

## Short Communication

### New distributional record of *Calliactis polypus* (Forsskål, 1775) (Cnidaria: Actiniaria: Hormathiidae) from Lakshadweep waters, Arabian Sea

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Cnidarians are highly diverse invertebrate group and are considered ecologically important species that provide food and shelter for a wide variety of fauna. The present study reports a hermit crab anemone, *Calliactis polypus* (Forsskål, 1775), a new distributional record in Lakshadweep waters, Arabian Sea. During the routine exploration, five specimens of anemone were collected from the intertidal regions of Agatti Island, which were associated with a hermit crab, *Pagurus bernhardus* (Linnaeus, 1758). Morphological examination of a hermit crab anemone confirmed the species and the same were compared with the previous reports. Additionally, the study provides information about cnidae composition, internal anatomy, live images of the species and comparison with other closely related species.

[Keywords: Cnidaria, Hormathiidae, India, Lakshadweep waters, New record, Sea anemones]

## Introduction

The order Actiniaria comprises the anthozoan cnidarians commonly known as sea anemones, which are widely distributed from coastal waters to the deepest areas throughout the world, with a particular abundance along the coasts of tropical oceans<sup>1</sup>. Just over 1000 species of sea anemones have been described worldwide, although about 54 species have been reported in India, belonging to 40 genera and 20 families<sup>1-3</sup>.

The genus *Calliactis* Verrill, 1869, belonging to the family Hormathiidae, is well-known for its symbiotic association with hermit crabs<sup>2</sup>. The genus *Calliactis* encompasses 19 species: *C. parasitica* (Couch, 1842), *C. algoensis* Carlgren, 1938, *C. androgyna* Riemann-Zürneck, 1975, *C. annulata* Carlgren, 1922, *C. argentacolorata* Pei, 1996, *C. armillatas* Verrill,

1928, *C. brevicornis* (Studer, 1879), *C. conchiola* Parry, 1952, *C. japonica* Carlgren, 1928, *C. marmorata* Studer, 1879, *C. parasitica* (Couch, 1842), *C. polypores* Pei, 1996, *C. polypus* (Forsskål, 1775), *C. reticulata* Stephenson, 1918, *C. sinensis* (Verrill, 1869), *C. tigris* Gusmão, Rodríguez & Daly, 2019, *C. tricolor* (Le Sueur, 1817), *C. valdiviae* Carlgren, 1938, *C. variegata* Verrill, 1869, and *C. xishaensis* Pei, 1996<sup>(ref. 4)</sup>. Among these, *Calliactis polypus* has been reported in Covelong, Chennai coast, Bay of Bengal, and waters around Andaman and Nicobar Islands by Raghunathan *et al.*<sup>3</sup> and Kumar & Prakash<sup>5</sup>.

Detailed information about the Indian sea anemone fauna has been provided by various researchers<sup>6-13</sup>. Recently, Madhu & Madhu<sup>14</sup>, Raghunathan *et al.*<sup>3</sup>, and Choudhury *et al.*<sup>15</sup> updated and reviewed the Indian benthic fauna in the Andaman and Nicobar Islands. Additionally, Shah *et al.*<sup>16</sup> reported 15 species of sea anemones belonging to 5 families and 10 genera from the Saurashtra coast. However, the *Calliactis* species from Lakshadweep waters remain insufficiently studied. In this context, the present study represents the first report of the species *Calliactis polypus* (Forsskål, 1775) from the Lakshadweep waters.

## Materials and Methods

### Sampling

During January 2022, five specimens of *C. polypus* were collected from the intertidal regions of Agatti Island, Lakshadweep (10°50'41.3" N; 72°11'19.7" E) at a depth of 3 – 5 m during low tide. The specimens were collected by hand-picking with the assistance of snorkelling. The collected specimens were transferred to the Germplasm resource centre of the ICAR-National Bureau of Fish Genetic Resources, Agatti Island using a plastic bucket with aeration. The collected specimens were photographed in live conditions to record the morphology and colour pattern of tentacles and column shape. Furthermore, the specimens were preserved in Neutral Buffer Formalin (NBF) for a detailed morphological study.

### Morphology

The preserved specimens were identified through the analysis of their external and internal taxonomic characters, supported by available literature<sup>17-21</sup>.

