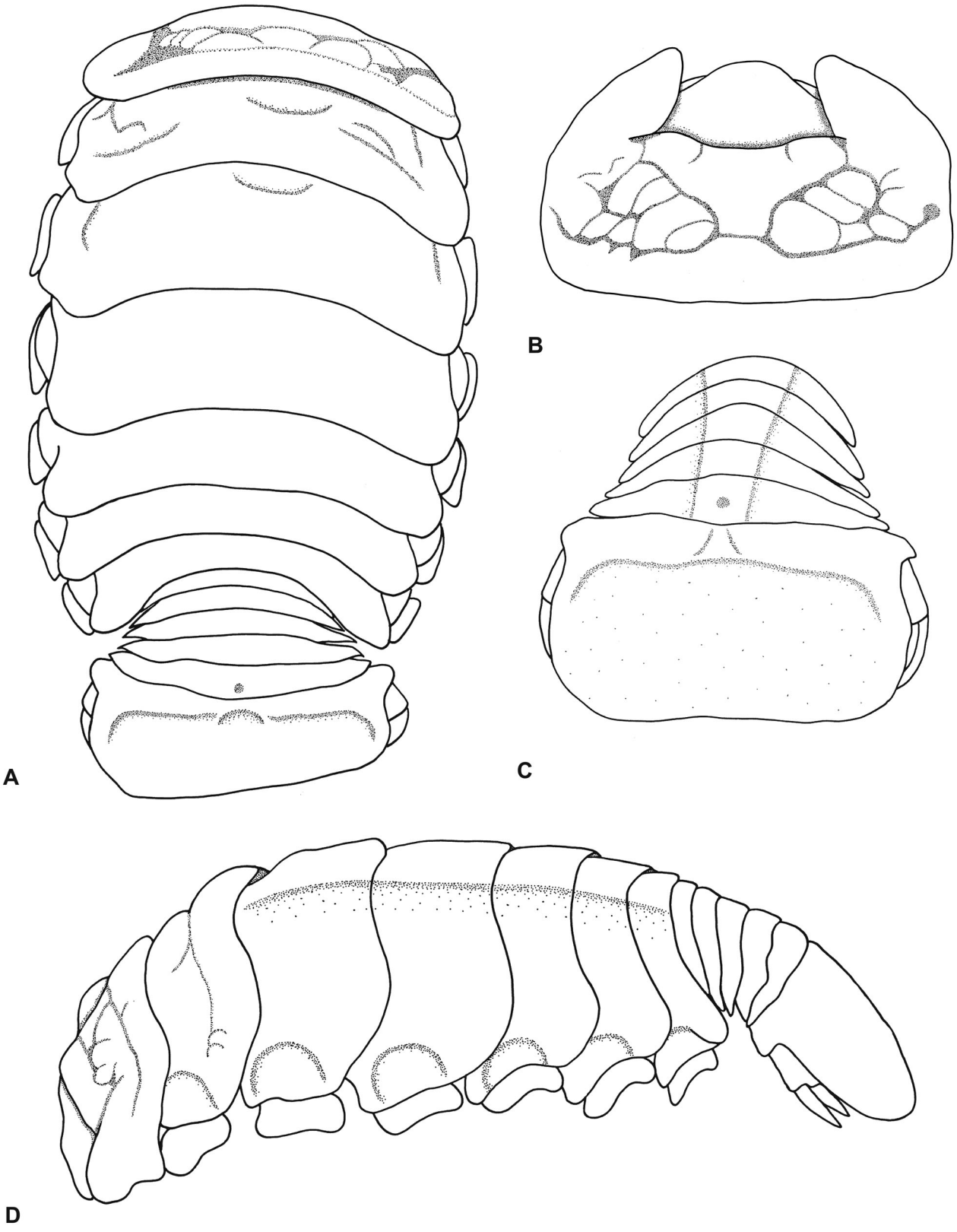

FIGURE 1. *Cymothoa hermani* sp. nov., female holotype (28.0 mm) (SAMC A47890). A, full length dorsal view; B, front view of pereonite 1 and cephalon; C, dorsal view of pleotelson; D, lateral view of body.

