



Two new sponge inhabiting leucothoid amphipod species from the Western Atlantic

VICTORIA M. CUMMINGS¹, KRISTINE N. WHITE^{2*} & JAMES DARWIN THOMAS³

¹Graduate course in Ecology and Evolution (PPGEE), State University of Rio de Janeiro (UERJ), São Francisco Xavier St, 524. 20550-900, RJ, Brazil.

✉ viccumings@outlook.com; <https://orcid.org/0000-0003-2824-6726>

²Department of Biological and Environmental Sciences, Georgia College & State University, Milledgeville, GA, 31061 USA.

✉ kristine.white@gcsu.edu; <https://orcid.org/0000-0002-5203-1656>

³Reef Foundation, Inc., Ellijay, GA, 30540 USA.

✉ anamixis@hotmail.com; <https://orcid.org/0000-0002-7914-2583>

*Corresponding author

Abstract

Two new leucothoid amphipod species are described from the Western Atlantic Ocean. *Leucothoe mucifibrosa* **sp. nov.**, collected from Belize, may represent a member of the “*Paraleucothoe*” group with a specific sponge host preference. *Leucothoe darthvaderi* **sp. nov.**, collected from South Florida, is part of the *Leucothoe spinicarpa* species complex and has demonstrated a shift in host preference over time, possibly associated with environmental perturbances.

Key words: biogeography, commensalism, *Leucothoe mucifibrosa* sp. nov., *Leucothoe darthvaderi* sp. nov., sponges, new species, Western Atlantic, Caribbean

Introduction

Sponge-inhabiting leucothoid amphipods vary in host specificity, with some species inhabiting multiple species of sponges or even different host phyla. One new species, *Leucothoe mucifibrosa* **sp. nov.**, collected from Belize prefers a specific sponge host. A second new species, *Leucothoe darthvaderi* **sp. nov.**, collected from South Florida occurs in multiple host species, with an interesting shift in host preference. *Leucothoe mucifibrosa* **sp. nov.** may belong to the “*Paraleucothoe*” group (White & Reimer 2012d; White & Thomas 2022), which may represent a separate genus upon further examination. *Leucothoe darthvaderi* **sp. nov.** belongs to the “*spinicarpa*” species complex (White, 2019), and is another in a long line of previously cryptic species attributed to *Leucothoe spinicarpa* (Abildgaard, 1789). Both new species are described herein and host preference is discussed.

Materials and Methods

Amphipods were collected *in situ* from sponge hosts following the methods of Thomas (2015) using SCUBA or snorkeling. Once separated from their hosts, amphipods were preserved in 2% buffered formalin or 70% ethanol. Specimens were transferred to glycerin for dissection and illustration. Specimens were drawn using a drawing tube attached to Meiji MT5900L phase contrast microscope. Pencil drawings were scanned and digitally inked following the methods of Coleman (2003) in Adobe Illustrator 2020 using a Wacom tablet. Specimens are deposited in the Gulf Coast Research Laboratory Museum (GCRL) and the Yale Peabody Museum (YPM).

TAXONOMY

Order Amphipoda Latreille, 1816

Suborder Gammaridea Latreille, 1802

Family Leucothoidae Dana, 1852

Genus *Leucothoe* Leach, 1814

Leucothoe mucifibrosa sp. nov.

(Figs. 1–4)

<http://zoobank.org/urn:lsid:zoobank.org:act:EFC92B75-226A-4F47-95A1-F4D4D6675603>

Type locality: Twin Keys, Belize, 16° 50.224' N, 88° 06.163' W, 6m depth, from the sponge *Haliclona mucifibrosa* Weerd, Rutzler, and Smith, 1991; 26 August 2006, James Darwin Thomas collector.

Holotype: YPM IZ.111030, male, 3.14 mm

Paratypes: GCRL6623, female, 3.14 mm, male, 2.64 mm

Other material examined: GCRL 6624, 7 male, 29 female specimens; YPM IZ.111031, 6 male, 29 female specimens; same station data as type specimens.

Diagnosis: Left and right mandibles each with layered lacinia mobilis; maxilliped outer plate strongly serrate; gnathopod 1 propodus palm serrate, dactylus reduced, reaching 0.2X propodus length, basis expanded proximally; telson apical margin rounded, bare.

Description of male holotype: Head. Anterior head margin truncate, anterodistal margin subquadrate. Ventral cephalic keel slightly excavate anteriorly. Eyes oval. Antenna 1, 0.28X body length, flagellum 7-articulate, accessory flagellum minute, 1-articulate. Antenna 2, 0.25X body length, 0.88X length of antenna 1, flagellum 5-articulate. Mandibular palp articles ratios 1–3, 1.0: 2.36:2.09, article 2 with 1 marginal and 1–2 distal setae, article 3 with 2–3 terminal setae, incisors strongly dentate, each lacinia mobilis strongly toothed, layered; left mandible with 8 raker spines, right mandible with 9 raker spines. Upper lip asymmetrically lobate, anterior margin weakly setose. Lower lip inner lobes fused, setose; outer lobes with large gape, anterior margins setose. Maxilla 1 palp 2-articulate, with 3 distal setae; outer plate with 4 robust distal setae and 2 slender medial marginal setae. Maxilla 2 inner plate with 3 distal setae, one mediofacial seta, and several slender marginal setae; outer plate with 2 distal and several slender marginal setae. Maxilliped inner plates, distal margin rounded with deep V-shaped indentation, setose; outer plate inner margin strongly tuberculate, reaching 0.5X along palp article 1; palp dactyl subequal in length with article 3, distally acute.

Pereon. Coxae 1–4 relative widths 1.0: 1.5: 1.1: 1.9. Gnathopod 1 coxa anterior margin serrate, anterodistal margin slightly produced, rounded, distal margin straight, serrate, posterior margin excavate; basis distally inflated, anterior and posterior margins bare; ischium bare; carpus straight, distal length 7X width, proximal margin smooth; propodus straight, palm serrate with several small medial setae; dactylus smooth, reaching 0.2X propodus length. Gnathopod 2 coxa equally as broad as long, wider than coxa 3, smooth, bare, anterior margin rounded, anterodistally rounded, distal and posterior margins straight; basis straight, anterior margin with 2–3 medium setae, posterior margin bare; carpus reaching 0.5X propodus length, curved, distally tapered, anterior margin serrate; propodus with single mediofacial setal row 0.84X propodus length, posterior margin smooth, palm convex, serrate with several small medial setae and one submarginal setal row; dactylus curved, reaching 0.4X propodus length, proximal margin smooth, bare, anterior margin distally tapered, apically rounded. Pereopod 3 coxa length 0.69X width, anterodistal corner overriding distal face of coxa 2, serrate, anterior and posterior margins straight, distal margin rounded. Pereopod 4 coxa anterior margin straight, serrate, distal margin rounded, posterior margin tapered. Pereopods 5–7 coxae, facial setae absent. Pereopods 5–7 bases width length ratios 1: 1.53, 1: 1.38, 1: 1.3, posterior margins serrate, with few fine setae, pereopod 7 basis posterior margin rounded.

Pleon. Epimera 1–3 bare, epimeron 3 posteroventral corner subquadrate. Uropods 1–3 relative lengths 1.0: 0.63: 0.94. Uropod 1 peduncle subequal in length with inner ramus, outer ramus 0.82X inner ramus length.

