

Range extension of Snowflake soft coral, *Carijoa riisei*, (octocorallia: alcyonacea) along Digha coast, West Bengal, India

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Short communication

Abstract

The present study reports the snowflake soft coral *Carijoa riisei* (Duchassaing and Michelotti, 1860) for the first time from the Digha coast, West Bengal, northeast coast of India, and it is reported from the Gulf of Mannar, south-east coasts to Gulf of Kachchh, north-west coasts of India. The sclerites ranged from 0.2 mm to 0.5 mm in size, and collected samples were deposited in ZSI-MARC, Digha, West Bengal.

Keywords: Invasive species, soft coral, snowflake, *Carijoa riisei*, alcyonacea, Digha

Introduction

The order Alcyonacea is commonly called soft coral and is distributed from shallow to deep-sea ecosystems. The soft coral, *Carijoa riisei* (Duchassaing and Michelotti, 1860), was commonly called Snowflake coral or Branched pipe coral. The genus *Carijoa* belongs to the order Alcyonacea, sub-order Stolonifera, and family Clavulariidae. The family is represented by three species, *C. multiflora*, *C. operculata*, and *C. riisei*. Of these, the species *C. riisei* was first reported from the Virgin Islands in the name of *Telesto rusei*, and the name has been revised as *Carijoa riisei* by Duchassaing and Michelotti (1860). *C. riisei* was distributed around the Indo-Pacific Coast and from Hawaii Island, Pacific Ocean (Evans *et al.*, 1974; Devancy and Eldredge, 1977; Kahng *et al.*, 2008). It is also reported from Chunk, Palau, Philippines, Indonesia, Australia, Thailand (Colin and Arneson, 1995) and Florida, USA to Santa Catarina (St. Paul Rocks, Brazil), Eastern Atlantic (Concepcion *et al.*, 2010), West Coast of Central Africa (Friedlander *et al.*, 2014). In India, the species was first reported from ten islands (Keelakari and Vembar group) in the Gulf of Mannar Marine National Park area

(Padmakumar *et al.*, 2011). This was followed by the report from Wondoor Jetty in Mahatma Gandhi Marine National Park, South Andaman (Dhivya *et al.*, 2012), Kudol Island, Nicobar by Raghunathan *et al.* (2013), Pirotan Island and Laku point reef in Gulf of Kachchh (Kumar *et al.*, 2014) and Grand Island, Goa coast (Patro *et al.*, 2015). Recently, it was reported from Thiruvananthapuram Harbour, Kerala (India Today, 2016). Based on the available literature, *C. riisei* was reported from 16 sites of the southeast coast to the northwest coast of India, and no reports are available from the northeast coast to the southeast coast of the Indian mainland. Hence, this present communication is the first-ever report of this species from the northern part of the East coast of India.

Material and methods

During a regular survey along the Digha coast, the first author collected two samples from the landing centre, Digha Mohana. The collected samples were fixed in 4% formalin, rinsed with distilled water after 24 hours and preserved in 70% ethanol (Benayahu *et al.*, 2002). The samples' sclerites were extracted using 5% sodium hypochlorite, and the sclerites were examined in detail by stereo zoom microscope. The identified samples were registered and deposited at the National Zoological collections, ZSI-MARC, Digha, West Bengal, India.

Results

Taxonomic account

Phylum : Cnidaria Hatschek, 1888
Class : Anthozoa Ehrenberg, 1834
Subclass : Octocorallia Haeckel, 1866

Order : Alcyonacea Lamouroux, 1816
Suborder : Stolonifera Thomson and Simpson, 1909
Family : Clavulariidae Hickson, 1894
Genus : *Carijoa* Muller, 1867
Scientific Name : *Carijoa riisei* (Duchassaing and Michelotti, 1860)

Material Examined: ZSI/MARC-C5370, C6440, two samples (8.5 cm and 5 cm) were collected by trawl sampling along Off Digha coast (Lat. 21°34.912' N; Long. 87°36.644' E; Lat. 21°36.663' N; Long. 87°33.408' E), West Bengal on 28.02.2018 & 07.11.2018 (Fig. 1).