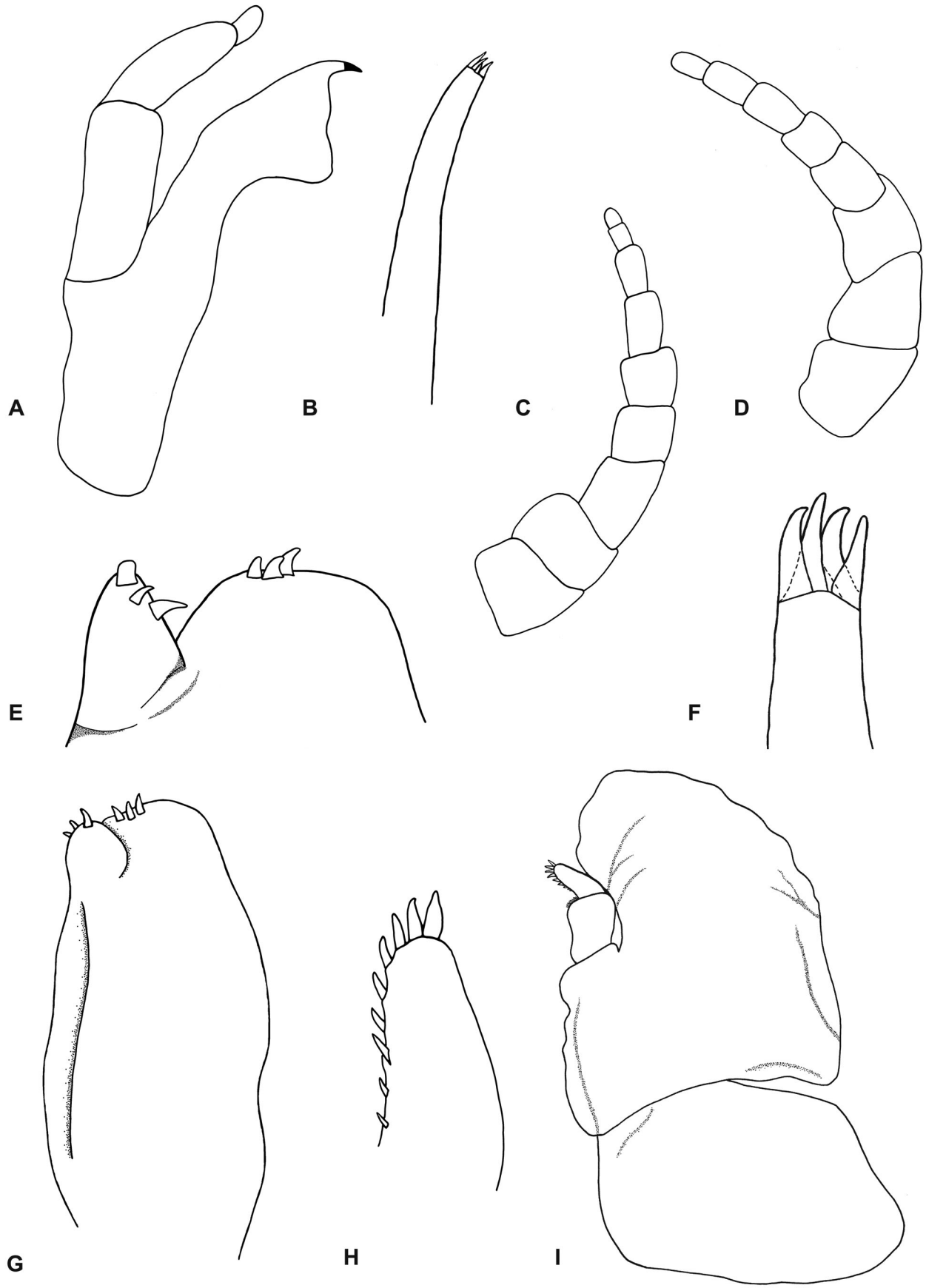

FIGURE 2. *Cymothoa hermani* sp. nov., female paratype (23.0 mm) (SAMC A47891). A, right mandible; B, right maxillule; C, antennule; D, antenna; E, tip of maxilla; F, tip of maxillule; G, left maxilla; H, maxilliped article 3; I, left maxilliped.

