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SHORT COMMUNICATION

A NEW DISTRIBUTION RECORD OF THE HORN CORAL *CARYOPHYLLIA GRANDIS* GARDINER & WAUGH, 1938 (ANTHOZOA: SCLERACTINIA) FROM THE KARNATAKA COAST, INDIA

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A new distribution record of the Horn Coral *Caryophyllia grandis* Gardiner & Waugh, 1938 (Anthozoa: Scleractinia) from the Karnataka Coast, India

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Abstract: Surveys were conducted under the project entitled “Resource exploration and Inventorisation of Deep Sea ecosystem & Marine ecosystem Dynamics: Sagar Sampada Cruise” by on-board FORV Sagar Sampada Cruise No. 374 from 2 April to 15 April 2018 from Okha to Cochin along the west coast of India. The species *Caryophyllia (Caryophyllia) grandis* is recorded from a depth of 580m off Karwar, Karnataka and is reported herein as a new distribution record to the Karnataka coast, India.

Keywords: Azooxanthellate coral, Scleractinian coral, west coast.

Scleractinian corals are represented by 627 species in India of which 35 species are azooxanthellate coral, among them nine species belonging to the genus *Caryophyllia* Lamarck, 1801 (Mondal et al. 2016). The genus *Caryophyllia* belongs to the family Caryophylliidae, order Scleractinia, suborder Hexacorallia, and commonly called azooxanthellate corals or deep-sea corals. The family Caryophylliidae is one of the 40 presently recognized families of the order Scleractinia (WoRMS 2021) which globally includes more than 300 species belonging to 42 genera (Cairns 1999) of which 90% of azooxanthellate corals and 10% of zooxanthellate corals were reported around the world (Reyes et al. 2009). In

the Indian Ocean, 86 species belonging to the family Caryophylliidae have been reported by Cairns (1999). Among them, 44 species of azooxanthellate corals were reported along the Indian coast (Venkataraman et al. 2003; Venkataraman 2006). A total of 10 species of coral belonging to the genus *Caryophyllia* was reported from Indian waters, of which five species were reported by Alcock (1898) three species by Venkataraman (2007) and three species by Lazarus & Chandran (2016). The present study gives a detailed description of the species *Caryophyllia (Caryophyllia) grandis* collected off Karwar, Karnataka coast, India.

MATERIALS AND METHODS

The present survey was conducted from 2 to 15 April 2018, along the west coast from Okha (Gujarat) to Cochin (Kerala) by on-board the fisheries and oceanographic research vessel FORV Sagar Sampada Cruise No. 374. The specimens examined in the present study were collected by a trawl fishing operation at about 580m depth off Karnataka (14.376°N, 73.027°E), west coast of India. The specimens were examined and identified under a Leica M205 stereo-zoom microscope (Cairns &

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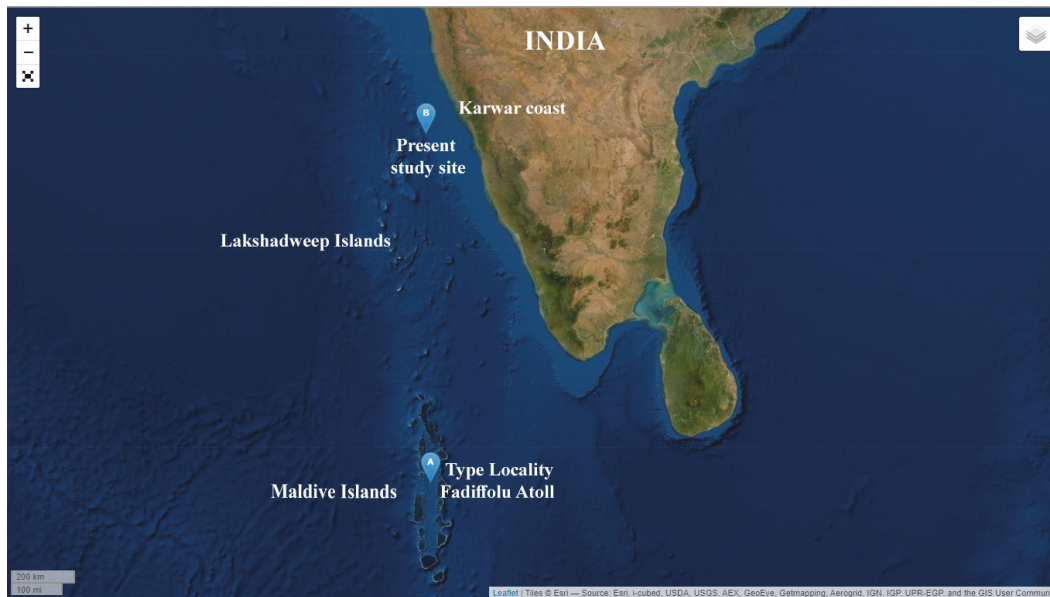


