



First Record of *Parapenaeopsis coromandelica* (Alcock, 1906) Coromandel Shrimp from Dholai Fishing Harbour, Northwest Coast of India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Globally Penaeidae family has 200 species under 41 genera, India accounts for 28.5% of the global diversity, with 57 species in the Penaeidae family, including 9 species of the genus *Parapenaeopsis*. As part of a broader survey to identify and document crustacean diversity along the Gujarat coast, male and female specimens of *Parapenaeopsis coromandelica* were collected from trawl catch, and morphological parameters were recorded. Although significant research has

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been conducted along the Gujarat coastline on crustacean diversity, there have been no prior records of *P. coromandelica*. This study not only broadens the known distribution of the species but also provides, morphometric parameters of the species, along with descriptive taxonomy.

Keywords: Dholai fishing harbour; *parapenaeopsis*; *penaeidae*; taxonomy.

1. INTRODUCTION

Arthropods are one of the major and most diverse groups of animals, and Subphylum Crustacea is a large group in marine ecosystems [1]. Crustaceans, which include prawns, lobsters, crabs, etc., exhibit the fourth largest diversity among animal groups on the planet [1]. There are estimated to be about 50,000 to 67,000 species worldwide, but ten times more of these remain undiscovered [2]

Crustaceans are a significant part of India's aquatic ecosystems. While most species are marine and estuarine, a notable number inhabit freshwater and terrestrial environments. The subphylum Crustacea includes five classes and 22 orders, encompassing approximately 4,258 species in India. Over 3,500 species are found in marine and estuarine habitats, with the highest diversity observed in Decapoda (1655 species) [3].

Decapoda, an important order of crustaceans, includes numerous economically significant species and is divided into two suborders: Dendrobranchiata and Pleocyemata. Dendrobranchiata consists exclusively of shrimp species within the superfamilies Penaeoidea (Rafinesque, 1815) and Sergestoidea (Dana, 1852). The superfamily Penaeoidea comprises seven families, which include the families, Aegeridae, Aristeidae, Benthescymidae, Carpopanaeidae, Penaeidae, Sicyoniidae, Solenoceridae [4]. The Penaeidae family includes around 200 species across 41 genera worldwide, with the genus *Metapenaeopsis* having the most species (79), followed by *Metapenaeus* (36 species), *Penaeus* (30 species), and *Parapenaeopsis* (28 species). India accounts for 28.5% of the global diversity, with 57 species in the Penaeidae family, including 9 species of *Parapenaeopsis* [5]

Within *Parapenaeopsis stylifera*, two varieties have been described from Indian waters: *P. stylifera* var. *coromandelica* (Alcock, 1906) and *P. stylifera* var. *cochinensis* (George, 1973). While the latter was later considered a synonym of *P. stylifera* [6, 7] elevated *P. stylifera* var. *coromandelica* to the species rank of *P.*

coromandelica, a classification supported by De Bruin [8], Holthuis [9] and Miquel [10]. More recently, De Grave [11] and Samuel et al. [12] also recognized *P. coromandelica* as a separate species. The species *Parapenaeopsis stylifera* and *P. coromandelica* are nearly morphologically identical, with a few distinct differences. *P. stylifera* has four pairs of subapical fixed spines on the telson, while *P. coromandelica* has one or two pairs of such spines. Additionally, the uropods of *P. coromandelica* are uniformly coloured, whereas the tips of the uropods of *P. stylifera* are distinctly white.

As part of a larger survey on the crustacean diversity in Gujarat, the objective of the present study was to identify *Parapenaeopsis coromandelica* from Dholai fishing harbour and provide its morphological description, contributing to the understanding of shrimp species geographical distribution.

2. MATERIALS AND METHODS

Specimens of *Parapenaeopsis coromandelica* were collected from the Dholai Fishing Harbour (72° 52' 0" E, 20° 48' 15" N) in the South Gujarat region (Fig. 1), on the northwest coast of India. The specimens were captured using a bottom trawler operating at approximately 45–50 meters. After capturing the specimens, they were carefully handled and transported to the College of Fisheries Science, Navsari, for further morphological examination. Morphological characteristics were used to separate male and female specimens. Morphometric parameters were recorded for each specimen. Measurements were taken using measuring scales, and specialized taxonomic trays to ensure accuracy. The taxonomic identification of the specimens as *P. coromandelica* was confirmed by comparing morphological characteristics with descriptions in FAO species catalogues [13]. The specimens were preserved in a 10% formalin solution to maintain the integrity of the specimens for future reference. The preserved specimens were stored in the Aquatic Biodiversity Museum at the College of Fisheries Science, Navsari (Accession No: C 1.3.3.1).