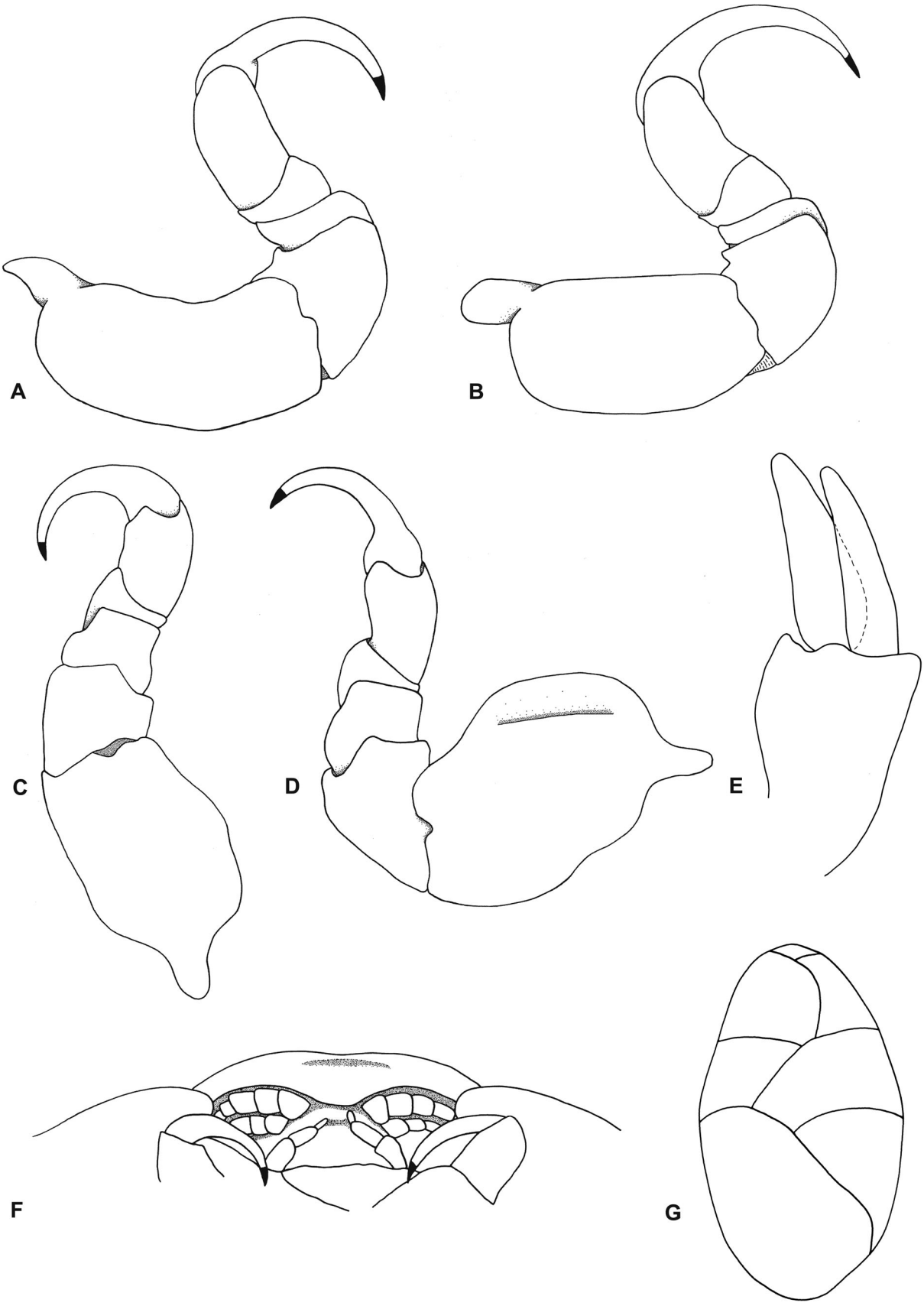

FIGURE 3. *Cymothoa hermani* sp. nov., female holotype (28.0 mm) (SAMC A47890). A, pereopod 1; B, pereopod 2; C, pereopod 6; D, pereopod 7; E, uropod; F, ventral view of cephalon; G, oostegites.

