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On species of genus *Byblis* Boeck, 1971 (Amphilochidea, Ampeliscidae) reported from India with the description of one new species

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Research Article

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Abstract

In the present study species of the genus *Byblis* Boeck, 1871, found in India are discussed. Previously, two species of the genus *Byblis*: *B. daleyi* (Giles, 1890b) and *B. lepta* (Giles, 1890a) were recorded from India. The taxonomy and world distribution of the two previously reported species is discussed in the study. Additionally, a new species *Byblis kachchhensis* **sp. nov.** is also described based on the specimens collected from Gujarat state, India. This new species is differentiated from its closely related species *B. calisto* Imbach, 1967 by having large eyes placed very close to each other and entire telson.

Introduction

Gujarat State, located on India's western side, has the longest coastline in the country, spanning about 1600 km (Trivedi *et al*., 2015a). It has diverse marine habitats like sandy shores, rocky shores, mudflats, coral reefs, mangroves and estuaries, which collectively sustain a vast range of crustaceans (Gosavi *et al*., 2017). Many studies regarding diversity of various groups of crustaceans such as brachyurans, anomurans and stomatopods occurring on coastal areas of Gujarat state have been carried out (Trivedi *et al*., 2015b, 2020; Trivedi and Vachhrajani, 2017; Gosavi *et al*, 2021; Patel *et al*., 2022). However, the diversity of amphipods occurring on the Gujarat coast are quite unknown (Myers *et al*., 2017, 2018; Gaikwad and Sautya, 2022; Thacker *et al*., 2023a, 2023b, 2023c). This study focuses on specimens from the genus *Byblis* Boeck, 1871, collected from Gujarat State, India.

Boeck (1871) established a new genus, *Byblis,* on the basis of samples of *Ampelisca gaimardii* Krøyer, 1846 [now *Byblis gaimardii* (Krøyer, 1846)] collected from various locations including Greenland, Iceland, and Norway. Boeck (1871) differentiated *Byblis* from other genera in having following characters: having mandibular palp article 3 shortest, article 2 narrow, and pereopod 7 basis downwards and dilated posteriorly. *Byblis* species exhibit a global distribution, spanning from intertidal zones to the deep sea (Bellan-Santini and Dauvin, 1993). Members of *Byblis* are detritivores and tube dwellers (Dickinson, 1983). There are more than 79 species of genus *Byblis* reported worldwide, among them only 2 species were reported from India till now: *Byblis daleyi* (Giles, 1890b) and *Byblis lepta* (Giles, 1890a) (Thacker *et al*., 2023c; Horton *et al*., 2024). Here, we have described a new species, *Byblis kachchhensis* **sp. nov.**, on the basis of specimens collected from Gujarat, India.

Materials and methods

Specimens were collected by sediment-sieve method from the muddy shore of Luni (22° 50′09″N 69°49′40″E), located on the Gulf of Kachchh in Gujarat state, India, in sediments surrounded by mangrove plantations. After collection, specimens were first kept in plastic container filled with 5% formaldehyde and rose bengal dye solution. Thereafter, specimens were brought to the laboratory and were transferred to 70% alcohol. Dissection of different body parts was carried out using a stereomicroscope (Metlab PST-901) for species-level identification. Photographs of various body parts were captured using a DSLR camera (Nikon D5200, attached with T ring and extension tube) attached to the microscope. The detailed illustrations were prepared by tracing the photographs in the Inkscape (an open-source vector graphics editor) software, following the method proposed by Coleman (2006). Specimens are deposited in the Zoological Reference Collection, Department of Life-sciences, Hemchandracharya North Gujarat University, Patan (LFSC.ZRC).

Systematics

Suborder Amphilochidea Boeck, 1871
Infraorder Lysianassida Dana, 1849
Parvorder Synopiidira Dana, 1852
Superfamily Synopioidea Dana, 1852
Family Ampeliscidae Krøyer, 1842

Genus *Byblis* Boeck, 1871

Byblis daleyi (Giles, 1980)

Ampelisca daleyi Giles, 1890b: 66, pl. II, fig. 3.

