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Short Communication

A note on zoogeographic range extension of *Endopachys grayi* Milne-Edwards & Haime, 1848 (Scleractinia: Dendrophyllidae) from Andaman and Nicobar Islands

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The family Dendrophylliidae represents solitary as well as colonial corals with a total of 183 extant valid species under the Order Scleractinia, distributed from littoral to the abyssal depths. During a recent deep-sea survey conducted by *FORV Sagar Sampada* (FORVSS367), a specimen of azooxanthellate dendrophylliid *i.e. Endopachys grayi* Milne-Edwards & Haime, 1848 was collected at the depth of 685 m from Nicobar waters which indicates its range extension to the Andaman and Nicobar Islands in Indo-Pacific region while the previously reported depth range of the species is 37 to 386 m. The present report of *E. grayi* is a new addition to this archipelago.

[**Keywords**: Azooxanthellate, Coral, Deep-sea, Indo-Pacific]

Introduction

Reef ecosystems of the world's oceans are the abode for vast marine biodiversity with the structural complexity of scleractinian corals which provide a baseline for other associated faunal communities. The complex structure of the scleractinian corals is constructed by the gradual deposition of calcium carbonate through secretion on their own. The composite three-dimensional structural organization of scleractinians provides a home and nursery ground for a variety of species to complete their life cycle stages either completely or partially. Globally, a total of 1676 valid and extant species of scleractinian corals under 36 families are recorded to contribute substantially to the formation of coral reef biodiversity[1]. The family Dendrophylliidae ranked third amongst all the families under this scleractinians with 183 species under 25 genera contributing to 10.91 % of global scleractinian corals diveristy[1]. Ten percent of the corals under this family are zooxanthellate while others are azooxanthellate which are also spread in 12 families[2,3]. The zoogeographic range of the dendrophylliids is found across the oceans from intertidal regions to the greater depths of the ocean with the maximum limit of 2165 m; whereas the major species occurrence was noted within a depth limit of 300 m except for Antarctica[2]. The colonies of the species under this genera are either solitary or colonial and represent ahermatypic or non-reef-building corals. Porous corallite walls are a distinct morphometric feature. Corallites are separated from each other. Septa are arranged according to the Pourtalès Plan for the individuals. The present paper reports the occurrence of one species of azooxanthellate coral under the family Dendrophylliidae from Andaman and Nicobar Islands as a range extension.

Materials and Methods

One specimen of azooxanthellate dendrophylliid coral was sampled by dredge operation during a cruise expedition (*FORV Sagar Sampada* [FORVSS367]) in Andaman and Nicobar Islands in November 2017. The skeletal structure of the corallum was sun-dried after being kept in freshwater for few days and analyzed under a stereo zoom microscope (LEICA M205A DFC 500). The identification of the species was confirmed by the keys of Cairns[4,5]. The specimen is deposited in the National Zoological Collections of Zoological Survey of India, Port Blair as a voucher specimen for future reference.

Results

One species of scleractinian coral was identified from the deep-sea collections of Andaman and Nicobar Islands. The detailed taxonomical features of the species are cited below.

Systematics

Phylum: CNIDARIA Hatschek, 1888
Class: ANTHOZOA Ehrenberg, 1834
Order: SCLERACTINIA Bourne, 1900
Suborder: DENDROPHYLLIINA Vaughan & Wells, 1943
Family: DENDROPHYLLIIDAE Gray, 1847
Genus: *Endopachys* Lonsdale, 1845
Endopachys grayi Milne-Edwards & Haime, 1848

Material examined: One sample was collected from off Car Nicobar Island of Andaman and Nicobar Islands (Lat.: 09°19.090′ N; Long.: 92°37.507′ E) at the depth of 685 m on 16.xi.2017; FORVSS367; (Reg. No.: ZSI/ANRC-19572 dated 24.iv.2018) (Fig. 1).