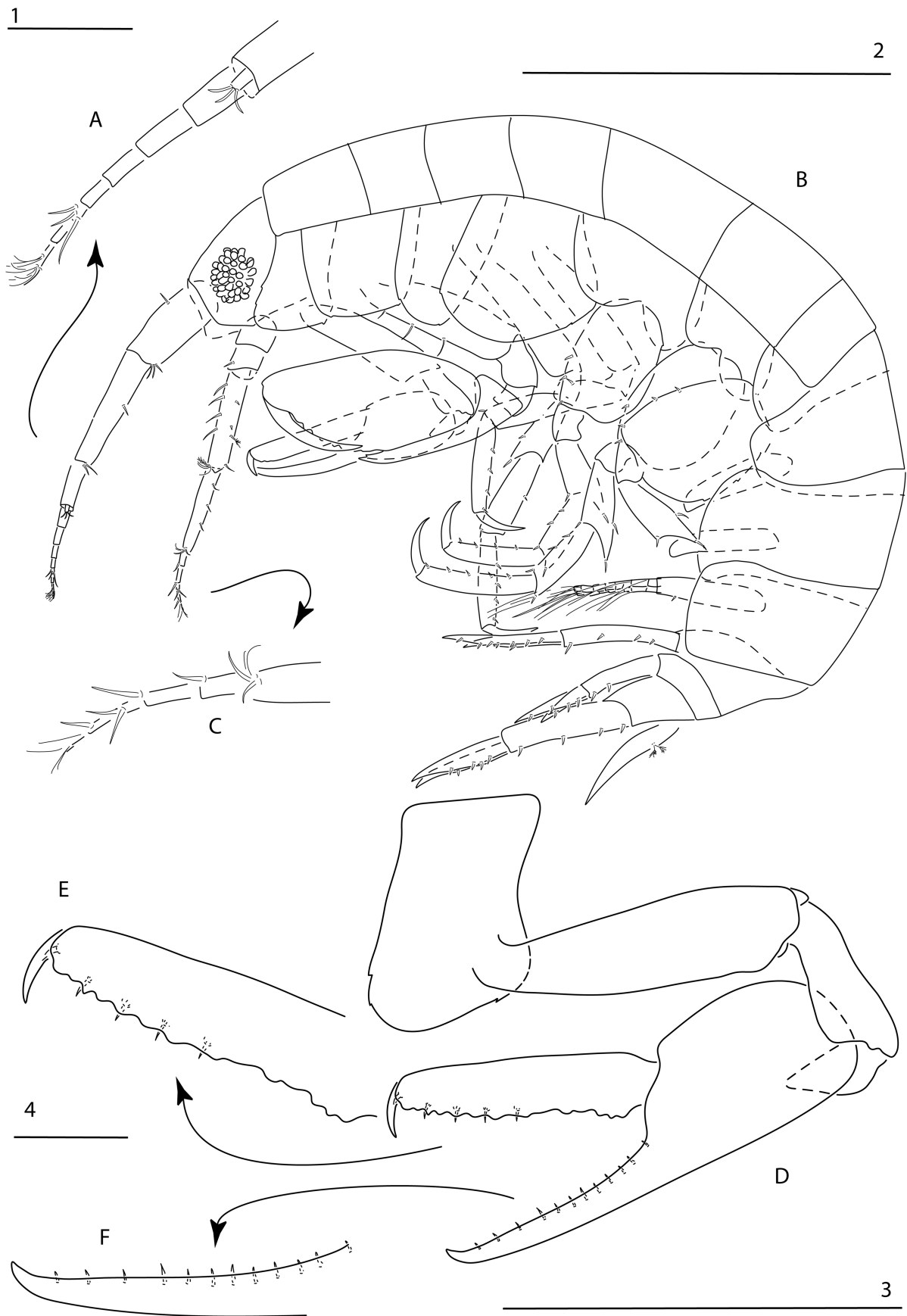


FIGURE 1. *Leucothoe mucifibrosa* **sp. nov.** male holotype, 3.14 mm. A Antenna 1 enlarged; B Habitus; C Antenna 2 enlarged; D Gnathopod 1 medial; E Gnathopod 1 propodus enlarged; F Gnathopod 1 carpus enlarged. Scale bars: 1 = 0.1mm (A), 2 = 1 mm (B), 3 = 0.5 mm (D), 4 = 0.1 mm (E,F).

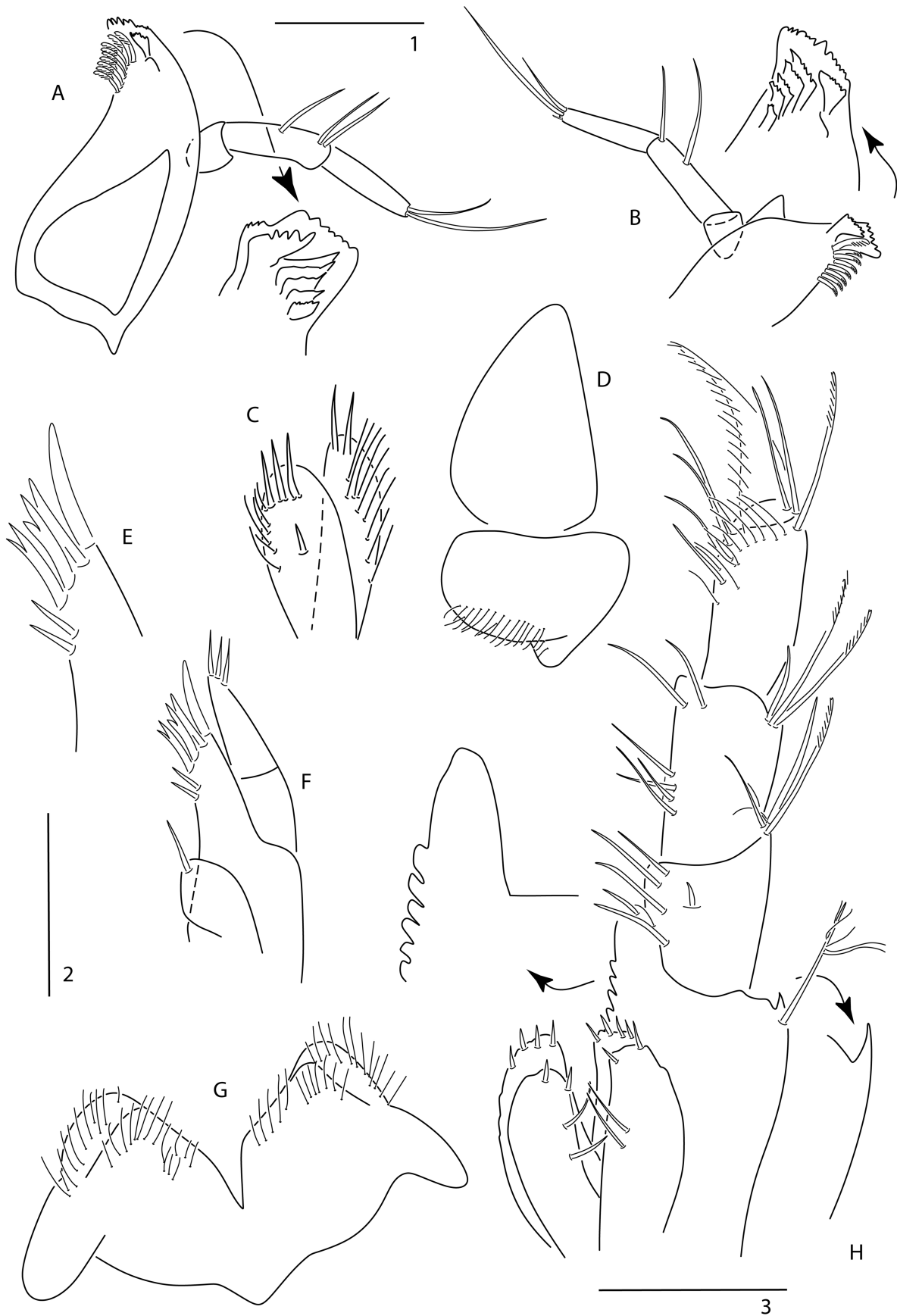


FIGURE 2. *Leucothoe mucifibrosa* sp. nov. male holotype, 3.14 mm. A Right mandible; B Left mandible; C Maxilla 2; D Upper lip; E Maxilla 1; F Maxilla 1 outer plate enlarged; G Lower lip; H Maxilliped. Scale bars: 1 = 0.1 mm (A,B), 2 = 0.1 mm (E), 3 = 0.1 mm (F–H).