Byblis daleyi Thacker *et al.*, 2023c: 36.

Diagnosis. Head ventral margin oblique to head dorsal margin. Antenna 1 reaching distal end of the peduncle article 4 of antenna 2. Eyes situated far apart from each other. Telson deeply cleft.

Remarks. This species was first described by Giles (1890b) as *Ampelisca daleyi* (now *Byblis daleyi*) on the basis of a single female specimen measuring 11 mm, collected from the depth of around 13 meters off the coast of Chennai, India. Till now, no additional records of this species have been reported beyond the original description. Therefore, it is currently considered endemic to the coast of Chennai, India.

Byblis lepta (Giles, 1980)

Ampelisca lepta Giles, 1890a: 223, pls. VIII & IX; Delia Valle, 1893: 894.

Byblis lepta Stebbing, 1906: 115; Barnard, 1937: 151; Nayar, 1959: 2, pl. 2, figs. 30–34; Nayar, 1966: 139, fig. 5a; Thacker *et al.*, 2023c: 36.

Diagnosis. Antenna 1 as long as peduncle of antenna 2. Eyes placed close to each other. Mandible accessory setal row with 5 setae. Pereopod 4 stoutest and longest among all. Telson cleft till half of its length.

Remarks. This species was first described by Giles (1890a) as *Ampelisca lepta* (now B*yblis lepta*) on the basis of samples collected from the depth of around 196 meters near Swatch of No Ground, Bangladesh. Till now this species has been found from various locations including Bangladesh (Giles, 1890a), India (Nayar, 1959; 1966), Gulf of Oman and Maldives (Barnard, 1937).

Byblis kachchhensis sp. nov.

(Figures 1–3)

Type material. Holotype female, 5 mm, Luni (22°50′09″N 69° 49′40″E), depth 25 m, bottom mud and sand. 16 January, 2024, coll. D.R. Thacker, LFSC.ZRC-218. Paratypes, 8 females, 4–5 mm, same data as holotype, LFSC.ZRC-219.

Type locality. Luni coast (22°50′09″N 69°49′40″E), mangrove plantation, muddy shore, Gulf of Kachchh, Gujarat state, India.

Etymology. This species is named after Kachchh district, India where the type locality of the new species is located. The name is used as a noun in apposition.

Diagnosis. Head ventral margin subparallel to dorsal margin. Eyes large, situated close to each other. Antenna 2 is as long as half of the body length. Dactylus comparatively smaller. Telson entire.

Description. Based on holotype, female, 5 mm.

Head. *Head* 1.8x as long as broad, ventral margin subparallel to dorsal margin; eyes large, situated close to each other. *Antenna 1* as long as antenna 2 peduncle; flagellum with 8 articles. *Antenna 2* 0.46x as long as body length, peduncular article 4 1.2x as long as article 5, flagellum 16 articulate. *Labrum* somewhat triangular with apical row of small setae. *Maxilla 1* inner plate with one plumose seta, outer plate with 8 serrated spines, palp 2 articulate; article 2 with several epical setae and 3 marginal plumose setae. *Maxilla 2* inner plate with 2 plumose setae on inner margin; outer plate broader than inner plate. *Mandible* with 6 dentate incisors; 5 dentate lacinia mobilis; accessory setal row with 5 setae, palp 3 articulate, article 2 1.3x as long as article 3. *Maxilliped* inner plate short with 6 apical plumose setae; outer plate large with a row of robust setae; palp 4 articulate.

Figure 1. *Byblis kachchhensis* **sp nov.**, female holotype 5 mm, (LFSC.ZRC-218), Luni, Gujarat, India.

Pereon. *Gnathopod 1* coxa longer than broad, ventral margin fringed with a row of long setae; basis rectangular, 4.5 times as long as broad, with few setae on both margins; ischium small; carpus 0.6x as long as basis, inflated medially, densely setose on posterior margin, inner margin bare; propodus oval, both margins crenated and moderately setose; dactylus long with a distal spine. *Gnathopod 2* coxa subrectangular, ventral margin weakly fringed with few setae; basis 4.5x as long as broad, anterior margins with a row of setae, posterior margin with few setae on middle; carpus 0.7x as long as basis, both margins moderately setose; propodus subrectangular with crenated margins; dactylus long with apical spine.