Description: The examined specimen is white (skeletal structure), triangular-shaped or cuneiform corallum (Fig. 1a). The attachment scar is visible at the base of the corallum. The scar is mostly covered due to the growth of costae and giving the base

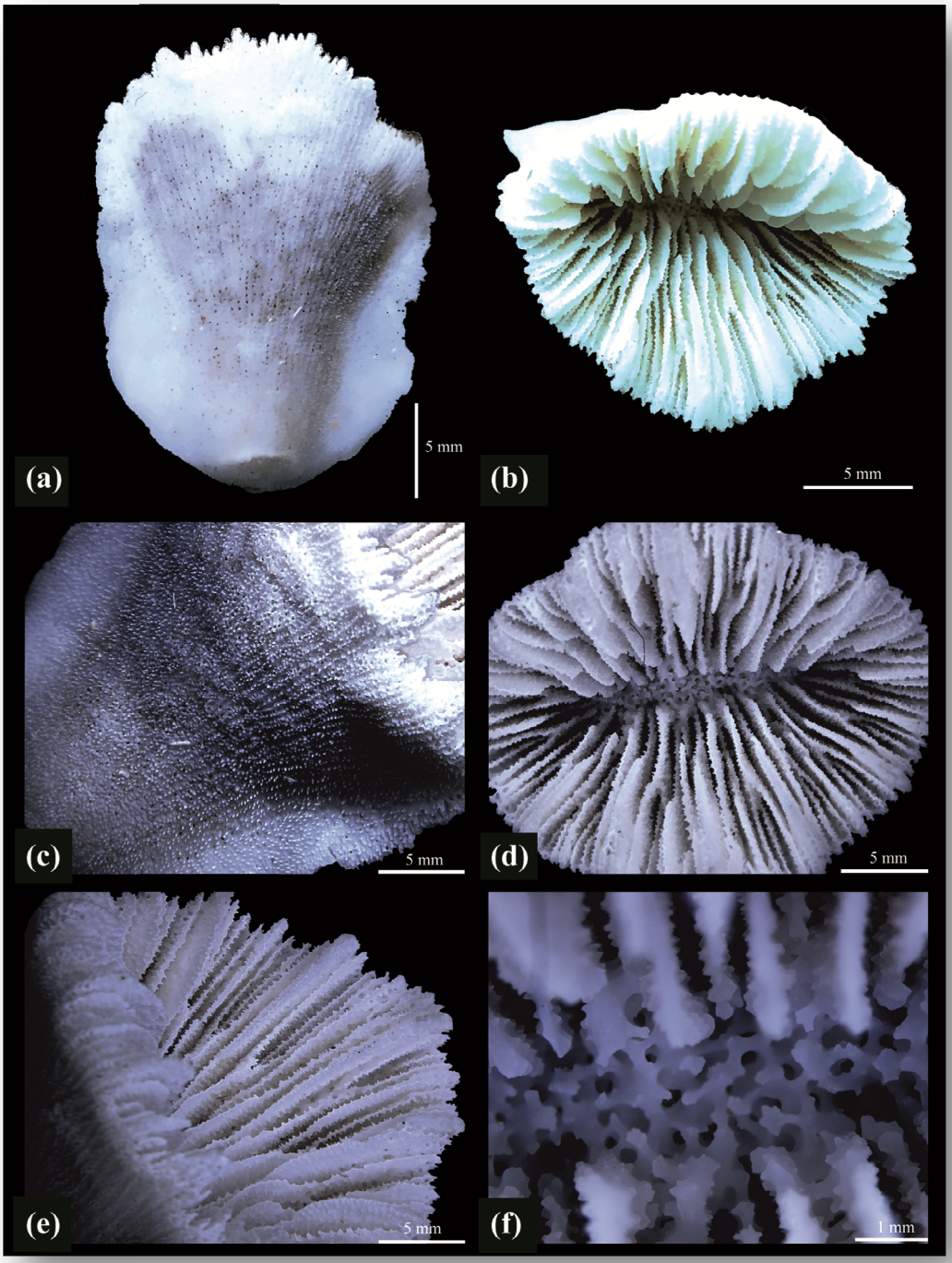

Fig. 1 — *Endopachys grayi* Milne-Edwards & Haime, 1848: a) Corallum structure, b) Calice structure and deep & elongated fossa, c) Arrangement of costae, d) Arrangement of Septa and deep & elongated fossa, e) Septal dentation and order, and f) Columella