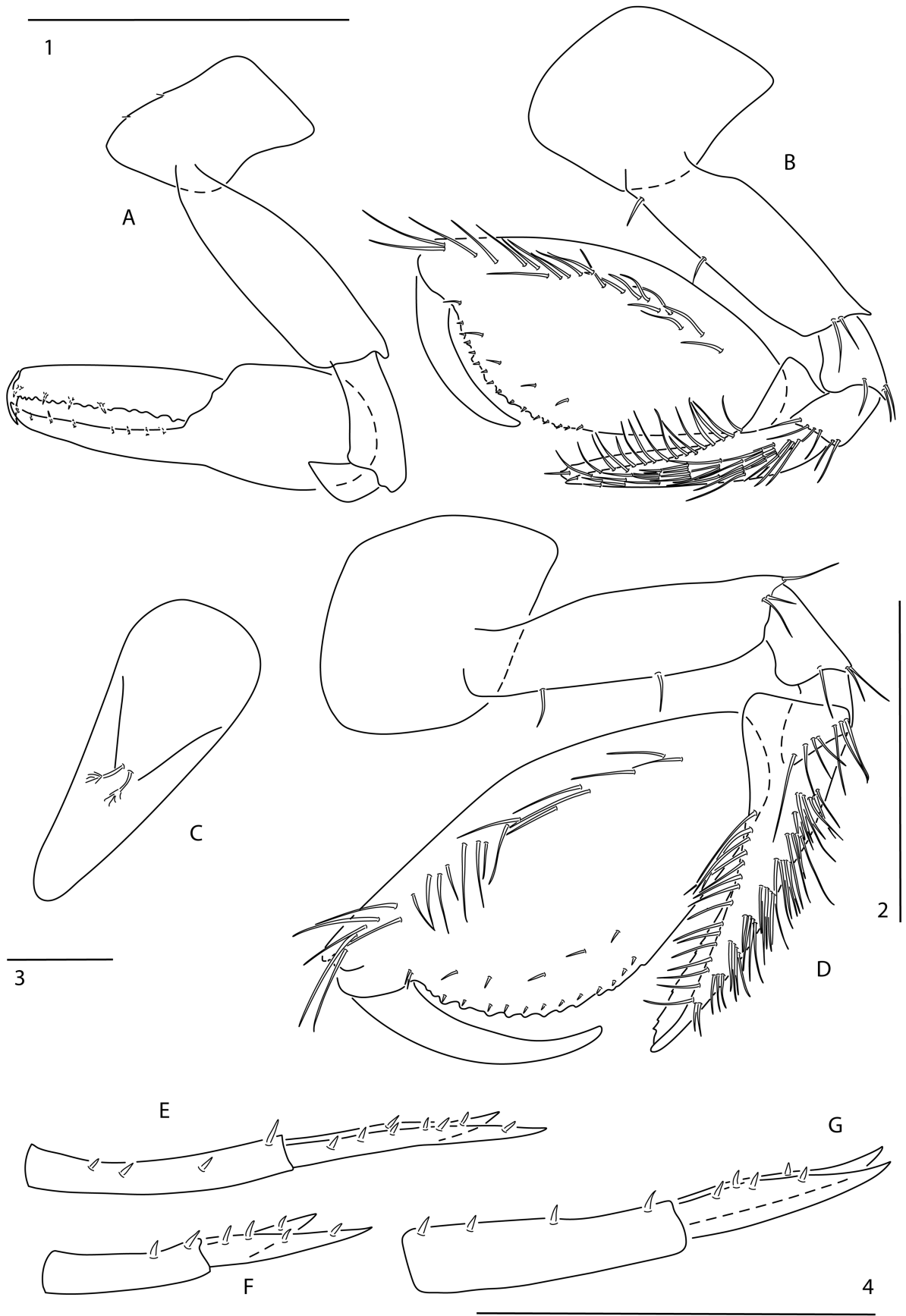


FIGURE 3. *Leucothoe mucifibrosa* sp. nov. female paratype, 3.44 mm. A Gnathopod 1 medial; B Gnathopod 2 medial. *Leucothoe mucifibrosa* sp. nov. male holotype, 3.14 mm. C Telson; D Gnathopod 2 medial; E Uropod 1; F Uropod 2; G Uropod 3. Scale bars: 1 = 0.5mm (A,B), 2 = 0.5 mm (D), 3 = 0.1 mm (C), 4 = 0.5 mm (E–G).

Uropod 2 peduncle subequal in length with inner ramus, outer ramus 0.67X inner ramus length, Uropod 3 peduncle 1.2X inner ramus length, outer ramus subequal in length with inner ramus. Uropods 1–3 inner and outer rami distal margins with several robust setae. Telson length 2.5X width, apical margin rounded, bare; with 2 plumose facial setae.

Female sexually dimorphic characters: Like male in all aspects except gnathopod 2 carpus anterior margin smooth.

Etymology: Referring to the sponge host of this species.

Color: Live specimens are white.

Geographical distribution: Known only from Belize

Ecology: Collected from interior cavities of the sponge *Haliclona mucifibrosa*. This sponge is tubular in form and creates a network of mucous strands.