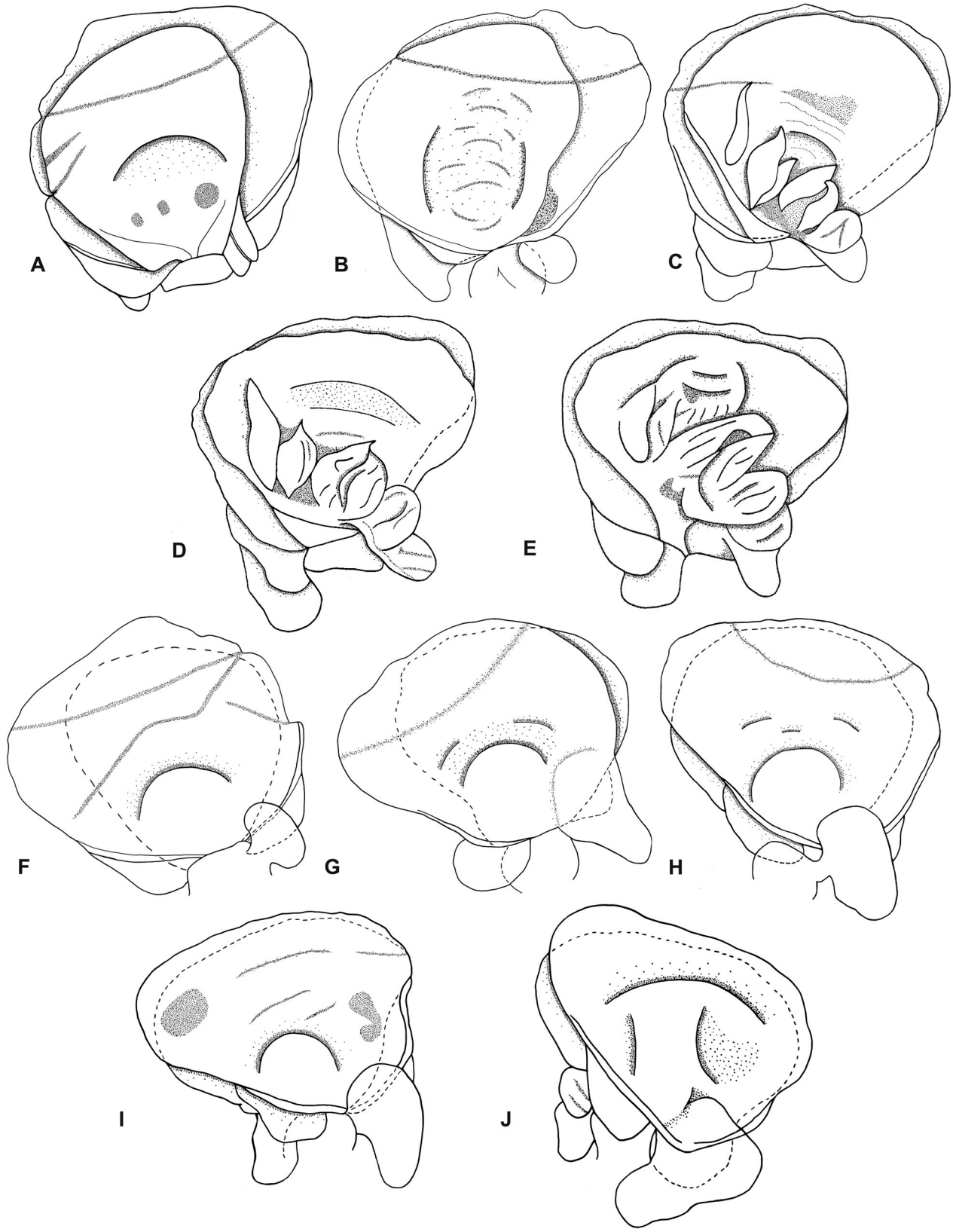

FIGURE 4. *Cymothoa hermani* sp. nov., female paratype (23.0 mm) (SAMC A47891). A, dorsal pleopod 1; B, dorsal pleopod 2; C, dorsal pleopod 3; D, dorsal pleopod 4; E, dorsal pleopod 5; F, ventral pleopod 1; G, ventral pleopod 2; H, ventral pleopod 3; I, ventral pleopod 4; J, ventral pleopod 5.

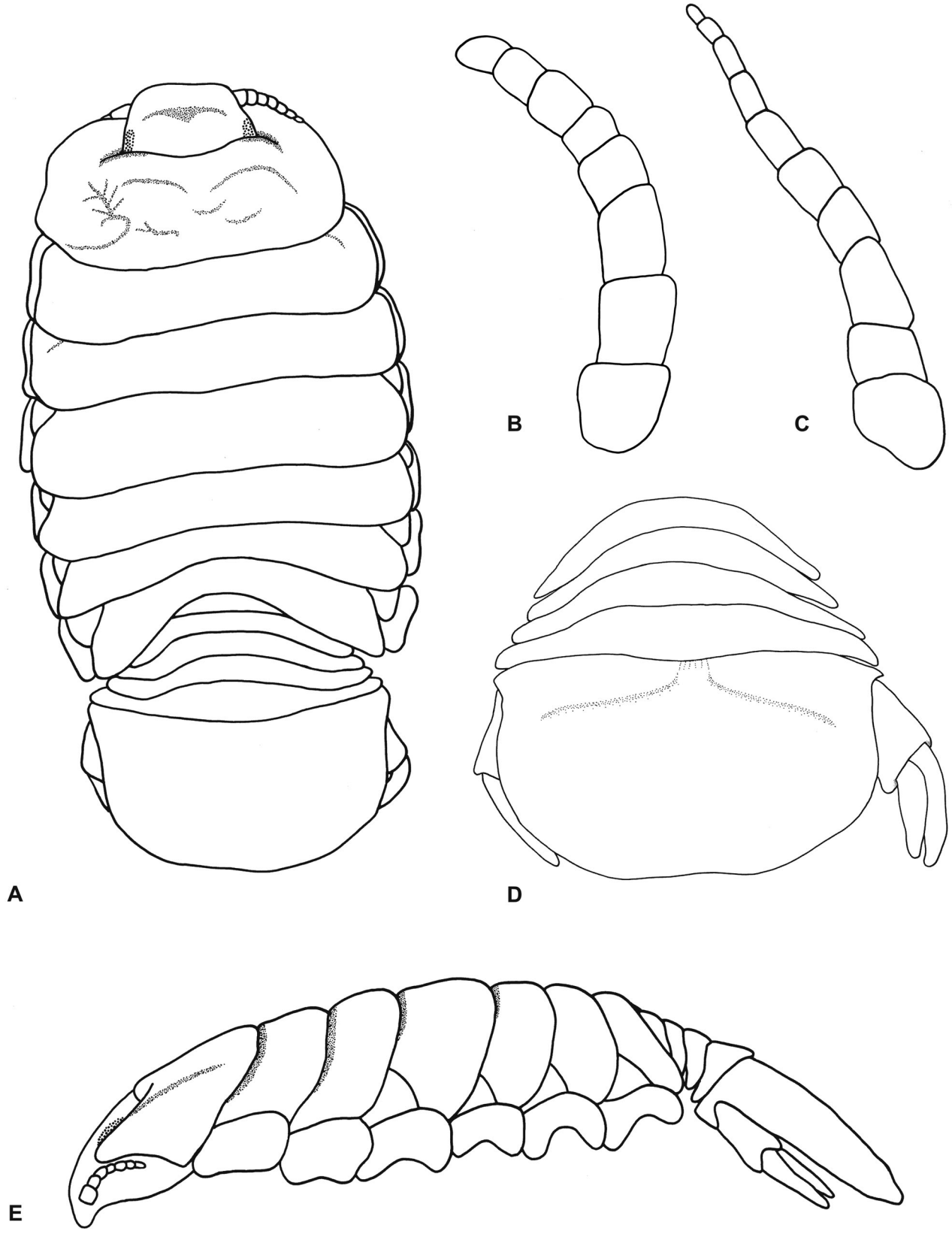

FIGURE 5. *Cymothoa hermani* sp. nov., male paratype (14.0 mm) (SAMC A47891). A, full length dorsal view; B, antennule; C, antenna; D, dorsal view of pleotelson; E, lateral view of body.