structure, a round-shaped appearance (Fig. 1a). The corallum is extensively compressed and provides the corallum with a wing-shaped structure with delicate edge crests. The height (H) of the said specimen is 24.29 mm (Fig. 1a). The greater calicular diameter (GCD) of the specimen is 19.33 mm and the lesser calicular diameter (LCD) is 15.98 mm (Fig. 1b). The ratio of GCD and LCD is 1.2 which represents the chalice as diamond-shaped orientation. The angle of the thecal edge is 45° and the angle of thecal faces is 35° (Fig. 1b). Costae are long from the thecal edge to the base and arranged either with a single or double row of short and simple spines without any regular interval pattern (Fig. 1c). The inter-coastal furrow is narrow and shallow with some pits (Fig. 1c). Five cycles of septa are arranged in hexameric order (Fig. 1d). The septal walls are with fine dentations (Fig. 1d, e). First and second-order septa are equal in length up to the columella while the upper portion is thick, porous, and exsert (Fig. 1d, e). The third-order septa are nearly half of the first and second-order septa. The fourth-order septa are paired with the other half of the same order to develop paliform structure (Fig. 1d, e). These fourth-order septa are comparatively wider than the third-order while the presence of fifth-order septa is incomplete (Fig. 1d, e). The fossa is deep and elongated (Fig. 1b, d). The columella is with spongy orientation but is not well developed (Fig. 1f).

Type locality: Unknown.

Global distribution: Japan, South China Sea, Philippines, Indonesia, Malaysia, Cocos Islands, Australia, New Caledonia, New Zealand, Mauritius, Persian Gulf, Tanzaniam, Mozambique, South Africa, Galapagos, Gulf of California and Hawaii Islands[4-15] (Fig. 2).

Indian distribution: Kerala[16] (Fig. 2), and off Car Nicobar Island of Andaman and Nicobar Islands (present report) (Figs. 2, 3).

Discussion

The genus *Endopachys* represents only two extant, valid, and solitary azooxanthellate coral species *viz*. *E. bulbosa* Cairns & Zibrowius, 1997 and *E. grayi* Milne Edwards & Haime, 1848. This genus is very similar to *Balanophyllia* in the structural organization[4]. The presence of a cuneiform corallum shape or wing-like coastal extension makes the basic difference between the closely related genus and sometimes the paracostal ridges. The detailed documentation of the holotype specimen and locality of *E. grayi* is unknown[5]. This species was recorded within the depth range of 57 to 274 m in the Indian Ocean regions by Van der Horst from Mauritius[6]. In addition, the species is also reported from off Bisho to Zululand[7], north-eastern Arabian Sea[8], Zululand[9], Mozambique, Zanzibar, and Tanzania[11]. Further, Carins[4,5,10,12-14], and