Pereopod 3 coxa subrectangular, basis 3.0x as long as broad, anterior margin with a row of small setae; merus 0.6x as long as basis, both margins with sparse setae distally; carpus as long as ischium; propodus as long as dactylus. *Pereopod 4* coxa subrectangular with posteroventral margin turning upward; basis 3.6x as long as broad, anterior margin with few setae while posterior margin with a row of setae; merus 0.7x as long as basis anterior margin with 4 setae while posterior margin with a row of setae; carpus 1.6x as long as ischium; propodus 0.7x as long as dactylus. *Pereopod 5* coxa bilobed; basis anterior margin bare, posterior margin with a row of setae; carpus 1.2x as long as propodus; dactylus small, upward turned. *Pereopod 6* basis with 3 robust setae on anterior margin; ischium as long as merus; carpus as long as propodus; dactylus small, upward turned. *Pereopod 7* basis with a huge lobe, posterior and ventral margin with a continuous series of setae; merus as long as propodus; carpus 1.6x as long as propodus; dactylus straight, 0.29x as long as propodus.

Pleon. *Epimera* with rounded posterior margins. *Uropod 1* peduncle 0.8x as long as outer ramus, with 4 robust setae on inner margin; inner ramus slightly shorter than outer ramus, with 3 robust setae on inner margin and 1 robust seta on the outer margin; outer ramus bare. *Uropod 2* peduncle 1.4x as long as subequal rami, with 2 robust setae on the inner margin, both rami bare. *Uropod 3* peduncle bare, almost half as long as outer ramus, inner ramus subequal to outer ramus, with 1 robust seta on the inner margin and 3 on the outer margin; outer ramus with 3 robust setae on the outer margin. *Telson* subtriangular, 1.3x as broad as long with 1 robust seta on each side, apical margin rounded.

Remarks. *Byblis kachchhensis* **sp. nov.** is the only species of the genus *Byblis* that has uncleft telson. Additionally, *B. kachchhensis* **sp. nov.** is closely related to *B. calisto* Imbach, 1967 by having antenna 1 subequal to peduncle of antenna 2; coxa 4 subrectangular, posteroventral corner not acutely turned upward. However, *B. kachchhensis* **sp. nov** is different from *B. calisto* in the following characters: head ventral margin parallel to dorsal margin, whereas in *B. Calisto* head ventral margin is oblique to dorsal margin; eyes placed very close to each other, while in *B. calisto* the eyes are small and are placed far apart; antenna 2 is as long as half of the body length, whereas in *B. calisto* antenna 2 is longer than one half of the body length; pereopod 7 basis moderately setose and dactylus comparatively smaller, 0.29x as long as propodus, whereas in *B. calisto* pereopod 7 basis is densely setose and dactylus is 0.47x as long as propodus; telson of *Byblis kachchhensis* **sp. nov.** is entire, whereas in *B. calisto* telson is cleft nearly to half of its length.