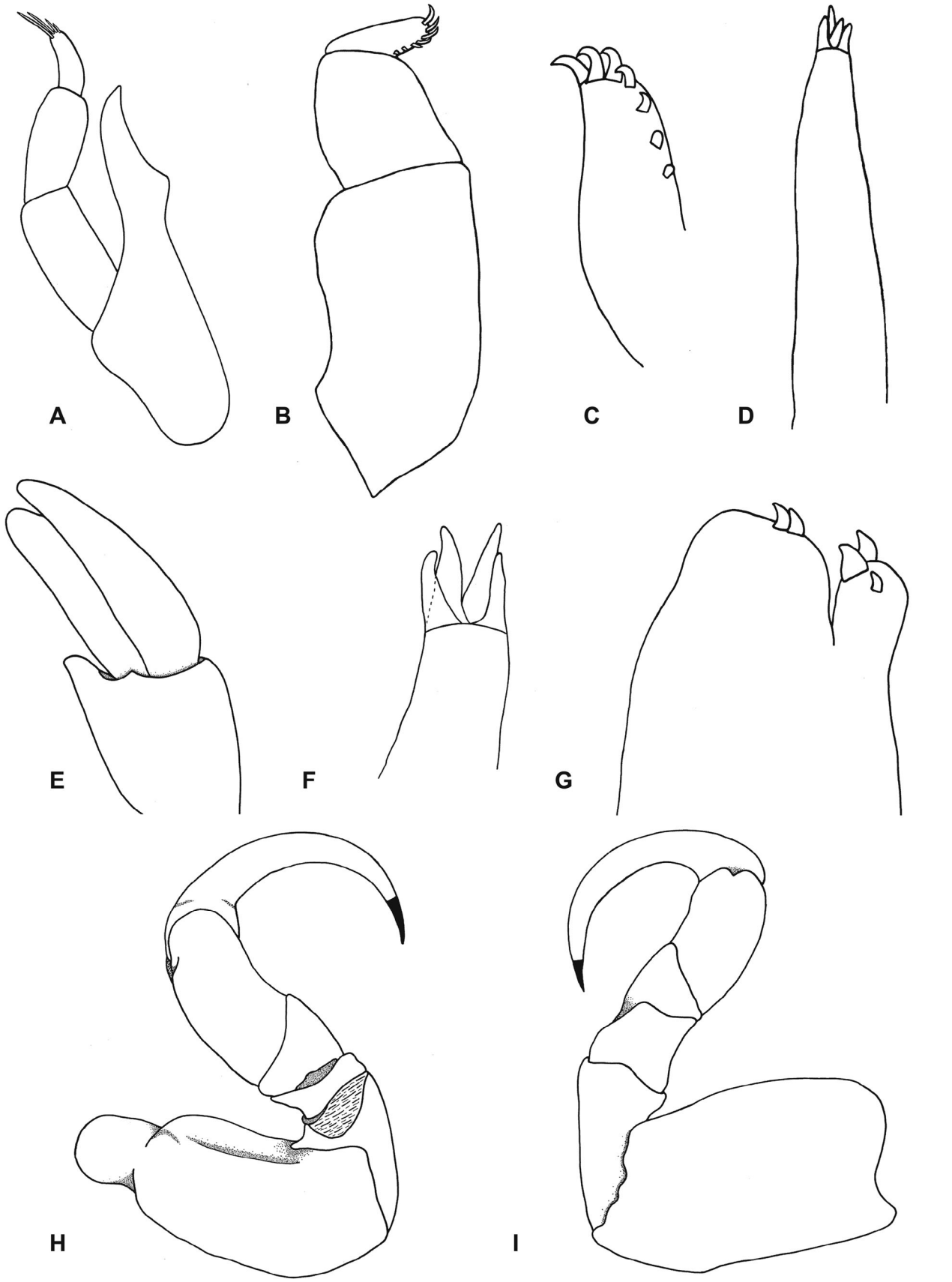

FIGURE 6. *Cymothoa hermani* sp. nov., male paratype (14.0 mm) (SAMC A47891). A, right mandible; B, left maxilliped; C, maxilliped article; 3, D, left maxillule, E, uropod; F, maxillule tip; G, left maxilla; H, pereopod 1; I, pereopod 7.