### Cnidae examination

Tissues from various organs of sea anemone (mesenteries filaments, tentacle and acontia) were stained with 0.5 % Rose Bengal stain (4, 5, 6, 7-tetrachloro - '2, 4' 5', 6, 8 7'-tetraiodofluorescein) and examined at 40X magnification, using a compound microscope (Motic, B series). The terminology employed for the analysis of the morphology of the cnidae follows the studies of Carlgren<sup>22,23</sup>, Mariscal<sup>24</sup>, Dunn<sup>25</sup> and Ostman<sup>26</sup>.

### Results

#### Systematics

Order: Actiniaria

Superfamily: Metridioidea Carlgren, 1893

Family: Hormathiidae Carlgren, 1932

Genus: *Calliactis* Verrill, 1869

*Calliactis polypus* Forsskål, 1775

#### Material examined

Five individuals (column length, 50 – 55 mm, after preservation 25 mm), collected at a depth of 3 – 5 m at Agatti Island, Lakshadweep, India, in the Arabian Sea, 10°50'41.3" N, 72°11'19.7" E, January 2022.

### Description

Cinclides fairly prominent, circular-shaped, occurring on small mounds in a zone of white tubercles (Fig. 1a). Tentacles arranged hexamerously ( $6+6+12+24+30 = 78$ ) (Fig. 1b). The first two cycles of tentacles, appeared near the mouth (Fig. 1b). Acontia projected from the cinclides as well as from the mouth (Fig. 1c). Oral disc flat. Column length up to 50 – 55 mm, 25 mm after preservation, adopting a cone shape. In preserved condition, oral disc smaller than pedal disc, with 17 mm in diameter and mouth fully covered by tentacles. Tentacles length about 10 – 12 mm in relaxed condition and 4 – 4.5 mm after the preservation (Fig. 1d). Column with a circle of 24 – 25 cinclides near the limbus; after preservation, cinclides have a swollen shape and a pale brown dotted structure. Body long, firm and proximally with a well-developed pedal disc (Fig. 1a); the whole column smooth, about 50 – 55 mm long in relaxed condition (Fig. 1e).

### Colour

Distal part of column pink with longitudinal lines of white thick bands radiating from the large white