Image 1. Study area with type locality of *Caryophyllia* (*Caryophyllia*) *grandis* Gardiner & Waugh, 1938 from the Maldives. (Map from <https://www.geoplanner.com/> A—Indian coast site | B—Maldives Islands)

Kitahara 2012) and both examples photographed using a Nikon Coolpix W300 camera. The voucher specimens are deposited in the National Zoological Collection, ZSI, MARC, Digha, Reg. No. C5498.

RESULTS

A total of nine species belonging to the genus *Caryophyllia* has been reported from India (Table 1). Among them, seven species were reported from the Andaman & Nicobar Islands, five species from Lakshadweep Islands, one species each off the Madras and Kerala coast. *Caryophyllia* (*Caryophyllia*) *grandis* was observed for the first time from the Karwar coast, Karnataka, India. A detailed description of this species is given below.

Systematic description

Phylum Cnidaria Verrill, 1865
 Class Anthozoa Ehrenberg, 1834
 Subclass Hexacorallia Haeckel, 1896
 Order Scleractinia Bourne, 1900
 Suborder Caryophylliina Vaughan & Wells, 1943
 Family Caryophylliidae Dana, 1846
 Genus *Caryophyllia* Lamarck, 1801
Caryophyllia (*Caryophyllia*) *grandis* Gardiner & Waugh, 1938 (Image 1 & 2).
 Common Name: Horn Coral

Materials examined: Reg. No. C5498, two samples from soft clay and fine sand bottom, off Karwar coast (14.376°N, 73.027°E) Karnataka, west coast of India,

Arabian Sea at 580m depth; coll. J.S. Yogesh Kumar.

Diagnosis: Both specimens are curved horn-shaped and free-living. One large specimen corallum is 38mm in size of Greater Calicular Diameter (GCD) and the average height of the corallum is 35mm. The septa are arranged hexamerally in five complete cycles (S1–S5); however, one large specimen 38mm GCD has 24 primary septa and a total of 96 septa (Image 2A left). The second specimen 33mm GCD has 22 primary septa and a total of 88 septa (Image 2A right). The septa S3 are slightly less exsert than primary septa (S1) and a total 24 and 22 paliform lobes are in both specimens, respectively. The paliform are narrower than S4 and border form a crown circling a fascicular columella. The columellar are composed of broad and twisted elements in the centre part of the corallites.

Type locality: West side of Fadifolu Atoll, Maldives Islands at 494m depth (14.978°N, 73.273°E) Reg. No. BM1950.1.9.211-225 (Cairns & Zibrowius 1997; Kitahara et al. 2010)

Distribution: Maldives (494m), western Australia (399–431 m), Indonesia (251–567 m); South Africa to western Sumatra (183–595 m).

Taxonomical Reference: Veron (1986); Cairns & Keller (1993); Cairns & Zibrowius (1997); Cairns et al. (1999); Kitahara et al. (2010).

Remark: *Caryophyllia* (*Caryophyllia*) *grandis* is closely related to *Caryophyllia* (*Caryophyllia*) *ambrosia* Alcock, 2007 (Laccadive, 1,000–1,070 fms).

Table 1. List of the species under the genus *Caryophyllia* Lamarck, 1801 as per the World Register of Marine Species (WoRMS).