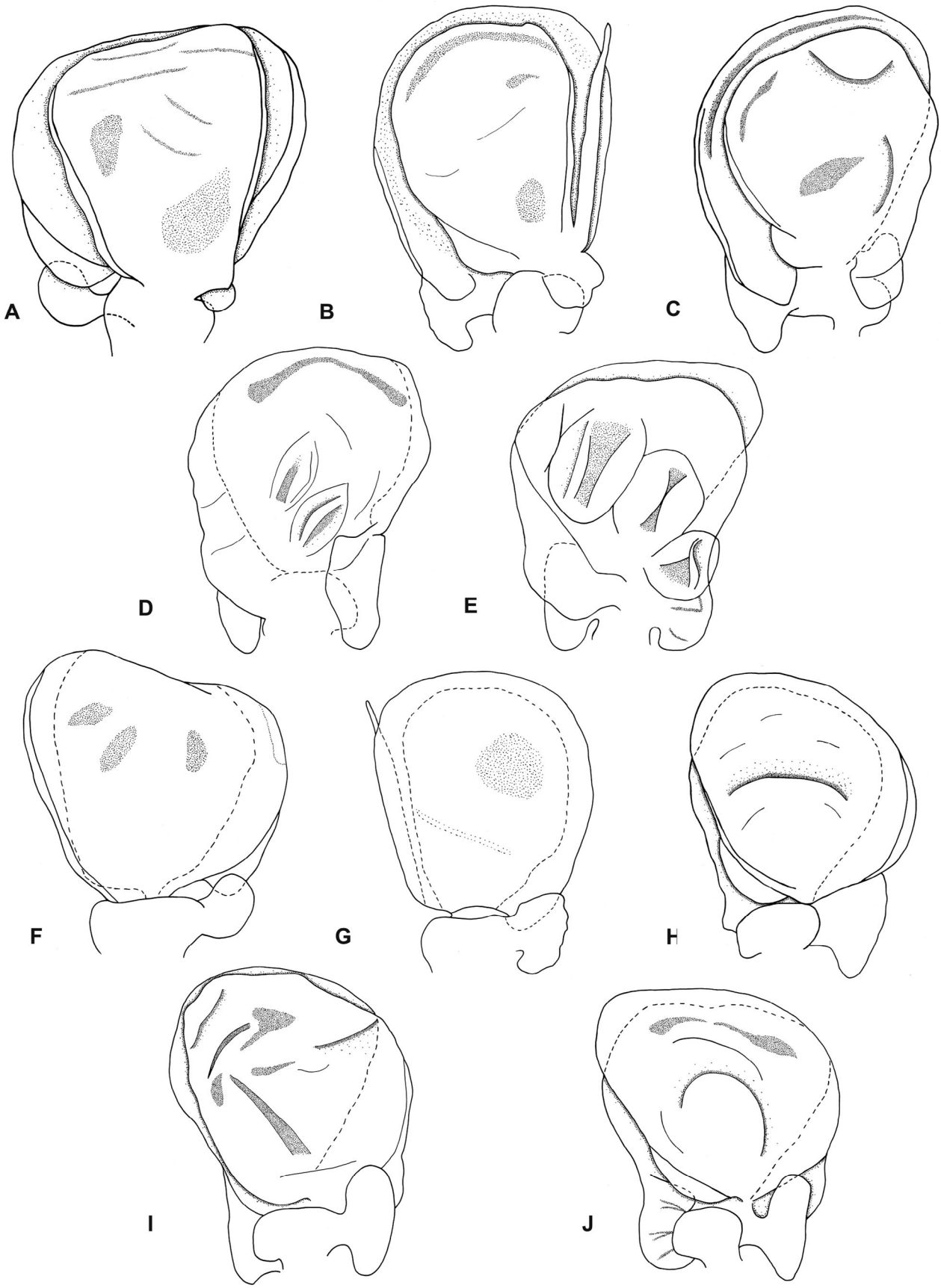

FIGURE 7. *Cymothoa hermani* sp. nov., male paratype (14.0 mm) (SAMC A47891). A, dorsal pleopod 1; B, dorsal pleopod 2; C, dorsal pleopod 3; D, dorsal pleopod 4; E, dorsal pleopod 5; F, ventral pleopod 1; G, ventral pleopod 2; H, ventral pleopod 3; I, ventral pleopod 4; J, ventral pleopod 5.

Etymology. Named after Prof. Herman van der Bank (University of Johannesburg) who collected this species on one of his research trips.

Remarks. *Cymothoa hermani* sp.nov. can be identified by the unique bulbous ornamentation on pereonite 1, anterolateral angles on pereonite 1 rounded and produced past frontal margin of cephalon, long and slender dactyli and the numerous lobes on pleopods 4 and 5 in the ovigerous female. No other species in the genus shows this unique combination of characters. There are currently no other described species of *Cymothoa* known from parrotfishes, although at least one species has been collected from parrotfish in Queensland (Museum of Tropical Queensland, QM W8961). The host, *Leptoscarus vaigiensis*, ('marbled parrotfish') is known from the Indo-Pacific (northern Red Sea and South Africa to Easter Island, north to southern Japan, south to Poor Knight's Island in New Zealand and Rottnest Island in Australia), and from the southeast Atlantic (False Bay, South Africa). It is known to inhabit seagrass areas or areas with hard substrates heavy with algal cover as it feeds on the seagrass and algae (Froese & Pauly 2010).