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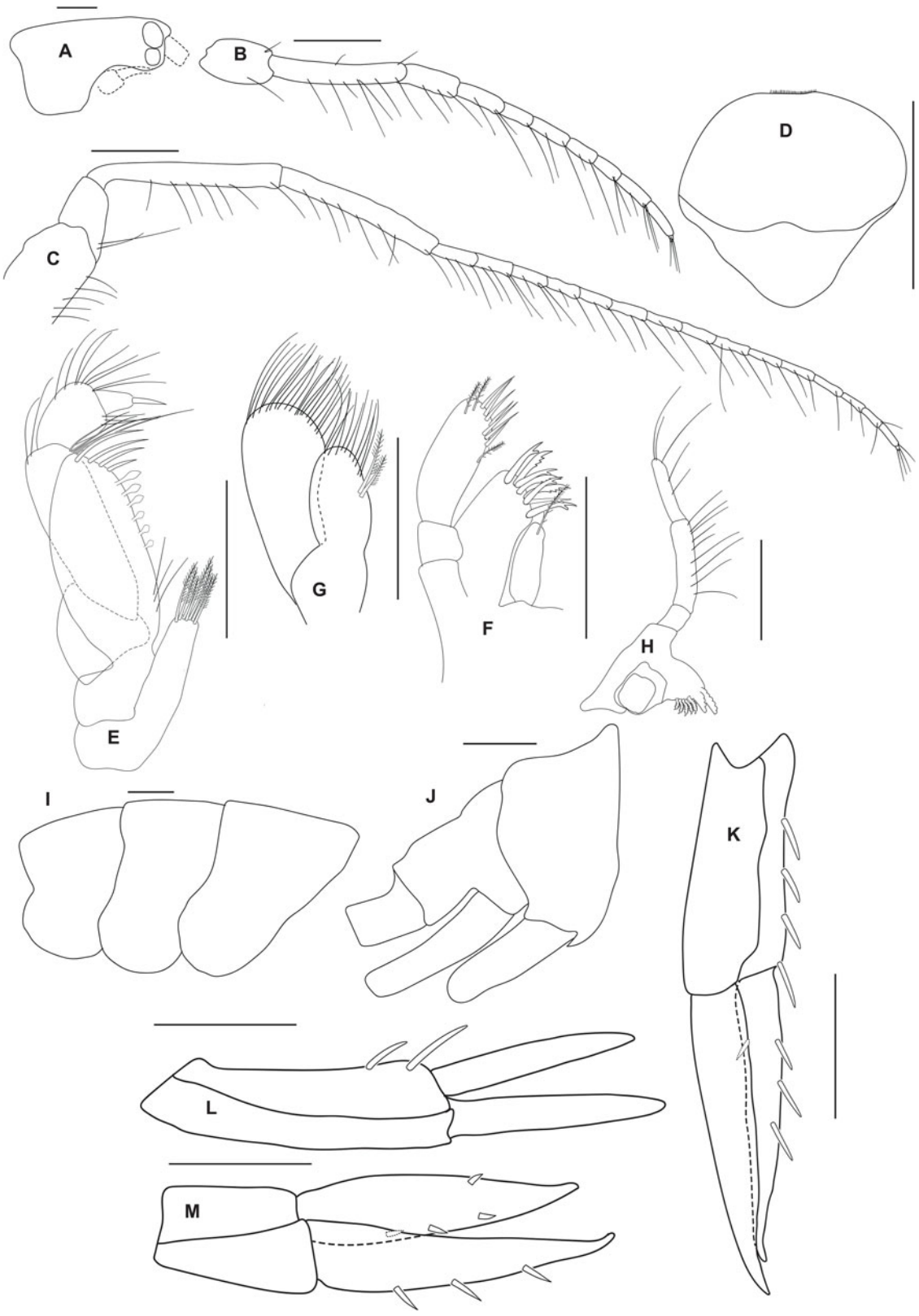

Figure 2. *Byblis kachchhensis* **sp nov.**, female holotype 5 mm: (LFSC.ZRC-218): (A) head; (B, C) antennae 1–2; (D) labrum; (E) maxilliped; (F, G) maxillae 1–2; (H) mandible; (I) epimera 1–3; (J) urosomites 1–3; (K–M) uropods 1–3. Scale- 0.25 mm.

Identification key to adult females of Indian species of *Byblis.*

1. Telson cleft . . . . . (2)
   Telson uncleft . . . . . *Byblis kachchhensis* **sp. nov.**
2. Antenna 1 as long as antenna 2 peduncle. . . . . *Byblis lepta* (Giles, 1890a)
   Antenna 1 shorter than antenna 2 peduncle . . . . . *Byblis daleyi* (Giles, 1890b)