	Reported name of the species	AN	LAK	KL	TN	KN	Ref.	Status
	Family Caryophyllidae Dana, 1846 Genus <i>Caryophyllia</i> Lamarck, 1801							
1.	<i>Caryophyllia</i> (<i>Acanthocyathus</i>) <i>grayi</i> (Milne Edwards & Haime, 1848)	*					I	Accepted
2.	<i>Caryophyllia</i> (<i>Caryophyllia</i>) <i>ambrosia</i> Alcock, 1898		*				II	Accepted
3.	<i>Caryophyllia</i> (<i>Caryophyllia</i>) <i>clavus</i> Scacchi, 1835 Accepted name: <i>Caryophyllia</i> (<i>Caryophyllia</i>) <i>smithii</i> Stokes & Broderip, 1828	*	*				III	Synonymised
4.	<i>Caryophyllia</i> (<i>Caryophyllia</i>) <i>ephyala</i> Alcock, 1891	*	*				II	Accepted
5.	<i>Caryophyllia</i> (<i>Caryophyllia</i>) <i>grandis</i> Gardiner & Waugh, 1938	+	+			**	I	Accepted
6.	<i>Caryophyllia</i> (<i>Caryophyllia</i>) <i>paradoxus</i> Alcock, 1898			*			II	Accepted
7.	<i>Caryophyllia</i> <i>arcuata</i> Milne Edwards & Haime, 1848	*	*				I, III	Accepted
8.	<i>Caryophyllia</i> <i>communis</i> (Seguenza, 1863) (fossil species)	*					II	Accepted
9.	<i>Caryophyllia</i> <i>scillaeomorpha</i> Alcock, 1894 Accepted name: <i>Caryophyllia</i> (<i>Caryophyllia</i>) <i>ambrosia</i> Alcock, 1898				*		II	Synonymised

*—Reported | **—present study report | +—doubtful | AN—Andaman & Nicobar | LAK—Lakshadweep | KL—Kerala | TN—Tamil Nadu | KN—Karnataka | Ref.—Reference | I—Venkataraman (2007) | II—Alcock (1898) | III—Lazarus & Chandran (2016).

DISCUSSION

Azooxanthellate corals are reported from deep water and dark environments (Dinesen 1982, 1983). Nearly 34 species of azooxanthellate corals are known from the seas around the Indian waters (Turner et al. 2001). Venkataraman (2007) reported updated checklist of azooxanthellate corals from the Indian coast. Recently, Lazarus & Chandran (2016) listed a total of 34 species belonging to 17 genera, four families from the Indian coast; of which 20 species were reported from the Andaman & Nicobar Islands, 13 species from the Gulf of Mannar, 12 species from the south-west coast of India, four species each from the Gulf of Kachchh, Lakshadweep, and 3 species from the mid-west coast (Goa). The species *Caryophyllia* (*Caryophyllia*) *grandis* was excluded in the updated list of azooxanthellate corals from the Indian coast (Lazarus & Chandran 2016).

In India, a total of nine species of coral belonging to the genus *Caryophyllia* were reported (Alcock 1898; Venkataraman 2007; Lazarus & Chandran 2016). The species name verified in the WoRMS database, of which seven species status showed accepted and two species synonymised (Table 1). The present study reported *Caryophyllia* (*Caryophyllia*) *grandis* azooxanthellate coral from Karwar, west coast of India and close to type locality Maldives (Image 1). The species was first described by Gardiner & Waugh (1938) from the Maldives at 494m depth followed by this species was reported from Australia at 431m depth, Indonesia at 567m depth, and South Africa to Western Sumatra at 595m depth (Cairns

1991; Cairns & Keller 1993; Cairns & Zibrowius 1997; Cairns 1998, 1999, 2004). Kitahara et al. (2010) reported the same species from Australian waters, and the size of the corallum is 50mm GCD and curved. The upper theca was white and the lower theca was discoloured. The present reported species, corallum is 39–40 mm in size, horn-shaped and lower thecas are pale white. The species *Caryophyllia* (*Caryophyllia*) *grandis* is the first distribution report from off Karwar coast, Karnataka, India.