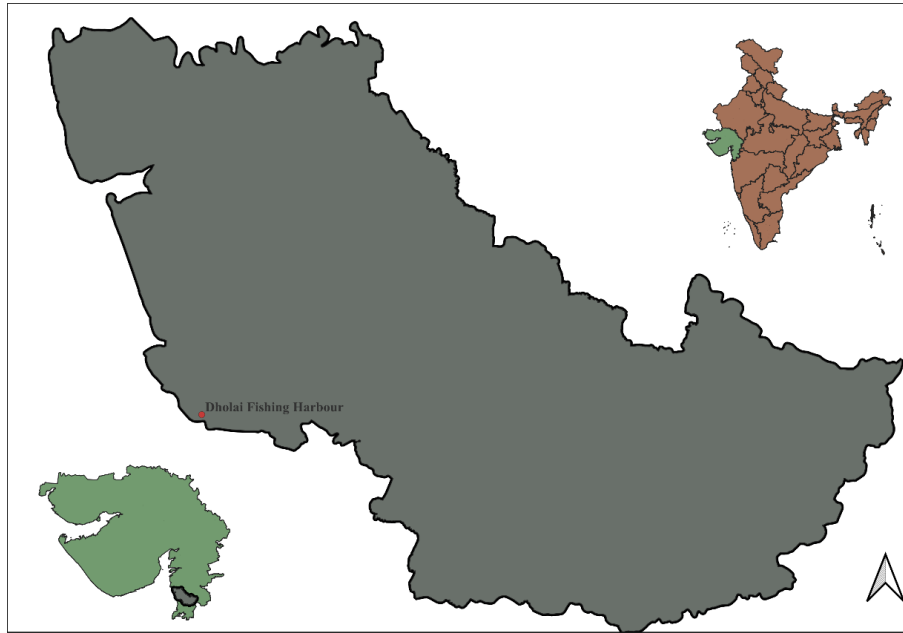


Fig. 1. Location of Dholai Fishing Harbour in Navsari District (QGIS 3.32.0)

Table 1. Morphometric parameters of *Parapenaeopsis coromandelica*

Sr. No	Parameter	Female (cm)	% of Total Length Female	Male (cm)	% of Total Length Male
1	Total Length	9.2	100.00	6.4	100.00
2	Rostrum length	2.7	29.35	1.5	23.44
3	Carapace length	2.7	29.35	1.9	29.69
4	Cephalothorax length	5.4	58.70	3.4	53.13
5	Abdomen length	5.5	59.78	3.0	46.88
6	Length of antennule flagellum	17.9	195.43	12.5	195.31
7	Dorsal antennular flagella	3.1	33.70	2.3	35.94
8	Ventral antennular flagella	2.7	29.35	2.2	34.38
9	Transverse suture	0.5	5.43	0.3	4.69
10	Longitudinal suture	1.6	17.39	1.1	17.19
11	Adrostral crest	1.6	17.39	1.2	18.75
12	Telson length	1.5	16.30	1.2	18.75
13	Uropod Endopod	1.5	16.30	1.4	21.88
14	Uropod Exopod	1.7	18.48	1.5	23.44
15	Dorsal crest	1.1	11.96	0.9	14.06
16	First pereopod	2.1	22.83	2.0	31.25
17	Second pereopod	2.6	28.26	2.2	34.38
18	Third pereopod	3.7	40.22	2.8	43.75
19	Fourth pereopod	3.2	34.78	2.6	40.63
20	Fifth pereopod	3.7	40.22	3.0	46.88

3. RESULTS AND DISCUSSION

Scientific classification (according to the World Register of Marine Species):

Kingdom: Animalia
Phylum: Arthropoda
Subphylum: Crustacea

Class: Malacostraca
Superorder: Eucarida
Order: Decapoda
Superfamily: Penaeoidea
Family: Penaeidae
Genus: *Parapenaeopsis*
Species: *P. coromandelica*

Table 2. Measurement of podomeres of walking legs of *Parapenaeopsis coromandelica*

Female (mm)						Male (mm)					
Appendage	First	Second	Third	Fourth	Fifth	Appendage	First	Second	Third	Fourth	Fifth
Basis	3	3	4	3	3	Basis	2	2	2	2	2
Ischium	4	4	5	4	4	Ischium	3	4	5	4	3
Merus	6	6	9	10	13	Merus	6	5	6	7	10
Carpus	4	8	13	8	14	Carpus	5	7	11	7	10
Propodus	2	3	3	7	3	Propodus	3	3	2	6	5
Dactylum	2	2	3			Dactylum	1	1	2		
Total length	21	26	37	32	37	Total length	20	22	28	26	30