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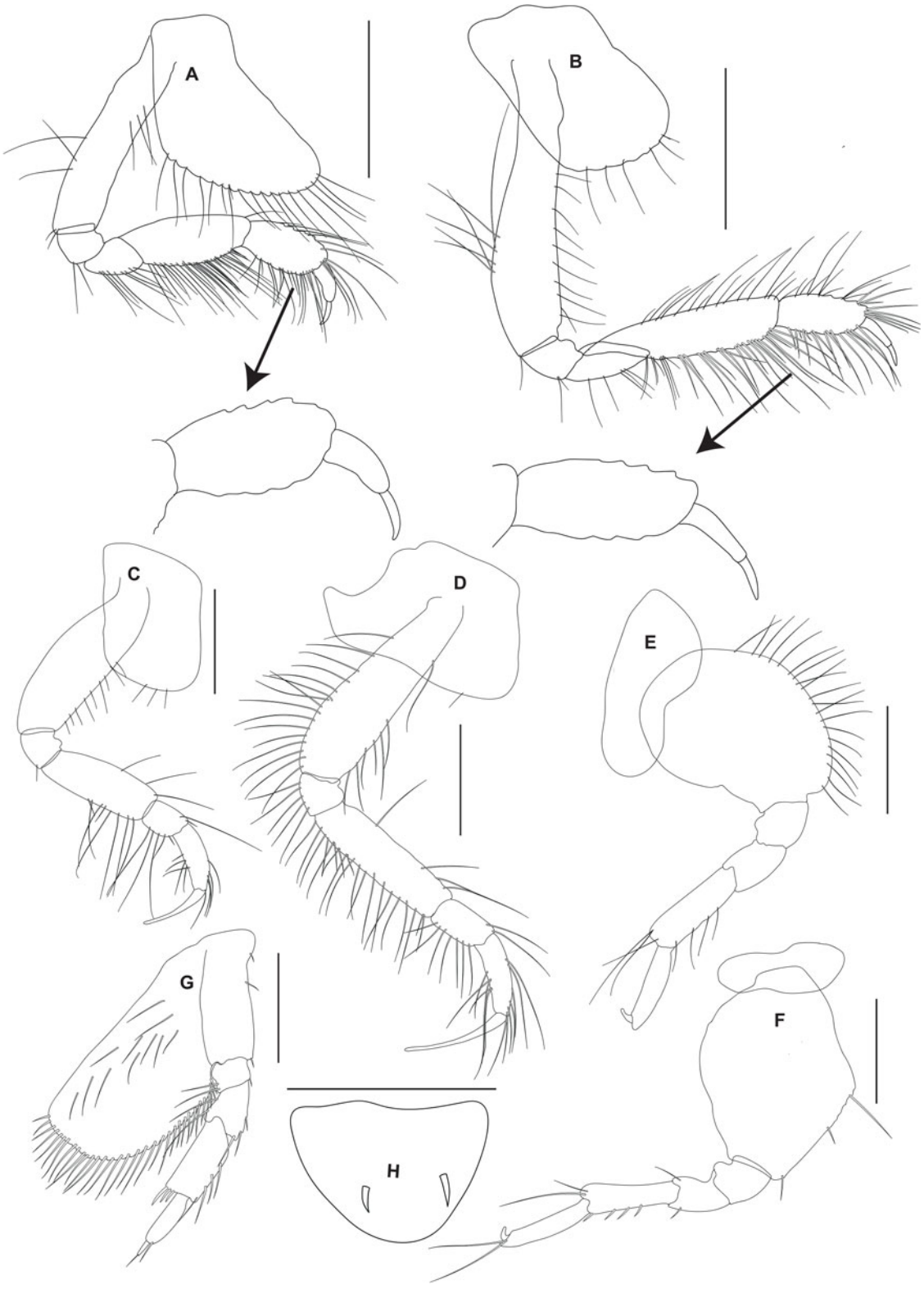

Figure 3. *Byblis kachchhensis* **sp nov.**, female holotype 5 mm: (LFSC.ZRC-218): (A, B) gnathopods 1–2; (C–G) pereopods 3–7; (H) telson. Sacle- 0.5 mm.

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Conflict of Interest. No potential conflict of interest was reported by the authors.

Ethical Standards. Not applicable.

Data Availability. All data underlying the results are available as part of the manuscript. Additional data can be shared on request.

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