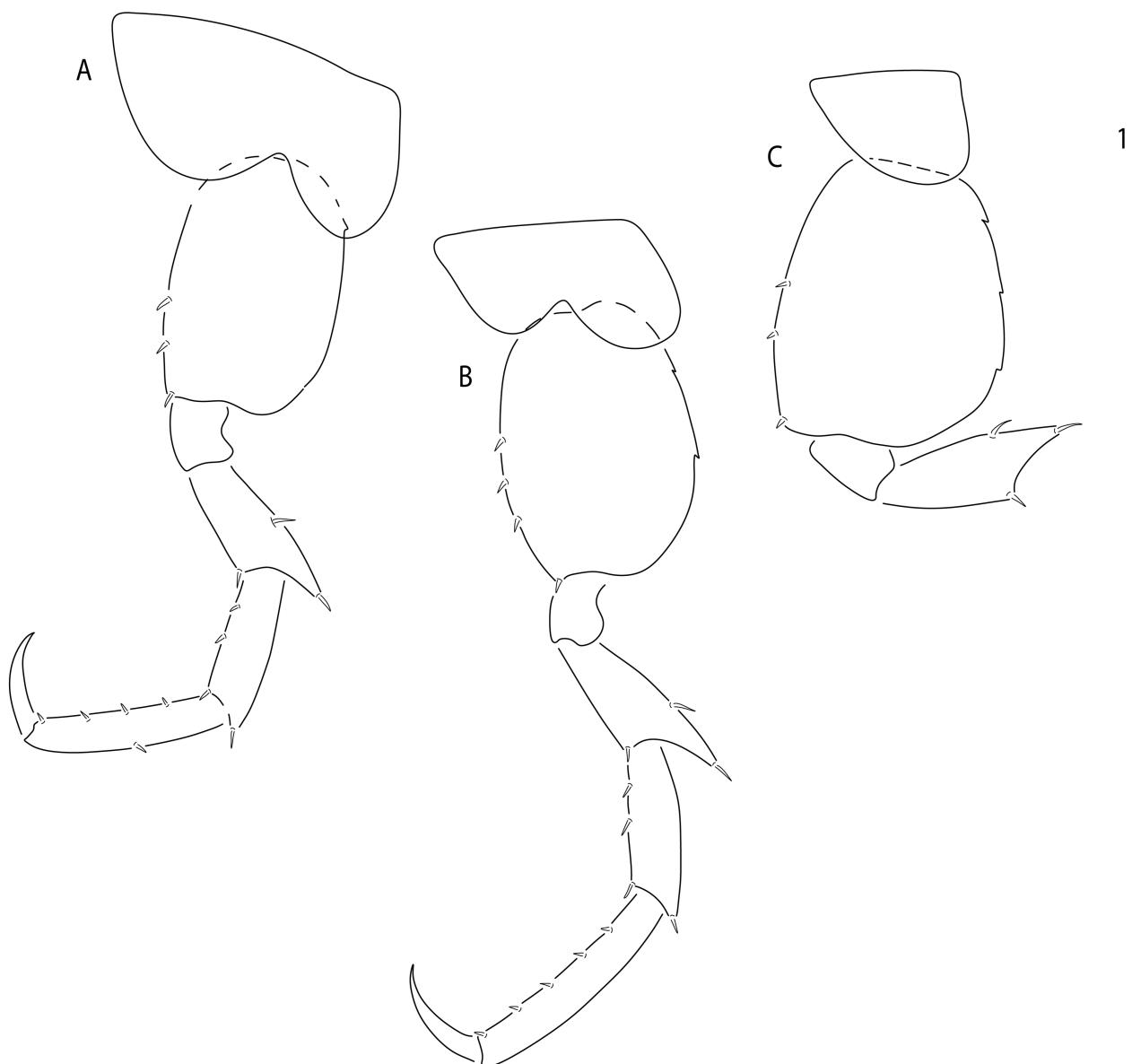


FIGURE 4. *Leucothoe mucifibrosa* **sp. nov.** male holotype, 3.14 mm. A Pereopod 5; B Pereopod 6; C Pereopod 7. Scale bar: 1 = 1 mm (A–C).

Remarks: *Leucothoe mucifibrosa* **sp. nov.** shares the short gnathopod 1 dactylus and the elongate maxilliped outer plate with members of the ‘Paraleucothoe group’ [*Leucothoe enko* White & Reimer 2012c, *Leucothoe kebukai* White & Reimer 2012c, *Leucothoe nagatai* Ishimaru, 1985, *Leucothoe obuchii* White & Reimer 2012a, *Leucothoe panjang* White & Thomas, 2022, *Leucothoe toribe* White & Reimer 2012b, *Leucothoe wheromura* White & Thomas, 2022]. Of these species, *L. mucifibrosa* **sp. nov.** shares an apically rounded telson with *L. enko*; the layered

lacinia mobiles on the mandibles with *L. nagatai*, *L. panjang*, and *L. wheromura*; and a serrate inner margin on outer plate of maxilliped with *L. panjang*. The new species, however, differs from all mentioned species in having a serrate gnathopod 1 propodus palm (smooth in all species except dentate in *L. enko*). The only other species with a short gnathopod 1 dactylus documented from Belize is *Leucothoe flammosa* Thomas & Klebba, 2007, which differs from the new species in having gnathopod 1 carpus with setose midposterior and posterior margins, lacking the accessory flagellum on antenna 1 and the layered lacinia mobiles.

***Leucothoe darthvaderi* sp. nov.**

(Figs. 5–8)

Leucothoe sp. F: LeCroy, 2011, p. 639, Fig. 522.

<http://zoobank.org/urn:lsid:zoobank.org:act:D4F4B492-25F0-4394-B3B3-BF99CE15141A>

Type locality: Mollases Key, Florida, U.S.A, from the sponge *Spheciospongia vesparium* (Lamarck 1815); 1969, Richard Heard collector.

Holotype: YPM IZ.111032, male, 7.85 mm.

Paratype: GCRL 6625, female, 7.7 mm.

Other material examined: GCRL 6626, 11 male, 33 female specimens, same station data as type specimens. YPM IZ.111033, 38 male, 39 female specimens, Channel No. 5, Upper Keys, Florida, U.S.A, 24.823720° N, 80.765323° W, 2 m depth, from the sponge *Cliona varians* (Duchassaing & Michelotti, 1864); 12 April 2012, James Darwin Thomas collector.

Diagnosis: Mandibular palp article 2 with 13–15 marginal setae; male gnathopod 2 basis anterior margin with large serrate tubercles and short setae, carpus apically subtruncate; pereopods 5–7 bases relatively expanded, each propodus anterior margin with continuous setae, distal setae longer, pereopod 7 basis posteriorly tapered. Female gnathopod 1 basis posterior margin with several long distal setae.

Description of male holotype: Head. Anterior head margin slightly rounded, anterodistal margin evenly rounded. Ventral cephalic keel convex anteriorly with subacute anteroventral corner. Eyes reniform. Antenna 1 0.32X body length, flagellum 11-articulate, accessory flagellum minute, 1-articulate. Antenna 2 0.29X body length, 0.9X length of antenna 1, flagellum 9-articulate. Mandibular palp ratio of articles 1–3 1.0:2.4:1.0, article 2 with 13–15 marginal setae, article 3 with 2 terminal setae, left mandible incisor strongly dentate, lacinia mobilis strongly toothed, with 15 raker spines, right mandible incisor strongly dentate, lacinia mobilis weakly toothed, with 15 raker spines. Upper lip asymmetrically lobate, anterior margin strongly setose. Lower lip inner lobes fused, setose; outer lobes with large gape, anterior margins setose. Maxilla 1 palp 2-articulate, with 3 distal setae; outer plate with 6 distal robust setae and several slender marginal setae. Maxilla 2 inner plate with 7 thick distal setae, inner margin with several fine setae; outer plate with 2 thick distal and several slender marginal setae. Maxilliped inner plates distal margin rounded with v-shaped indentation, with few large setae; outer plate inner margin smooth, reaching 0.3X palp article 1; palp article 4 0.73X length of article 3, distally acute.

Pereon. Coxae 1–4 relative widths 1.0: 1.5: 1.0: 1.7. Gnathopod 1 coxa anterodistal margin strongly produced, rounded, serrate, bare, distal margin straight, serrate, posterior margin excavate; basis proximally inflated, anterior margin with several short setae; carpus straight, distal length 9.8X width, proximal margin smooth, lined with short setae; propodus straight, palm finely dentate with several small lateral setae; dactylus smooth, reaching 0.5X propodus length. Gnathopod 2 coxa equally as broad as long, wider than coxa 3, smooth, bare, anterior margin rounded, anterodistally rounded, distal margin straight, posterior margin slightly convex; basis straight, anterior margin lined with large tubercles and short setae, posterior margin bare; carpus 0.55X propodus length, curved, distally subtruncate, anterior margin serrate; propodus with 2 mediofacial setal rows, primary row reaching 0.57X propodus length, secondary row with one seta, posterior margin smooth, palm convex with several small medial setae and one submarginal setal row, with 2 large and several small tubercles; dactylus curved, reaching 0.50X propodus length, proximal margin smooth, bare, anterior margin distally tapered, apically acute. Pereopod 3 coxa length 1.33X width, anterodistal corner overriding distal face of coxa 2, smooth, anterior margin straight, distal margin rounded, posterior margin tapered. Pereopod 4 coxa smooth, anterior margin straight, distal margin rounded, posterior margin tapered. Pereopods 5–7 bases width length ratios 1: 1.14, 1: 1.17, 1: 1.13 posterior margins serrate, bare, each propodus anterior margin with setae distally clustered, pereopod 7 basis posterior margin tapered.

