FIRST REPORT OF *HASTULA ANOMALA* (GRAY, 1834) (GASTROPODA: TEREBRIDAE) FROM INDIAN WATERS

Members of the gastropod family Terebridae, commonly known as auger or pencil shells are distinctively narrow, slender and multiwhorled, inhabiting specialized sand and mud shallow marine habitats¹. Worldwide, this family is represented by about 400 species² with significant numbers from the tropical Indo Pacific region^{3, 4}. In India, collections of terebrids were made in the latter half of the nineteenth century by G. H. Booley from Andamans and J. Henderson off Chennai waters and were subsequently studied by J.C. Melvill and others^{5, 6}. The collections were deposited in the Manchester Museum, The University of Manchester, U.K. In all, 21 species were reported from Andamans and 17 from Tamil Nadu. Until now, studies with specific reference to terebrids^{3,7} were mostly from biodiversity-rich areas such as the Andaman Islands and Tamil Nadu. Although 69 species were reported from India, certain synonymies accorded to the species in the afore-cited publications are redundant, confusing, and not updated according to the latest nomenclature provided in the MolluscaBase². Recent examinations^{3, 7} of the Terebridae collection present in the Zoological Survey of India, recorded 52 species, most of which (45 species) were from the Andamans, some (4 species) from Tamil Nadu and other coastal regions (14 species) of India. The majority of the terebrid species were assigned to the genera Hastula and Terebra. Currently, of the terebrids occurring in India, 13 species are ascribed to the former genus and 17 species to the latter. Of these, 5 species of Hastula and 6 species of Terebra were from Andhra Pradesh waters. Hitherto 13 species of terebrids were documented off Andhra Pradesh^{8,3,9} on the east coast of India, with most also distributed in the coasts of Tamil Nadu and Andamans. The earlier studies on Terebridae of Andhra Pradesh were based on museum or beach-washed specimens. Our recent exploratory benthic surveys (2008-2017) along India's east peninsular coast from 13°59.988'N, 80°11.599'E to 18°59.509'N, 84°42.934'E, revealed in all, 11 species of the family Terebridae in live condition, in the dredge hauls, the first exclusive report from the state. Five species, namely Hastula anomala (Gray, 1834), H. raphanula (Lamarck, 1822), Terebra cumingii Deshayes, 1857, T. triseriata Gray, 1834, and T. quoygaimardi Cernohorsky & Bratcher, 1976 are new additions to the Mollusca inventories from Andhra Pradesh. In addition, H. strigilata (Linnaeus, 1758) depicted a distribution range along the east coast of India from Odisha³, Andhra Pradesh⁸, and Tamil Nadu, while H. raphanula (Lamarck, 1822) was earlier recorded from Kerala and Karnataka on the west coast and observed in the Andaman Islands and Bay of Bengal³. Notably, the incidence of *H. anom*ala is the first-time observation from India and reported here. The total number of terebrids from the state currently adds up to 18. The list of species reported from the state is given in Table 1.

Material examined 2 sp (live specimens), Reg No. MBLDZAU–103 (Fig. 1) (Deposited at Marine Biology Laboratory, Department of Zoology, Andhra University); dated 18.09.2014; Locality: Nakkapalli (17°20.608'N, 82°43.123'E) of Andhra Pradesh, India, depth of 15.7m.

Measurements Morphometric shell characteristics measurements (mm) of *Hastula anomala* (Gray, 1834), are tabulated (Table 2).

Description Shell shiny, moderate size. Whorls 10, plus 3 whorls of protoconch, sloping. Body whorl straight-sided, flattened, and elongate. Background color dark orange-brown and ornamented with a broad white band on the body whorl just above the margin of aperture and the suture for other whorls; indistinctly ribbed on either side of the suture, characterized by a distinct band and prominent sub sutural grooves. Spire bluish-colored, aperture broad and smooth, with straight outer lip, a white band within the aperture, the base of aperture straight, columella twisted and with strong fasciolar band.

Habitat Sandy substrate (sand 92.62%, silt & clay 7.38%, organic matter 1.37%), salinity 21.52 PSU.

Geographic range Madagascar, India (Andhra Pradesh), Philippines.