Literature was scrutinized for *C. riisei* distribution from the Indian coast, resulting that it was not reported from Tamil Nadu to West Bengal, the southeast coast to the northeast coast of India. *C. riisei* is not reported from the Digha coast, West Bengal, or the northern part of the East coast of India.

Description: The colonies are branched and sometimes bushy with erect and flexible stems. Tall axial polyp has many short lateral polyps. Extended polyps have eight white pinnate

tentacles. The average sizes of the samples are 5cm to 8.5 cm from the Digha coast. The colonies have buds-like calyces facing upward directions and the polyps are tall axial polyps. The polyps are mostly monomorphic and retractile. Colonies are interconnected with creeping stolons.

Sclerites: Colourless sclerites up to 0.5 mm in size, slender and rod-shaped, with somewhat pointed ends, sometimes branching and small thorns are located on the surface of sclerites. Sclerites sometimes occur as tangled masses. The different sizes and shaped sclerites have been presented in Fig. 2.

Colour: live colony polyps are white in colour and stolons are creamy in colour. Underwater, the colonies are yellow, red, orange, brown and blue in colour with encrusting sponges.

Distribution: Native range is Western Atlantic and the Caribbean from Florida to Brazil; Indo-Pacific coast; In India Keelakari, Vembar group of Islands in Gulf of Mannar Marine National Park, Wandoor Jetty in Mahatma Gandhi Marine National Park, Pirotan Island and Laku point reef

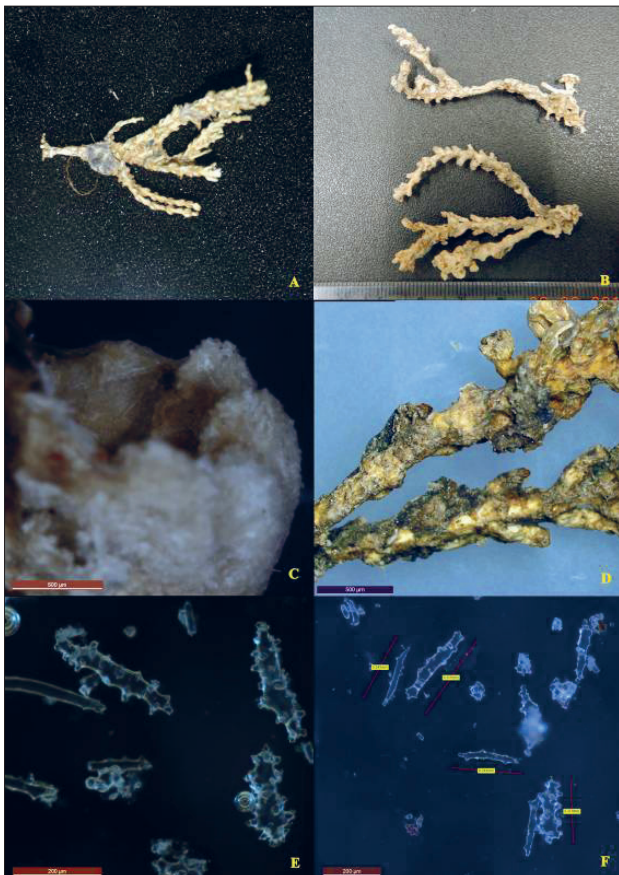


Fig. 1. *Carijoa riisei* from Digha coast, West Bengal, North East coast of India (A, B – different preserved samples of *C. riisei* from study site; C, D - polyps of *C. riisei*; E, F - various sclerites of *C. riisei*)