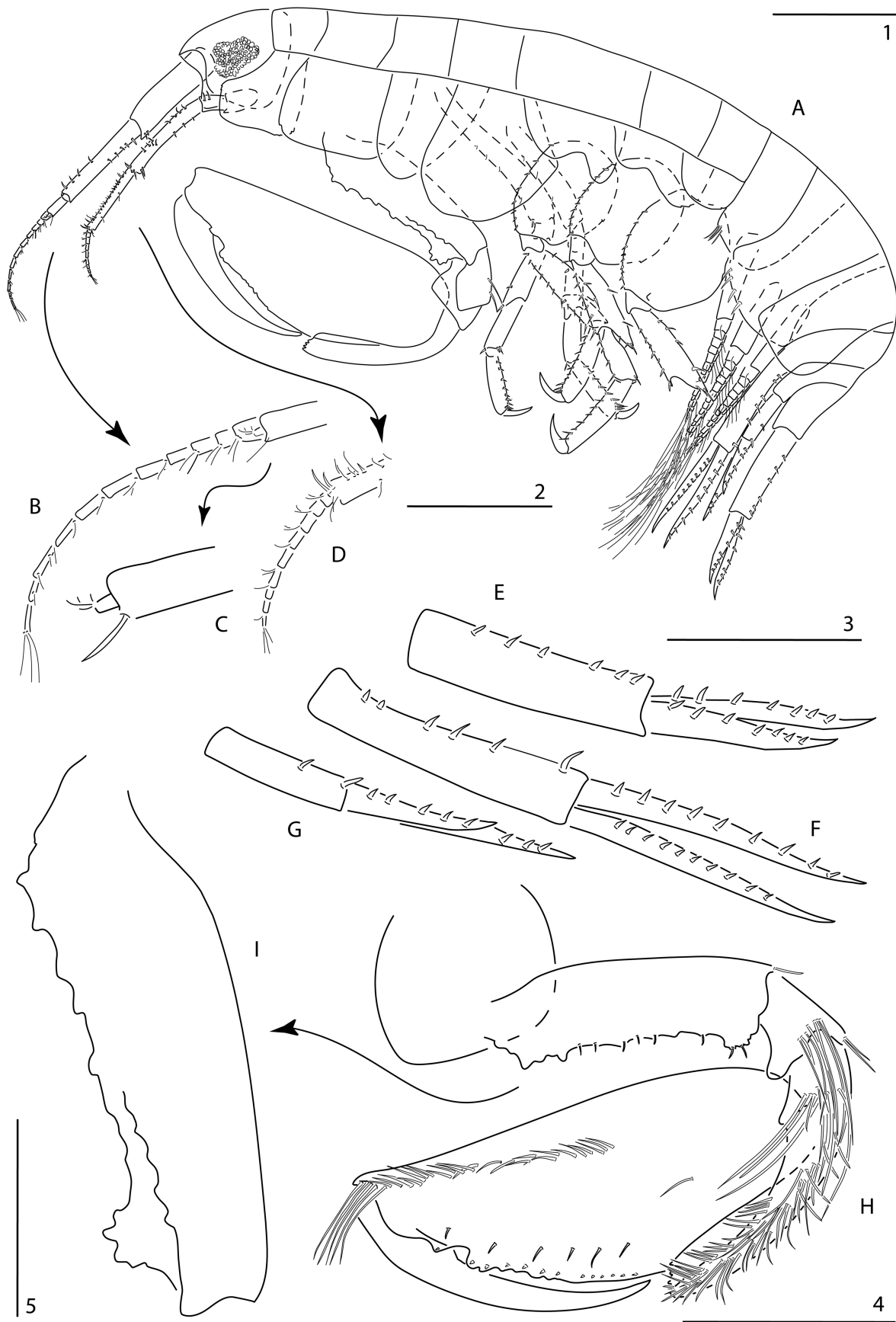


FIGURE 5. *Leucothoe darthvaderi* **sp. nov.** male holotype, 7.85 mm. A habitus; B Antenna 1 enlarged; C Antenna 1 accessory flagellum; D Antenna 2 enlarged; E Uropod 3; F Uropod 1; G Uropod 2; H Gnathopod 2 medial; I Gnathopod 2 basis enlarged Scale bars: 1 = 1 mm (A), 2 = 0.5 mm (B,D), 3 = 0.5 mm (E–G), 4 = 0.5 mm (H), 5 = 0.5 mm (I).