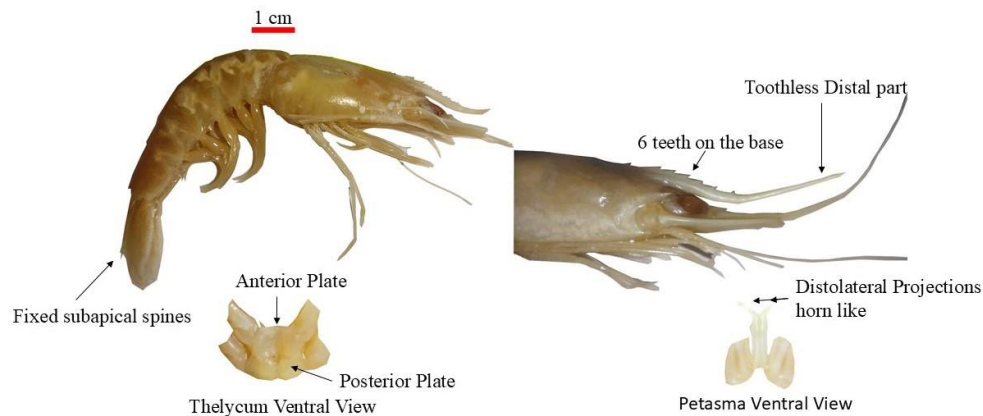


Fig. 2. *Parapenaeopsis coromandelica*

During the morphometric and meristic analysis, 20 body parameters were measured and expressed as percentages of the total length to facilitate a comparison between male and female specimens. The list of parameters is provided in Table 1.

3.1 Species Description

The rostrum is sigmoidal, strongly upcurved, and overreaches the tip of the antennular peduncle. It is toothless on at least the distal half and armed at the base above the eye with dorsal teeth. In males, the rostrum has two teeth before the eye and three teeth after it, whereas in females, only two teeth are present after the eye. The ventral side of the rostrum is entirely toothless, and an epigastric tooth is present on the dorsal surface. The carapace lacks a lateral keel, and the cutting portion of the mandible is short and massive. The adrostral crest almost reaches the posterior margin on the dorsal part of the carapace, while the longitudinal suture extends to a little less than two-thirds of the carapace length. The orbital spine is behind the eyestalk, with post-orbital spines on both sides of the carapace. The branchiostegal spine and branchiocardiac carina are present on the carapace. The carapace is grooved in males and females, but no median groove is present. The antennular flagella are slightly longer than the carapace. The cicatrix is located on the lateral side of the sixth abdominal segment. The pleura of the second abdominal segment does not overlap the first or third segments.

The first three pereopods are chelated in both males and females. In females, the third pereopod is the longest, followed by the fifth, whereas in males, the fifth pereopod slightly

exceeds the third in length (Table 2). Exopods are present in all pereopods in both sexes. Epipods and basal spines are present on the first and second pereopods, but the basis of the third pereopod is unarmed. The telson is armed with one or two pairs of subapical, fixed spines. When two pairs are present, the second pair is much smaller than the distal pair.

Shape and structure of reproductive organs: In males, distolateral projections of petasma are slender, horn-like and straight, directed anterolaterally, with ventro-external openings; distomedian projections are small and curved ventrally.

In females, the anterior plate of thelycum is square and concave, with a slender stem-like posterior process; the posterior plate is deeply notched anteromedially.

Colouration: In fresh specimens, the body is grey-reddish the rostrum and abdominal crest darker; pereopods and pleopods are brown to red or greyish; uropods are uniform brownish.

This is the first reported occurrence of *Parapenaeopsis coromandelica* from the Dholai fishing harbour in South Gujarat. Previous studies from this region, such as Borichangar et al., [14] have not documented this species. Although various studies have been conducted along the Gujarat coast, very few have focused on crustacean diversity. Research from other fishing harbours, such as Okha in Northwestern Gujarat Solanki et al., [15] and Veraval on the Saurashtra Coast [16], also does not mention *P. coromandelica*. Furthermore, although Trivedi et al. [17] conducted research in the Gulf of Kutch region, no record of this species was found. The

present study is significant as it provides the first documented record of *P. coromandelica* in the Dholai fishing harbour.

4. CONCLUSION

During the survey of crustacean diversity in Gujarat, specimens of *Parapenaeopsis coromandelica* were collected from the Dholai fishing harbour. Given that limited research has been conducted on crustacean diversity along the Gujarat coast, this study presents a new geographical record and detailed species description of *P. coromandelica* from the northwest coast of India. Previously, *P. coromandelica* was reported only from the southern coast of India, making this a significant addition to its known distribution. The specimens in the present study were compared with the descriptions by (Fischer, 1984) indeed proving it to be *P. coromandelica*.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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