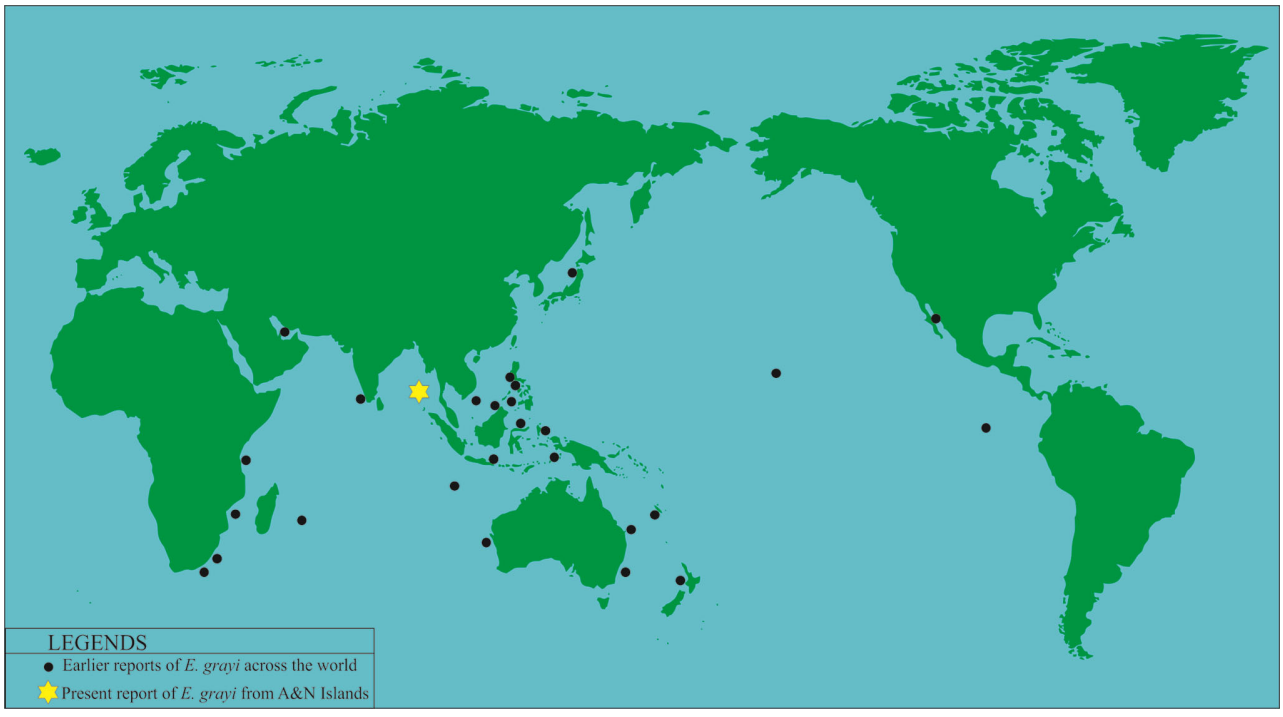

Fig. 2 — Global zoogeographical range of *Endopachys grayi* Milne-Edwards & Haime, 1848