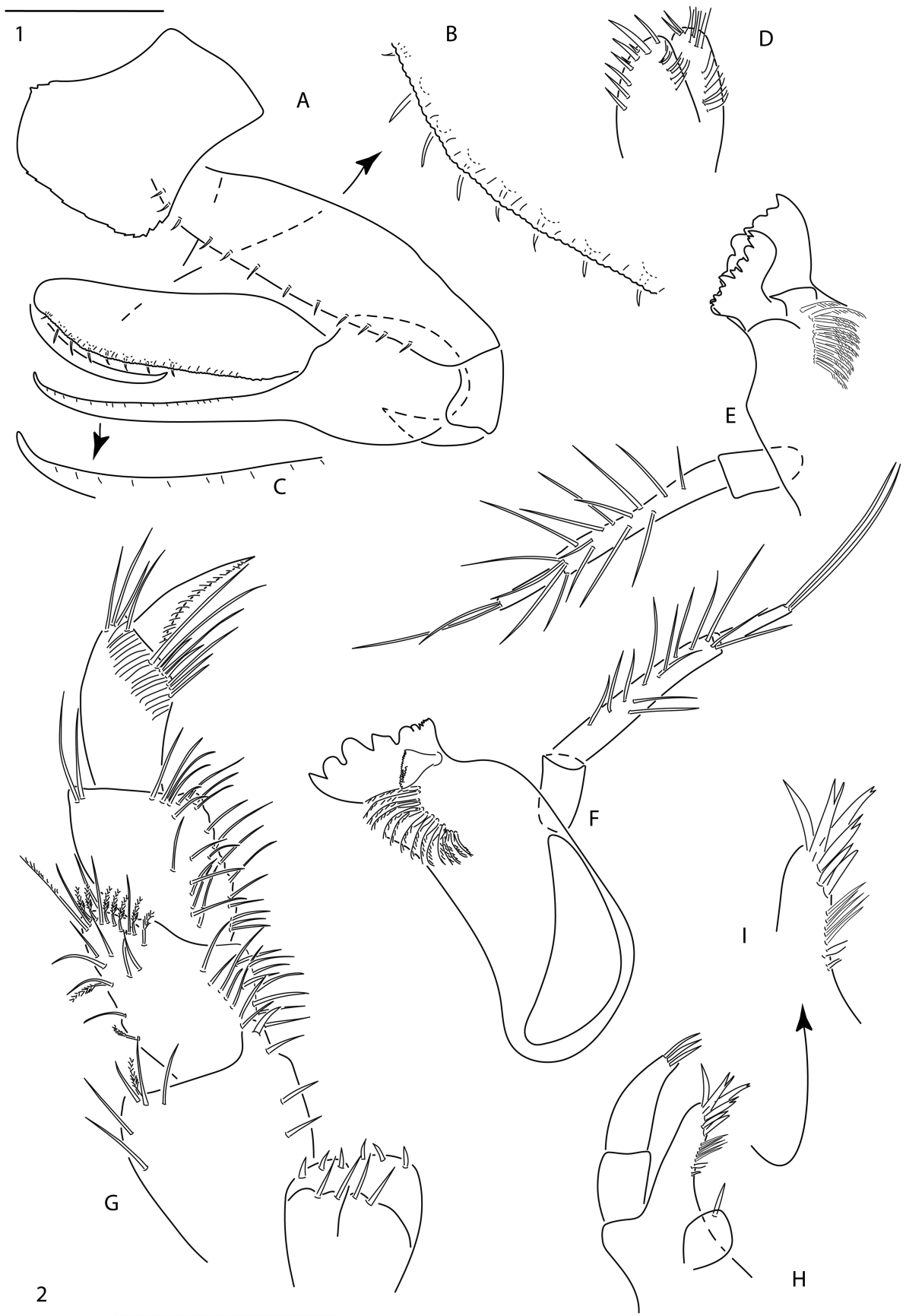


FIGURE 6. *Leucothoe darthvaderi* sp. nov. male holotype, 7.85 mm. A Gnathopod 1 medial; B Gnathopod 1 propodus enlarged; C Gnathopod 1 carpus enlarged; D Maxilla 2; E Left mandible; F Right mandible; G Maxilliped; H Maxilla 1; I Maxilla 1 outer plate enlarged. Scale bars: 1 = 0.5 mm (A), 2 = 0.5 mm (D–H).

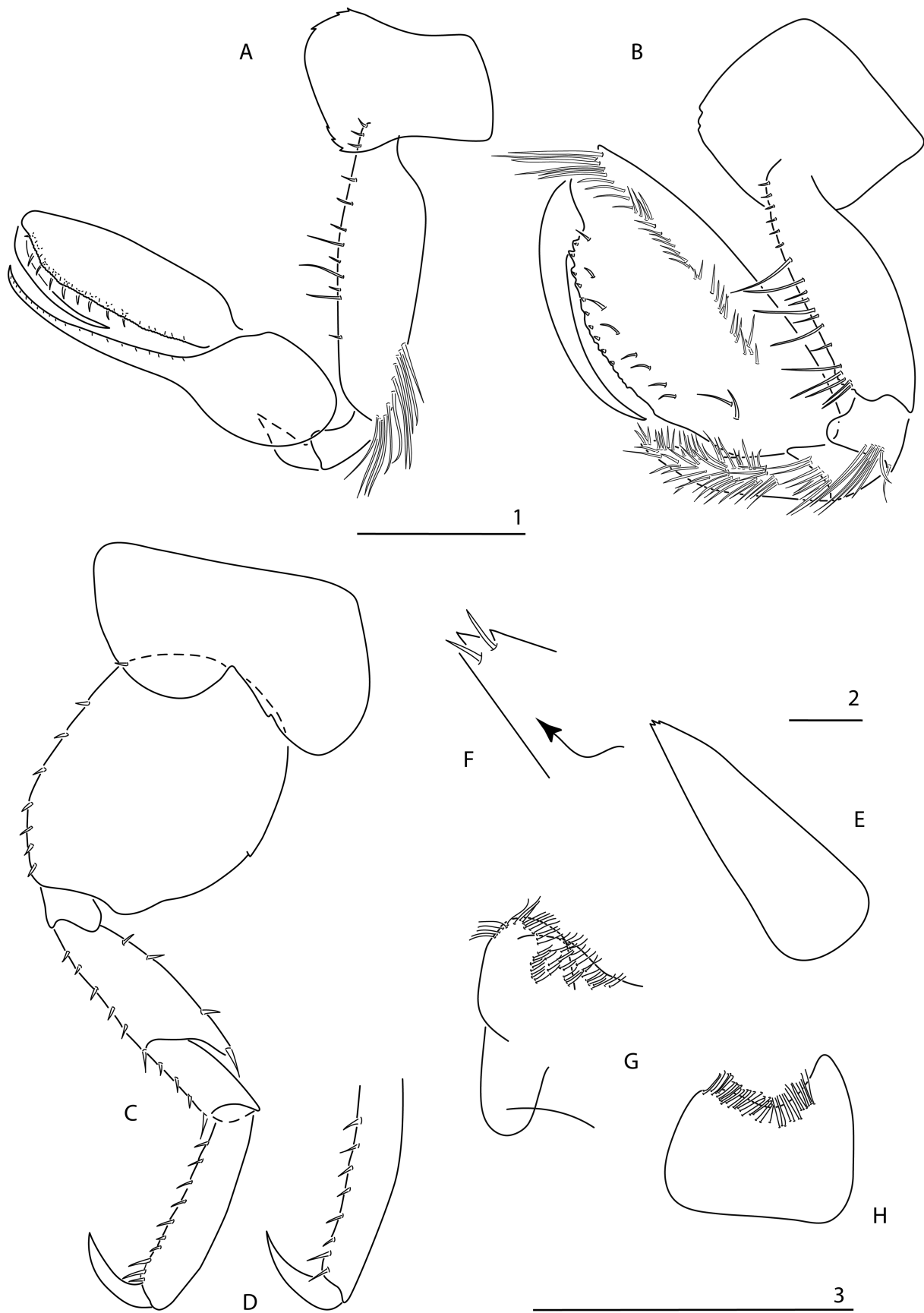


FIGURE 7. *Leucothoe darthvaderi* **sp. nov.** female paratype, 7.7 mm. A Gnathopod 1 medial; B Gnathopod 2 medial. *Leucothoe* **sp. F** **sp. nov.** male holotype, 7.85 mm. C Pereopod 5; D Pereopod 6; E Telson; F Telson apex enlarged; G Lower lip; H Upper lip. Scale bars: 1 = 0.5 mm (A–D), 2 = 0.5 mm (E), 3 = 0.5 mm (G,H).