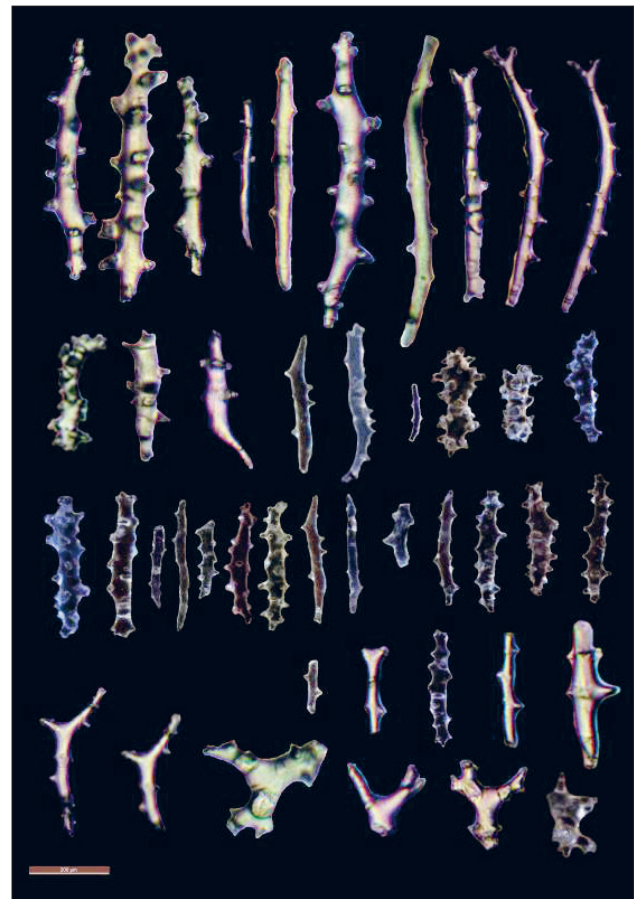


Fig. 2. Different sized and shaped sclerites in *Carijoa riisei* from Digha coast, West Bengal

in Gulf of Kachchh Marine National Park, Grand Island in Goa coast and a present study reported from Digha coast in West Bengal.

Remarks: *C. riisei* can be identified by the presence of eight white pinnate tentacles, like the rays of a snowflake; tall axial polyp with short lateral polyps; has two extra tentacles than stony coral; Sclerites are slender, branching, semi-pointed ends and thorny. The new record extends its distribution to the Digha coast, West Bengal.

Discussion

Carijoa riisei was mostly observed as fouling organisms on artificial reef structures like a shipwreck, jetty and other concrete structures in the sea (Fabricius and Alderslade, 2001). The species *Carijoa riisei* was first discovered on the Western Atlantic coast and the Caribbean coast. In India, it was observed to foul on live coral in the Gulf of Mannar, Kudol Island, and Gulf of Kachchh. Some reports are from artificial reef ecosystems such as the Wondoor jetty in Andaman and a shipwreck in Grand Island, Goa. The invasion of this species was reported from Hawaii Island (Evans *et al.*, 1974), and the range extended through the ballast water by ships (Padmakumar *et al.*, 2011). *C. riisei* established the status of invader from the Caribbean origin. However, shockingly, genetic studies of the genus showed that the genetic diversity of this coral is highest in the Indo-West Pacific, less in the Hawaiian Islands, and least in the Western Atlantic (Concepcion *et al.*, 2008). As per Concepcion *et al.* (2010), native range of *C. riisei* is Indo-Pacific, Indian and western Pacific Oceans. It was reported from the major port cities in India, like Tuticorin Port in the Gulf of Mannar, Kandla port in the Gulf of Kachchh, Marmagao port in Goa, Port Blair in Andaman and Vizhinjam port in Thiruvananthapuram. The present study reports the *Carijoa riisei* from the Digha coast, which is close to the Haldia Port in West Bengal. This occurrence confirms that *C. riisei* can be transported through ballast water. The invasion of *C. riisei* was first reported in India from the Gulf of Mannar Marine National Park. Since then, this range has been extended to the Andaman and Nicobar Islands, the Gulf of Kachchh, the Goa coast, the Thiruvananthapuram coast, and recently, the Digha coast in West Bengal. The continuous distribution of *C. riisei* over the Indian coastline poses a threat to the native and indigenous species of coral in the reef ecosystem due to its high growth rate. Further studies are needed to investigate its distribution and determine how it will affect the indigenous diversity of the Indian region. Effective measures should be planned based on the results to stop the invasion from the Indian coast.

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