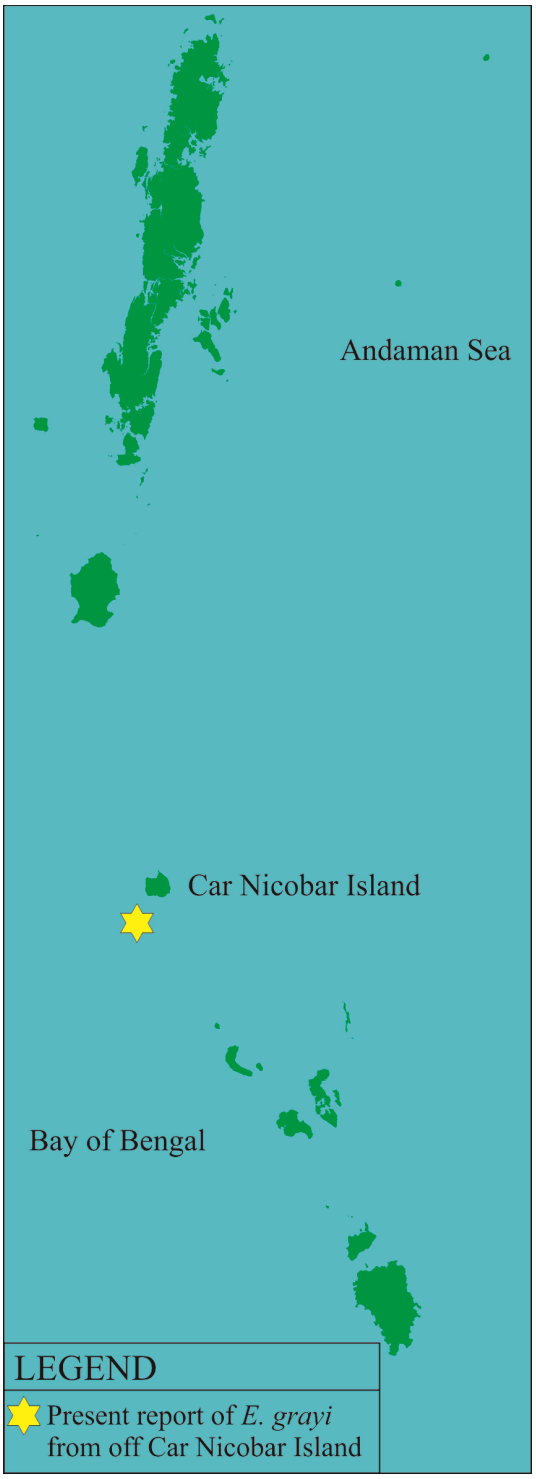

Fig. 3 — Record of *Endopachys grayi* Milne-Edwards & Haime, 1848 from Andaman and Nicobar Islands

Cairns & Zibrowius[15] reported this species within the depth range of 37 to 274 m from Western Pacific, Hawaii Islands, and the Gulf of California, 91 to 386 m from O'ahu, 20 to 183 m from Galapagos, 36 to 658 m from Indo-Pacific region, and 75 to 175 m from Australia. Only a single specimen of *E. grayi* was documented from the Indian waters previously by Pillai & Jasmin[16] and the collection was made off Quilon, Kerala from 1987 to 1989 within the depth limit of 40 – 100 m. The recorded morphometry of the specimen was GCD – 9 mm, LCD – 6 mm, and H – 8 mm[16]; whereas the prime morphological measures of this presently recorded specimen are GCD – 19.33, LCD – 15.98, and H – 24.29 which defines a comparatively larger sample. After the first record of this species from Kerala[16], no other reports were made on this species of azooxanthellate coral from any of the major and minor reef areas of India in nearly the last three decades. Singarayan & Rethnaraj provided misleading information by mentioning the record of *E. grayi* from the Andaman and Nicobar Islands[17]. They provided this incorrect information by mentioning a publication[18] but no such species is available in that publication among the listed 27 species. However, the presently studied *E. grayi* is recorded from Andaman and Nicobar Islands at 685 m depth which is much deeper than the earlier distributional records across the globe. The occurrence of *E. grayi* in these islands is reported to be a new addition to the scleractinian fauna along with expanding its global maximum depth limit of record. The reporting of this species from the Bay of Bengal region of Andaman and Nicobar Islands strengthens the distributional ranges as it was previously reported from off Quilon, the Arabian Sea region which is nearly 1780 km away in linear distance. Being a solitary coral, the distribution of *E. grayi* can be seen in a restricted area in comparison with the colonial coral species. Andaman and Nicobar Islands provide conducive habitat for the scleractinian corals and are considered as one of the major diversified areas for coral reefs in the Indo-Pacific province. Several comprehensive studies were carried out by the first author in Andaman and Nicobar Islands to explore the scleractinian corals mostly in the shallow reef region with a maximum depth of 43 m by SCUBA diving for the last 14 years which resulted in the magnificent status of scleractinian corals[19-24]. Reporting of a solitary coral from this oceanic group of islands signifies the noteworthy importance of the Andaman and Nicobar Islands in terms of ecological sustainability especially enriched coastal and marine ecosystems. Dedicated deep-sea coral exploration in Indian seas especially in this archipelago may bring out several new findings not only to the country but also to science.

Conclusion

Endopachys grayi Milne-Edwards & Haime, 1848 is one of the deep-sea azooxanthellate scleractinian corals under the family Dendrophylliidae with a previous depth range record of 37 to 386 m. The present report reveals the first report of *Endopachys grayi* to the Andaman and Nicobar Islands. This species is reported at the depth of 685 m from this archipelago which defines the new depth ranges for this species in the world's oceans.

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Conflict of Interest

There is no competing or conflict of interest for this said research paper.

Ethical statement

Not required.

Author Contributions

TM made the entire taxonomical studies on this scleractinian coral along with the sample processing, preservation, identification, writing, editing and review of this manuscript. BKK collected the specimen and CR scrutinized, editied and reviewed the manuscript.

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