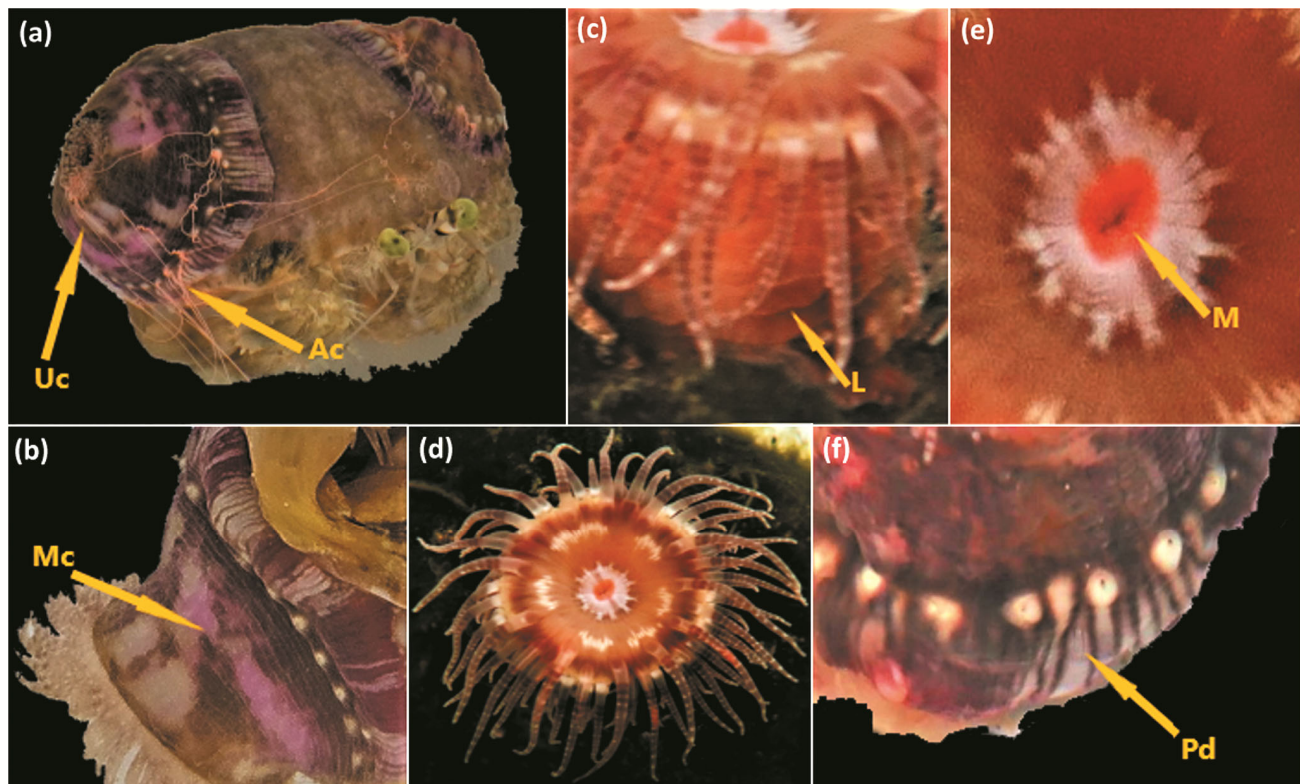


Fig. 1 — External morphology of *Calliactis polypus* (Forsskål, 1775): a) well-developed pedal disc (Pd) and Cinclidae (Cn); b) *ex situ* condition; c) acontia (Ac) from the mouth; d) microscopic view of preserved tentacle; and e) column

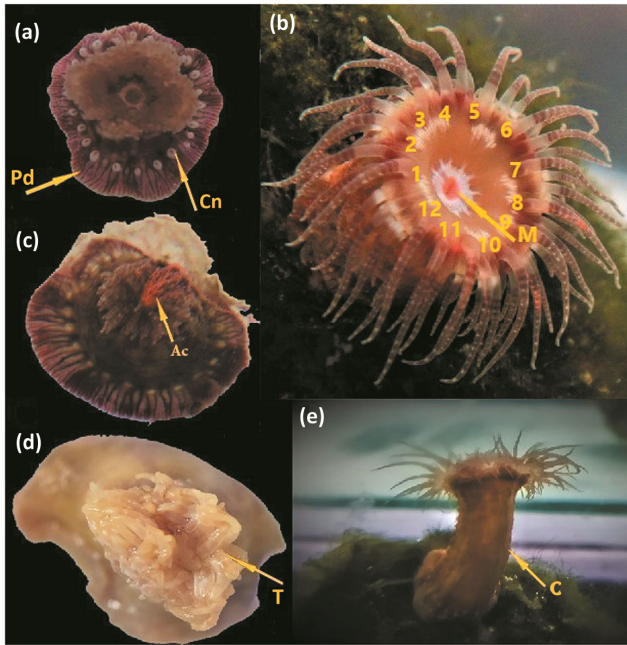


Fig. 2 — Colour difference in various parts of the external body of *Calliactis polypus* (Forsskål, 1775): a) uc: upper column, ac: acontia from cinclidae; b) middle column; c) l: limbus; d) dorsal view of the oral disc; e) mouth; and f) pedal disc

cinclides towards limbus. Upper part of column brown and dark pinkish with irregular brown batches (Fig. 2a). Tentacles light cream with light brown bands regularly from the middle of the tentacle to the tip; some tentacles have white flakes. The base of tentacles and margin of the oral disc are light brownish. Oral disc creamish orange. Mouth with irregular white circular patches and siphonoglyph coloured with dark orange (Fig. 2b-f)

**Internal anatomy**

Column with numerous ectodermal invaginations. Mesenteries fewer than tentacles. Retractor muscles fairly weak, diffuse. Marginal sphincter mesogleal, strong. Acontia present below the mesenteries and visible near the actinopharynx (Fig. 3).

**Cnidae**

The cnidom of *C. polypus* is composed of microbasic *p*-mastigophores, basitrich and spirocysts (Fig. 4).

**Discussion**

The species was previously reported from the Andaman and Nicobar Islands with morphological notes and documented off the Covelong, Chennai coast, Bay of Bengal in association with a spider crab, *Doclea muricata*<sup>5</sup>. In the present study, the