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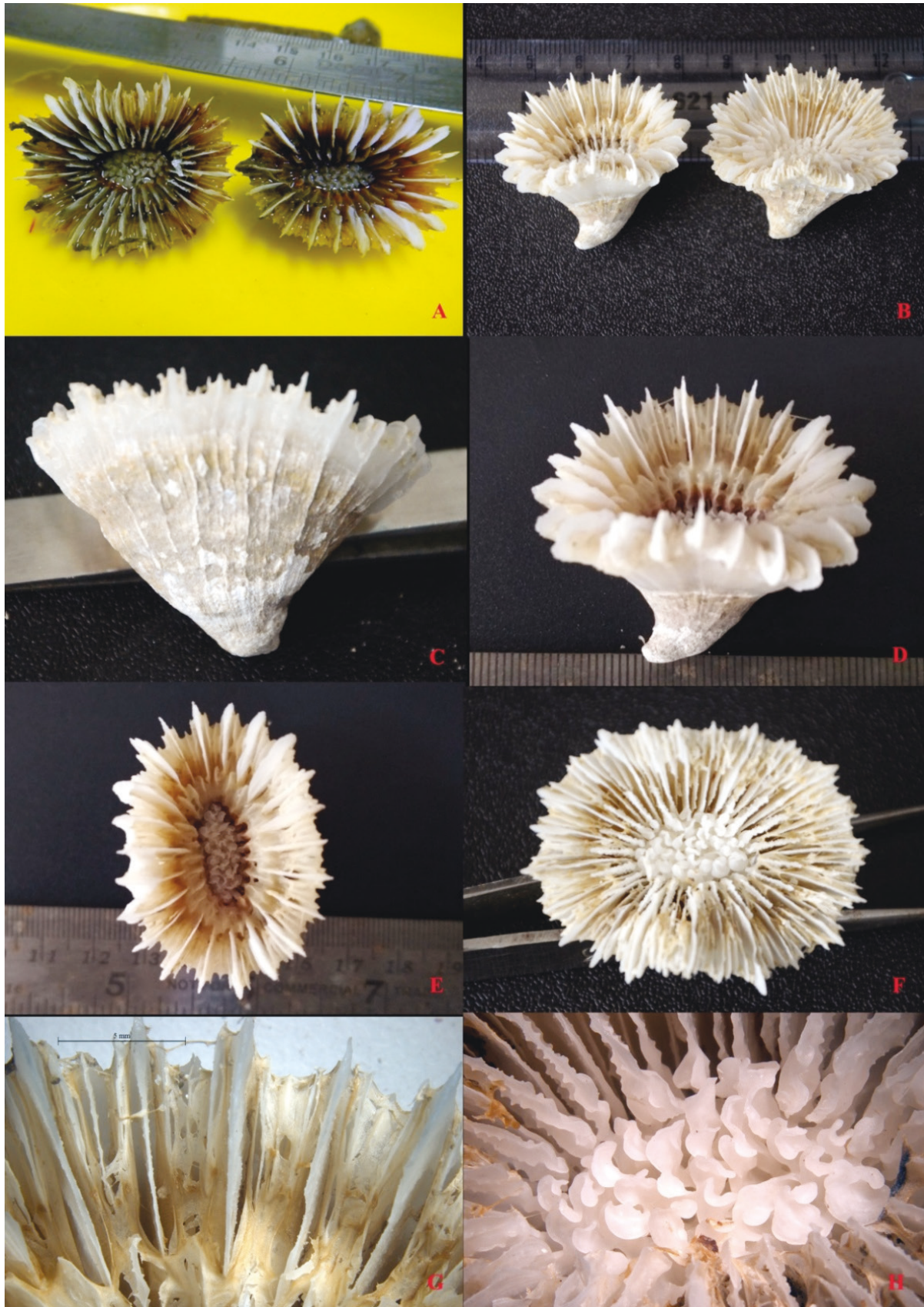


Image 2. *Caryophyllia* (*Caryophyllia*) *grandis*: A—Entire specimen | B—View of corallum | C—Lateral view of exsert septa and costa | D—Oblique view | E, F—Calicular views | G—Septa | H—Columella. © J. S. Yogesh Kumar.

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