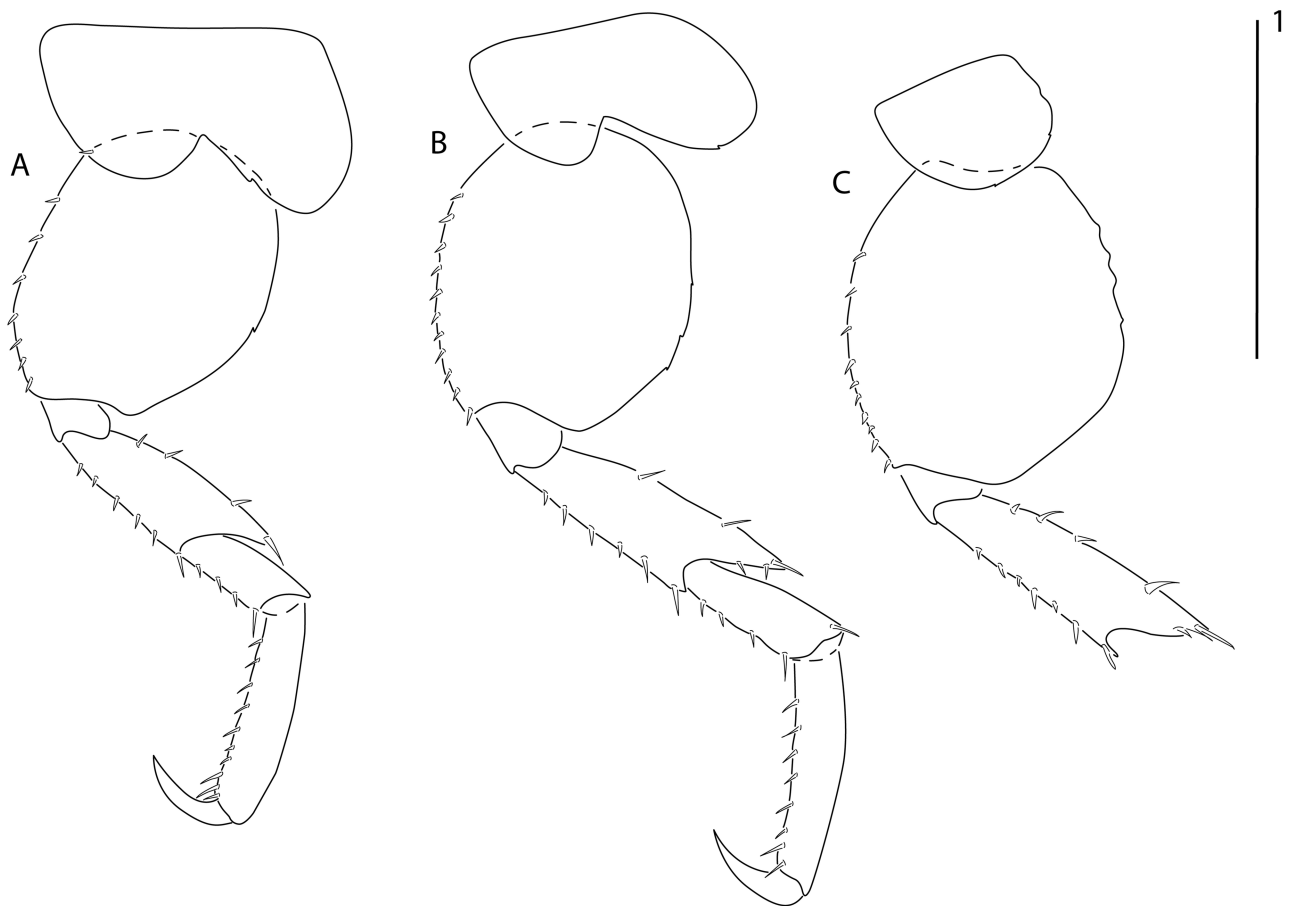


FIGURE 8. *Leucothoe darthvaderi* **sp. nov.** male holotype, 7.85 mm. A Peropod 5; B Pereopod 6; C Pereopod 7. Scale bar: 1 = 1 mm (A–C).

Pleon. Epimeron 1 with anteroventral tuft of setae, epimeron 2 with few marginal setae, epimeron 3 bare, posteroventral corner rounded. Uropods 1–3 relative lengths 1.0: 0.69: 0.84. Uropod 1 peduncle 0.90X length of inner ramus, outer ramus 0.91 X length of inner ramus. Uropod 2 peduncle 0.59X length of inner ramus, outer ramus 0.64X inner ramus length, uropod 3 peduncle 1.08X inner ramus length, outer ramus 0.96X length of inner ramus. Uropods 1–3, inner and outer rami lined with robust setae. Telson length 2.71X width, apical margin tridentate with 2 apical setae.

Female sexually dimorphic characters: Similar to male in all aspects except for the following: gnathopod 1 basis anterior margin with longer setae and posterodistal margin with several long distal setae; gnathopod 2 basis anterior margin smooth with several long distal setae.

Etymology: Named for Darth Vader from the Star Wars movie series about the takeover of the Imperial rebel army, in reference to the rapid appearance and colonization of *L. darthvaderi* **sp. nov.** in the host sponge *Cliona varians*.

Color: Live specimens have a distinct translucent white color.

Geographical distribution: Known from the Florida Keys and southern Gulf of Mexico

Ecology: *Leucothoe darthvaderi* **sp. nov.** is commonly found in the sponge *Cliona varians*. In 1983, the third author collected a single specimen of *L. darthvaderi* **sp. nov.** from the branchial chamber of the solitary tunicate *Phallusia nigra* Savigny, 1816 from Sawyer Key in the Florida Keys.

Remarks: *Leucothoe darthvaderi* **sp. nov.** is part of the *Leucothoe spincarpa* species complex, with a rounded head and long gnathopod 1 dactylus. It is similar to *Leucothoe tunica* White, 2019 collected from Florida in overall appearance, including a long gnathopod 1 dactylus and tapered posterior margin on pereopod 7. The new species differs from every known leucothoid species in having the gnathopod 2 basis anterior margin lined with large tubercles. The new species shares the long setae on posterodistal margin of female gnathopod 1 basis and the heavily setose mandibular palp article 2 with *Leucothoe ubouhu* Thomas & Klebba, 2007, but differs in having an accessory

flagellum on antenna 1 (lacking in *L. ubouhu*), rounded head anterodistal head margin (angular in *L. ubouhu*), pereopod 7 basis posteriorly tapered (rounded in *L. ubouhu*), and the tuft of setae on epimeron 1 anteroventral margin (lacking in *L. ubouhu*).

Discussion

The description of these two species increases the number of leucothoid amphipods to 203 (Horton *et al.* 2023). Continued investigation of species demonstrating characters that were once considered unique to the genus *Paraleucothoe*, (ie. short gnathopod 1 dactylus, elongate maxilliped outer plate, uni-articulate maxilla 1 palp) will elucidate what species are truly members of the “*Paraleucothoe* group”. *Leucothoe mucifibrosa* **sp. nov.** collected from interior cavities of the sponge *Haliclona mucifibrosa*. The extensive network of mucous strands created by the sponge may deter predators, hence explaining the preference of the amphipods to inhabit this host species. The new species is frequently found in association with another amphipod *Dulichella lecrovae* Lowry and Springthorpe, 2007 usually consisting of one to several hyper adult males with enlarged second gnathopods and numerous females and juveniles. Adult males of the genus *Dulichella* are known to use the enlarged gnathopod 2 to produce a cavitation “pop” like species of alpheid snapping shrimps (Longo *et al.* 2021).

Continued investigation of species that may have been attributed to *Leucothoe spinicarpa* regularly reveals new species. Extensive sampling of Florida Keys sponges over 30+ years for commensal amphipods by the third author, including *Cliona varians*, failed to document occurrences of *L. darthvaderi* **sp. nov.** after the initial collection in 1969. Following the cold-water anomaly event of January 2010, there was a rapid expansion of *C. varians*. This historical cold-water event caused the worst coral mortality on record for the Florida Reef Tract (Lirman *et al.*, 2011). The resulting availability of carbonate coral skeletal elements essentially created a phase shift from coral to sponge dominated habitats (Bell *et al.* 2013). This phase shift potentially allowed for rapid colonization and expansion of *C. varians* throughout the Florida Keys, creating a rare historical opportunity for leucothoid amphipods to exploit the potential new sponge hosts. It seems that *L. darthvaderi* is an opportunistic species and this phase shift would explain the sudden success of the species after being absent for 30 years.

Acknowledgements

This project was supported by the Department of Biological and Environmental Sciences at Georgia College & State University. The authors would like to thank Klaus Rutzler for manuscript suggestions and Sara LeCroy for the loan of specimens.