Three species of *Cymothoa* are recorded from the south-western Indian Ocean to date, namely *C. borbonica*, *C. eremita* and *C. rotundifrons*. *Cymothoa borbonica* is similar to *C. hermani* but differs in having shorter uropods and a larger pleotelson which has a rounded posterior margin compared to the small rectangular pleotelson seen in *C. hermani*. *Cymothoa rotundifrons* differs from *C. hermani* in having two lateral depressions on pereonites 3 and 4, three near-parallel lines of sunken pits on pereonites 5 and 6, and the pleon not narrowing posteriorly.

Cymothoa eremita, the only other *Cymothoa* species known from Zanzibar, differs in that it does not show the characteristic bulbous ornamentation on pereonite 1 that is present in *C. hermani*. The cephalon of *C. eremita* is visible dorsally, the anterolateral margin of pereonite 1 is not produced past the cephalon, and the lateral pereonite margins are more acutely produced than in *C. hermani*. Furthermore, the pleonite posterior margins are irregular in *C. eremita* with the pleonite 5 appearing to have very distinctly produced sub-medial points; *C. eremita* has a much wider than long cephaloson compared to the much longer than wider *C. hermani* cephalon. The host species for *C. eremita* in Zanzibar is not known, but hosts for *C. eremita* elsewhere include a diverse range of species from the families Coryphaenidae, Stromateidae, Chloropthalmidae and Psettodidae (Trilles 1994).

Acknowledgements

The financial assistance of the National Research Foundation (NRF) towards this research is hereby acknowledged (project FA2005022500012). Opinions expressed and conclusions arrived at, are those of the authors and are not necessarily to be attributed to the NRF. Special thanks to Prof. Herman van der Bank for collecting these isopods on his research trip to Zanzibar; as well as to Dr Ofer Gon, Senior Marine Scientist, South African Institute for Aquatic Biodiversity (SAIAB), Grahamstown, South Africa for identifying the host. Thanks also to the organizations that provided the authors with funding to travel: NLB thanks the University of Johannesburg for providing airfare and accommodation costs for his visits in 2008 and 2010; KLH thanks the South African Biosystematics Initiative (SABI) for the International Travel Grant awarded to her to visit Australia in 2010.

References

Adlard, R.D. & Lester, R.J.G. (1994) Dynamics of the interaction between the parasitic isopod, *Anilocra pomacentri*, and the coral reef fish, *Chromis nitida*. *Parasitology*, 109(3), 311–324.

Barnard, K.H. (1920) Contributions to the Crustacean fauna of South Africa. 6. Further additions to the list of marine Isopoda. *Annals of the South African Museum*, 17, 319–438.

Barnard, K.H. (1926) Report on a collection of Crustacea from Portuguese East Africa. *Transactions of the Royal Society of South Africa*, 13, 119–129.

Barnard, K.H. (1960) Isopoda parasitic on Madagascar fish. *Institute Scientifique de Madagascar, Office de la Recherche Scientifique et Technique Outre-mers. Memoires, série F*, 3, 93–95.

Brunnich, M. (1783) Spicilegia Zoologica e Museis Naturae Curiosorum in itineribus apud exteros reportata.fol. 1765–99.

Brusca, R.C. (1981) A monograph on the Isopoda Cymothoidae (Crustacea) of the eastern Pacific. *Zoological Journal of the Linnean Society*, 73(2), 117–199.

Bruce, N.L. (1986) Revision of the isopod crustacean genus *Mothocya* Costa, in Hope, 1851 (Cymothoidae: Flabellifera), parasitic on marine fishes. *Journal of Natural History*, 20, 1089–1192.