Sl. No.	Species	References	
1	Duplicaria duplicata (Linnaeus, 1758)	Ramakrishna <i>et al.,</i> 2007	
2	Gradaterebra capensis (E. A. Smith, 1873)	Monolisa & Edward, 2015	
3	Hastula anomala (Gray, 1834)	Present collection	
4	H. bacillus Deshayes 1859	Ramakrishna et al., 2007; Venkitesan et al., 2012	
5	H. raphanula (Lamarck, 1822)	Present collection	
6	H. strigilata (Linnaeus, 1758)	Ramakrishna et al., 2007	
7	H. traillii (Deshayes, 1859)	Ramakrishna et al., 2007; Venkitesan et al., 2012	
8	Impages hectica (Linnaeus, 1758)	Ramakrishna et al., 2007	
9	Myurella affinis (Gray, 1834)	Monolisa & Edward, 2015	
10	Oxymeris crenulata (Linnaeus, 1758)	Venkitesan et al., 2012; Monolisa & Edward, 2015	
11	O. maculata (Linnaeus, 1758)	Ramakrishna et al., 2007; Venkitesan et al., 2012	
12	Punctoterebra succincta (Gmelin, 1791)	Ramakrishna et al., 2007; Venkitesan et al., 2012	
13	Terebra commaculata (Gmelin, 1791)	Ramakrishna et al., 2007; Venkitesan et al., 2012	
14	T. cumingii Deshayes, 1857	Present collection	
15	T. guttata (Röding, 1798)	Ramakrishna et al., 2007; Venkitesan et al., 2012	
16	T. quoygaimardi Cernohorsky & Bratcher, 1976	Present collection	
17	T. subulata (Linnaeus, 1758)	Monolisa & Edward, 2015	
18	T. triseriata Gray, 1834	Present collection	

 Table 1
 List of Terebrid species recorded from Andhra Pradesh



Figure 1 Location map showing the site of collection, along the coast of Andhra Pradesh, east coast of India; **a**–**d** *Hastula anomala* (Gray, 1834) **a** Ventral view **b** Dorsal view **c** and **d** enlarged anterior part.

Characteristics	Specimen 1	Specimen 2
Shell Length	36.36	45.02
Shell Width	7.58	8.62
Thickness of shell	7.1	8.22
Aperture length	10.74	11.2
Aperture Width	4.64	4.64
No. of whorls	13	13

Table 2Morphometric measurements (mm) of
Hastula anomala (Gray, 1834)

Comparisons Specimens of H. anomala examined are similar to the type specimen rechecked and reported¹⁰. Of the 15 species of *Hastula* reported from India³, the specimens obtained in the present study resemble H. stylata in certain characters. The species is morphologically dissimilar to H. stylata. The shell color in the latter is apparently deep brown in contrast to the dark orange hue observed in H. anomala. Furthermore, the suture in *H. anomala* has a broad white band with distinct narrow axial ribs and clearly visible subsuture in comparison to a mere narrow band in *H. stylata*. The difference observed between *H*. anomala and H. strigilata, is distinct. The shell in the latter is characterized by manifestation of a white streak with small blackish-brown blocks of near rhomboidal patterns, below the suture on the subsutural bands, the presence of prominent axial sculptures and a narrow siphonal canal without the columellar fold. H. raphanula (Lamarck, 1822) in our collection showed a faded brownish-purple blended coloration, the shell encircled by markedly defined flattened subsutural bands without patterns, no axial sculptures, and absence of a columellar fold.

Remarks Notably, *Diplomeriza anomala* (p.75 Pl.1, fig1)³, is a clear misidentification as evident from the figure. The columella is described as straight and little calloused in the specimen. Besides, the absence of a bluish aperture distinctive of the species lacks mention in the above cited publication. Our attempts to locate the specimen in the Zoological Survey of India were futile. Reexamination of the existing image (p.75 Pl.1, fig. 1, op. cit), indicated morphological similarity to *Hastula* sp. possibly suggestive of an additional new record from India. The species certainly does not belong to the genus *Diplomeriza*, as the latter is characterized by small and ovate aperture, prominent axial ribs, deep spiral grooves

at the suture, besides the presence of a siphonal canal with a deep notch. In contrast, the genus *Hastula* is differentiated by wide aperture, short anterior canal with a wide deep notch, indistinct spiral groove with fine close-set axial ribs, mostly without a well-defined sub sutural band, folded columella, exceedingly short, stout siphonal canal and well-developed fasciole. Notably, the presence of a twisted columella with strong fasciolar band is characteristic of *H. anomala*, a feature observed in the live specimens obtained in our collections.

Distribution data indicated a single listing of *H. anomala* from Madagascar in the Indian Ocean, and the Philippines (www.obis.org 22.08.2020) with none recorded from the Indian subcontinent. The occurrence of the specimens examined in this study is the first documentation of *H. anomala* from the Indian coastal waters.

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