References

- Abildgaard, P.C. (1789) *Zoologica Danica seu animalium Daniae et Norvegiae rariorum ac minus notorum. Descriptiones et Historia*. N. Möller et filius, Havniae, 71 pp.
<https://doi.org/10.5962/bhl.title.63796>
- Bell, J.J., Davy, S.K., Jones, T., Taylor, M.W. & Webster, N.S. (2013) Could some coral reefs become sponge reefs as our climate changes? *Global Change Biology*, 19, 2613–2624.
<https://doi.org/10.1111/gcb.12212>
- Coleman, C. (2003) "Digital inking": How to make perfect line drawings on computers. *Organisms Diversity Evolution*, 3, 1–14.
<https://doi.org/10.1078/1439-6092-00081>
- Dana, J.D. (185) On the classification of the Crustacea, Choristopoda, or Tetracapoda. *American Journal of Science and Arts*, Series 2, 14, 297–316.
- Duchassaing, P. & Michelotti, G. (1864) Spongiaires de la mer Caraïbe. *Natuurkundige verhandelingen van de Hollandsche maatschappij der wetenschappen te Haarlem*, 21, 1–124.
- Horton, T., Lowry, J., De Broyer, C., Bellan-Santini, D., Coleman, C.O., 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., Sket, B., Souza-Filho, J.F., Tandberg, A.H., Thomas, J.D., Thurston, M., Vader, W., Väinölä, R., Vonk, R., White, K. & Zeidler, W. (2022) *World*

- Amphipoda database*. Available from: <https://www.marinespecies.org/amphipoda> (accessed 22 May 2023)
- Ishimaru, S.I. (1985) A New Species of the Genus *Leucothoe* (Amphipoda: Gammaridea: Leucothoidae) from Japan. *Proceedings of the Japanese Society of Systematic Zoology*, 30, 46–52.
- LeCroy, S.E. (2011) *An Illustrated Identification Guide to the Nearshore Marine and Estuarine Gammaridean Amphipoda of Florida*. Vol. 5. Families Leucothoidae, Liljeborgiidae, Neomegamphopidae, Ochlesidae, Phliantidae, Phoxocephalidae, Platyschnopidae, Pleustidae, Podoceridae, Pontoporeiidae, Sebidae, Stenothoidae, Synopiidae and Talitridae. Florida Department of Environmental Protection, Tallahassee, 209 pp.
- Lamarck, J.B. de (1815) Suite des polypiers empâtés. *Mémoires du Muséum d'Histoire naturelle, Paris*, 1, 69–80 + 162–168 + 331–340.
- Latreille, P.A. (1802) *Histoire naturelle, générale et particulière des Crustacés et des Insectes. Ouvrage faisant suite à l'histoire naturelle générale et particulière, composée par Leclerc de Buffon, et rédigée par C.S. Sonnini, membre de plusieurs Sociétés savantes*. Vol. 3. Dufart, Paris, 467 pp.
<https://doi.org/10.5962/bhl.title.15764>
- Latreille, P.A. (1816) n.k. In: *Nouveau Dictionnaire d'histoire naturelle, appliquée aux arts, à l'Agriculture, à l'Economie rurale et domestique, à la Médecine, etc. Par une Société de Naturalistes et d'Agriculteurs*. Vol. 1. Nouvelle Édition. Chez Deterville, Paris, pp. 467–469.
- Leach, W.E. (1814) Crustaceology. In: Brewster, D. (Ed.), *The Edinburgh Encyclopedia*. 7 (2). Blackwood, Edinburgh, pp. 383–437.
- Lirman, D., Schopmeyer, S., Manzello, D., Gramer, L.J., Precht, W.F., Muller-Karger, F., Banks, K., Barnes, B., Bartels, E., Bourque, A., Byrne, J., Donahue, S., Duquesne, J., Fisher, L., Gilliam, D., Hendee, J., Johnson, M., Maxwell, K., McDevitt, E., Monty, J., Rueda, D., Ruzicka, R. & Thanner, S. (2011) Severe 2010 cold-water event caused unprecedented mortality to corals of the Florida reef tract and reversed previous survivorship patterns. *PLoS One*, 6, e23047.
<https://doi.org/10.1371/journal.pone.0023047>
- Longo, S.J., Ray, W., Farley, G.M., Harrison, J., Jorge, J., Kaji, T., Palmer, A.R. & Patek, S.N. (2021) Snaps of a tiny amphipod push the boundary of ultrafast, repeatable movement. *Current Biology*, 31, R116–R117.
<https://doi.org/10.1016/j.cub.2020.12.025>
- Lowry, J.K. & Springthorpe, R.T. (2007) A revision of the tropical/temperate amphipod genus *Dulichieilla* Stout, 1912, and the description of a new Atlantic genus *Verdeia* gen. nov. (Crustacea: Amphipoda: Melitidae). *Zootaxa*, 1424 (1), 1–62.
<https://doi.org/10.11646/zootaxa.1424.1.1>
- Savigny, J.C. (1816) *Observations générales sur la bouche des arachnides des crustacés et des entomostraces. Mémoires sur les Animaux sans vertèbres. Première partie. Description et classification des animaux invertébrés et articulés, connus sous les noms de Crustacés, d'Insectes, d'Annelides, etc.* Deterville, Paris, 84 pp.
<https://doi.org/10.5962/bhl.title.65971>
- Thomas, J.D. & Klebba, K.N. (2007) New species and host associations of commensal leucothoid amphipods from coral reefs in Florida and Belize (Crustacea: Amphipoda). *Zootaxa*, 1494 (1), 1–44.
<https://doi.org/10.11646/zootaxa.1494.1.1>
- Thomas, J.D. (2015) *Leucothoe eltoni* sp. n., a new species of commensal leucothoid amphipod from coral reefs in Raja Ampat, Indonesia (Crustacea, Amphipoda). *ZooKeys*, 518, 51–66.
<https://doi.org/10.3897/zookeys.518.9340>
- Weerdt, W.H.de, Rützler, K. & Smith, K.P. (1991) The Chalinidae (Porifera) of Twin Cayes, Belize, and adjacent waters. *Proceedings of the Biological Society of Washington*, 104 (1), 189–205.
- White, K.N. & Thomas, J.D. (2022) Two new endemic species of leucothoid amphipods (Amphipoda: Leucothoidae) from New Zealand and northeastern Indonesia. *Journal of Crustacean Biology*, 42, 1–12.
<https://doi.org/10.1093/jcbiol/ruac060>
- White, K.N. (2019) Simplification of a species complex: Two new species of Leucothoidae (Crustacea: Amphipoda) previously attributed to *Leucothoe spinicarpa* (Abildgaard, 1789) in Florida, USA. *The Journal of Crustacean Biology*, 39, 739–747.
<https://doi.org/10.1093/jcbiol/ruz058>
- White, K.N. & Reimer, J.D. (2012a) Commensal Leucothoidae (Crustacea, Amphipoda) of the Ryukyus Archipelago, Japan. Part I: ascidian-dwellers. *Zookeys*, 163, 13–55.
<https://doi.org/10.3897/zookeys.163.2003>
- White, K.N. & Reimer, J.D. (2012b) Commensal Leucothoidae (Crustacea, Amphipoda) of the Ryukyus Archipelago, Japan. Part II: sponge-dwellers. *Zookeys*, 166, 1–58.
<https://doi.org/10.3897/zookeys.166.2313>
- White, K.N. & Reimer, J.D. (2012c) Commensal Leucothoidae (Crustacea, Amphipoda) of the Ryukyus Archipelago, Japan. Part III: coral rubble-dwellers. *Zookeys*, 173, 11–50.
<https://doi.org/10.3897/zookeys.173.2498>
- White, K.N. & Reimer, J.D. (2012d) DNA phylogeny of Leucothoidae (Crustacea: Amphipoda) from the Ryukyu Archipelago, Japan. *Contributions to Zoology*, 81, 159–165.
<https://doi.org/10.1163/18759866-08103003>