Coleman, C.O., Lowry, J.K. & Macfarlane, T. (2010) DELTA for Beginners. An introduction into the taxonomy software package DELTA. *ZooKeys*, 45, 1–75.
Dana, J.D. (1852) On the classification of the Crustacea Choristopoda or Tetradecapoda. *American Journal of Sciences and Arts*, 2(14), 297–316.
Fabricius, J.C. (1793) Entomologica systemica emendata et acuta, Secundum classes, ordines, genera, species, adjectis synonymis, locis, observationibus, descriptionibus. Hafniae: C.G. Proft Vol. 2 pp. viii 519.
Froese, R. & Pauly, D. (Eds). (2010) FishBase. World Wide Web electronic publication. www.fishbase.org, version (07/2010).
Hadfield, K.A., Bruce, N.L. & Smit, N.J. (2010) Redescription of the monotypic genus *Cinusa* Schioedte and Meinert, 1884 (Isopoda, Cymothoidae), a buccal-cavity isopod from South Africa. *Zootaxa*, 2437, 51–68.
Haller, G. (1880) Ueber einige neue Cymothöinen. *Archiv für Naturgeschichte*, 46, 375–95, pl.18.
Horton, T. & Okamura, B. (2001) Cymothoid isopod parasites in aquaculture: a review and case study of a Turkish sea bass (*Dicentrarchus labrax*) and sea bream (*Sparus auratus*) farm. *Diseases of Aquatic Organisms*, 46(3), 181–187.
Kensley, B. (2001) Biogeography of the marine Isopoda of the Indian Ocean, with a check-list of species and records. In: Kensley, B. & Brusca, R.C. (Eds.) *Isopod Systematics and Evolution*. Crustacean Issues 13. A.A. Balkema, Rotterdam, p 205–264.
Kensley, B. & Schotte, M. (1989) *Guide to the Marine Isopod Crustaceans of the Caribbean*. Smithsonian Institution Press, Washington, D.C. & London, 1–308 pp.
Kussakin, O.G. (1979) *Marine and brackishwater likefooted Crustacea (Isopoda) from the cold and temperate waters of the Northern Hemisphere. Suborder Flabellifera. Opredeliteli po Faune SSSR, Izdavaemye Zoologicheskim Institutom Akademii Nauk SSSR*. Izdatel'stvo Nauka, Leningrad [In Russian], 1, 3–472.
Leach, W.E. (1818) Cymothoadées. In Cuvier, F. (Ed), *Dictionnaire des Sciences Naturelles*, 12. Paris. pp 338–354.
Milne Edwards, H. (1840) Histoire Naturelle des Crustaces, comprenant l'anatomie, la physiologie et la classification de ces animaux, vol 3. Paris: Roret, pp 605.
Mladineo, I. (2002) Prevalance of *Ceratothoa oestroides* (Risso, 1826), a cymothoid isopode parasite, in cultured sea bass *Dicentrarchus labrax L.* on two farms in middle Adriatic Sea. *Acta Adriatica*, 43(1), 97–102.
Monod, T. (1934) Isopodes marins des campagnes du 'de Lanessan'. *Notes de l'Institut Océanographique de l'Indochine, Saigon*, 23, 1–22, pls 1–45.
Poore, G.C.B. (2002) Crustacea: Malacostra: Syncarida, Percarida: Isopoda, Tanaidacea, Mictacea, Thermosbaenacea, Spelaeogriphacea. In: Zoological Catalogue of Australia, edited by W. W. K. & Beesley P. L. eds In Houston, Melbourne: CSIRO Publishing Australia, p. 1–434.
Quoy, J.R.C. & Gaimard, J.P. (1824) Description des Poissons. Chapter IX. In: Freycinet, L. de, *Voyage autour du Monde exécuté sur les corvettes de L. M. "L'Uranie" et "La Physicienne," pendant les années 1817, 1818, 1819 et 1820*. Paris. Voyage Uranie, Zoology. 192–401, pls. 43–65.
Ravi, V. & Rajkumar, M. (2007) Effect of isopod parasite, *Cymothoa indica* on Gobiid fish, *Oxyurichthys microlepis* from Parangipettai coastal waters (South east coast of India). *Journal of Environmental Biology*, 28, 251–256.
Richmond, M.D. (Eds). (2002) A Field Guide to the Seashores of Eastern Africa and the Western Indian Ocean Islands. 2nd edition. Stockholm, Sweden, SIDA, SAREC & University of Dar es Salaam, 1–461 pp.
Schioedte, J.C. & Meinert, F.W. (1884) Symbolae ad Monographiam Cymothoarum Isopodum Familiae 4. Cymothoidae. Trib. II. Cymothoinae. Trib. III. Livonecinae. *Naturhistorisk Tidsskrift*, 14(3), 221–454.
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 19 Oct 2010]
Stebbing, T.R.R. (1904) Marine Crustaceans. XII. Isopoda, with description of a new genus. *In:* Gardiner, J.S. (Ed.) *Fauna and Geography of the Maldive and Laccadive Archipelagoes*. Cambridge, Cambridge University Press Vol. 2. 699–721. XLIX–LIII.
Stebbing, T.R.R. (1910) General catalogue of South African Crustacea. Part V. of S.A. Crustacea, for the Marine Investigations in South Africa. *Annals of the South African Museum*, 6, 281–594, pls 16–22.
Trilles, J.P. (1975) Les Cymothoidae (Isopoda, Flabellifera) des collections du Muséum National d'Histoire naturelle de Paris. III. Les Cymothoinae Schioedte et Meinert, 1884. Genre *Cymothoa* Fabricius, 1787. *Bulletin du Muséum National d'Histoire Naturelle, Paris, 4e série, Zoologie*, 318(225), 977–993.
Trilles, J.P. (1979) Les Cymothoidae (Isopoda, Flabellifera; parasites de poissons) du Rijksmuseum van Natuurlijke Historie te Leiden II. Afrique, Amerique et regions Indo-Ouest-Pacifique. *Zoologische Mededelingen (Leiden)*, 54, 245–275.
Trilles, J.P. (1991) Present researches and perspective on Isopoda (Cymothoidae and Gnathiidae) parasites of fishes (systematics, faunistics, ecology, biology and physiology). *Wiadomosci Parazytologiczne*, 37, 141–143.
Trilles, J.P. (1994) Les Cymothoidae. *Studia Marina*, 21, 1–288.