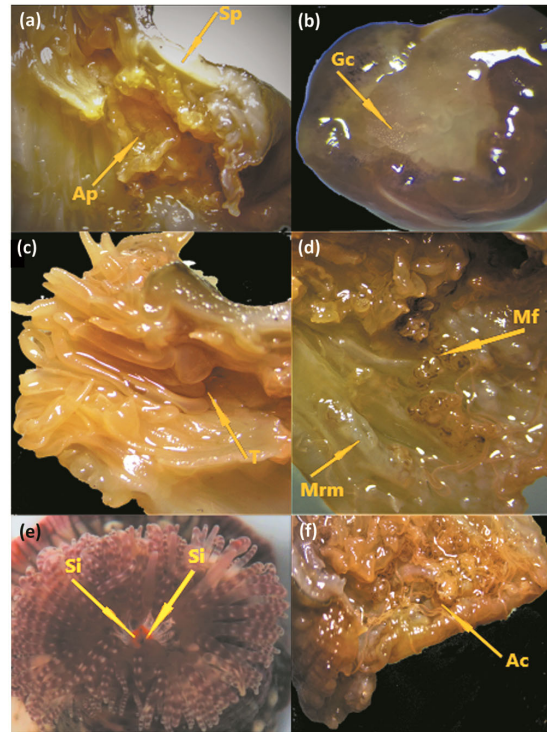


Fig. 3 — Internal anatomy of *Calliactis polypus* (Forsskål, 1775): a) Sp: sphincter, ap: actinopharynx; b) gastrovascular cavity; c) lower portion of tentacle's attached with the oral disc; d) mf: mesenterial filament, mrc: mesentery retractor muscle; e) siphonoglyph; and f) acontia centre of the body

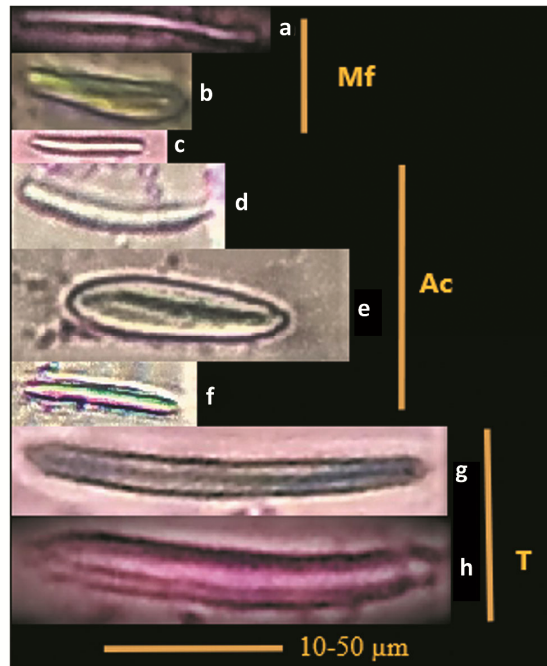


Fig. 4 — Cnidae structure of *Calliactis polypus* (Forsskål, 1775): a) Microbasic *p*-mastigophores, b) Basitrich, c) Microbasic *p*-mastigophore, d) Basitrich, e) Microbasic *p*-mastigophores, f) Basitrich, g) Basitrich, and h) Spirocysts

morphological features agreed well with the description made by Raghunathan *et al.*<sup>3</sup>. This study represents the first record of *Calliactis polypus* from the Lakshadweep archipelago at Agatti Island. The present specimens are closely related with *C. tigris* and were compared with Australian specimens<sup>27</sup>. The oral disc of *C. polypus* is smaller than the pedal disc, with a diameter of 17 to 17.5 mm; whereas, the pedal disc of *C. tigris* measured 17.0 to 80.0 mm in preserved conditions. The column length was observed to be up to 55 mm in *C. polypus* and after preservation, it reduced to 25 mm in length and exhibited a cone-like shape. In comparison, the column length of *C. tigris* was 15.0 to 59.0 mm, with a diameter of 19.0 to 75.0 mm in preserved condition. The tentacles of *C. polypus* were arranged hexamerously (6+6+12+24+30 = 78), and the first two cycles appeared near the mouth. In contrast, in *C. tigris*, the outer half of the oral disc had up to 110 tentacles, hexamerously arranged in 5 cycles (6+6+12+24+48+n). Finally, the *C. polypus* which is commonly distributed in the Andaman and Nicobar Islands, now shows the range expansions to Lakshadweep Sea. Conversely, *C. tigris* has only been observed off the coast of New South Wales and Queensland in Australia, in the western Pacific Ocean.

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### Conflict of Interest

Authors have no competing or conflict of interest.

### Ethical Statement

Animals are collected from the intertidal regions of Agatti Island, and no restrictions are imposed on the collection of this species for research purposes.

### Author Contributions

SB & PP: Sampling and identification; DPR: Manuscript final revision; TTA: Concept and manuscript preparation; KKL: Guidance and facilitating the work.

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