



## **New Record of Brachyuran Crabs from the Visakhapatnam Coast, Andhra Pradesh, 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.

### **Article Information**

DOI: 10.9734/JSRR/2022/v28i1030564

### **Open Peer Review History:**

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/91483>

**Original Research Article**

**Received 01 July 2022**  
**Accepted 02 September 2022**  
**Published 05 September 2022**

### **ABSTRACT**

Crustaceans are a highly diverse group. In particular, the order Decapoda represents a highly diverse order of malacostracan crustaceans. There are 7620 brachyuran species from 104 genera present globally. In India, 910 marine brachyuran crabs are reported, belonging to 361 genera and 62 families. Andhra Pradesh shows typical habitat heterogeneity for Brachyuran crabs. A total of 121 brachyuran crabs have been reported from Andhra Pradesh. Two species of brachyuran crabs, one is *Eucrate indica* Castro & P.K.L. Ng, 2010 belonging to the family Euryplacidae Stimpson, 1871 and another is *Liagore rubromaculata* (De Haan, 1983) belonging to the family Xanthidae MacLeay, 1838 are reported here for the first time from the Visakhapatnam coast, Andhra Pradesh, India. These crabs were collected from the Visakhapatnam fishing harbour in the trawl bycatch during the coral reef and reef-associated faunal survey in Andhra Pradesh. The morphological features, taxonomical systematic, colour and distribution of these crabs are discussed here.

**Keywords:** Andhra Pradesh; brachyuran; eucrate; euryplacidae; liagore; visakhapatnam; xanthidae.

### **1. INTRODUCTION**

Andhra Pradesh is situated between Orissa and Tamil Nadu, covered 973.4 km length of the coast. The coast covered different types of

ecosystems like reef patches, seaweed, ecosystems with rocky bottom and rocky shore, mudflat ecosystems, mangrove ecosystems and sandy beaches [1]. Visakhapatnam is a major fish landing centre and the capital of Andhra

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Pradesh. The crab fishery is well known for its commercial importance in Andhra Pradesh coastal area. Mostly the crabs from the family Portunidae are commercially valuable. Numerous Brachyuran crab species from different families were caught accidentally in trawl net fishing along with fish [2]. Crustacean diversity being in study trends to understand macrobenthic faunal relations are represented by 67,000 species globally [3,4]. Among crustaceans, brachyuran crabs are the most diverse group. There are 7620 brachyuran species from 104 genera is present globally [5, 6,7]. A total of 910 species belonging to a total of 62 families and 361 genera have been reported from Indian waters and from Andhra Pradesh 121 species, 67 genera, and 27 families have been reported [8,9].

Brachyuran crabs belonging to the families Euryplacidae and Xanthidae are smaller in size. The family Euryplacidae Stimpson, 1871, accommodates 31 species belonging to 13 genera, of which genus *Eucrate* represents only eight species from around the world. In India, three species *E. alcocki*, *E. crenata* and *E. indica* have been reported. *E. indica* has been reported in Tamil Nadu [10,11, 12, 8] and Gujarat coast [8]. The genus *Liagore* De Haan, [13] belongs to the family Xanthidae, represents total of three species, *Liagore erythematica* Guinot, 1971, *Liagore pulchella* PKL Ng & Naruse, 2007, *Liagore rubromaculata* (De Haan, 1835) around the world. Of which two species *L. rubromaculata* and *L. erythematica* have been reported from Indian waters [14] (T. Vaitheeswaran, 2019; [8]. The present study reports the presence of *Eucrate indica* Castro & P.K.L. Ng, 2010 and *Liagore rubromaculata* (De Haan, 1983) for the first time from the Andhra Pradesh coast.

## 2. MATERIALS AND METHODS

The study was carried out as part of a research project entitled "Studies on the Coral and reef-associated faunal community along the Andhra and Odisha coast of India". During the field survey, the samples have been collected from Visakhapatnam fishing harbour (N 17.696022, E 83.302603). Fig. 2. Shows the collection locality of these two brachyuran crabs. The collected specimens were washed properly to remove sediment, Photographed and then preserved in 10% formalin for further identification. The specimens are deposited in the National Zoological Collections in Zoological Survey of India, Sunderban Regional Centre, Canning, West Bengal. The specimens were identified

following the descriptions and standard taxonomical key characters [15; 11, Ng & Chen 2004; 16, 7, 17].

## 3. RESULTS

In the present study, brachyuran crab species *Eucrate indica* Castro & P.K.L. Ng, 2010 and *Liagore rubromaculata* (De Haan, 1983) are reported as new records from the Andhra Pradesh coast.

### 3.1 Systematic Details of the Collected Species

Order: Decapoda Latreille, 1802  
Infraorder: Brachyura Latreille, 1802  
Family: Euryplacidae Stimpson, 1871  
Genus: *Eucrate* De Haan, 1835  
*Eucrate indica* Castro & P.K.L. Ng, 2010

### 3.2 Material Examined

One male specimen (Fig. 4. A&B) collected by trawl catch, Visakhapatnam fishing harbour, Bay of Bengal, Andhra Pradesh, India, (N 17.696022, E 83.302603), 22.01.2022, Collector: Dr J. S. Yogesh Kumar, Accession No: ZSI/SbRC/KN5110 (Deposited in the National Zoological Collections of ZSI- Sunderban Regional Centre).

### 3.3 Diagnostic Characters

Carapace of *E. indica* is hexagonal shaped, surface of the carapace is smooth and without any granules.

The anterolateral margin of the carapace possesses three anterolateral teeth excluding the outer orbital tooth. The first tooth is short, triangular; the second tooth is largest, sharp, pointed and slender; the third tooth is short, almost reduced, and not much noticeable.

The male abdomen of *E. indica* is narrow; it almost looks like 'T'. Propodus is swollen; cheliped is slightly broader than propodus. Cheliped fingers are stout moderately. Small red-brown dots are distributed on the dorsal portion of cheliped and maxillipeds. The dorsal Carapace with numerous small red-brown dots. Dorsal portion of the carapace contains two large red-brown spots on the median region; each large blotch is flanked by two small red-brown vertically placed spots (Fig. 4. A &B).

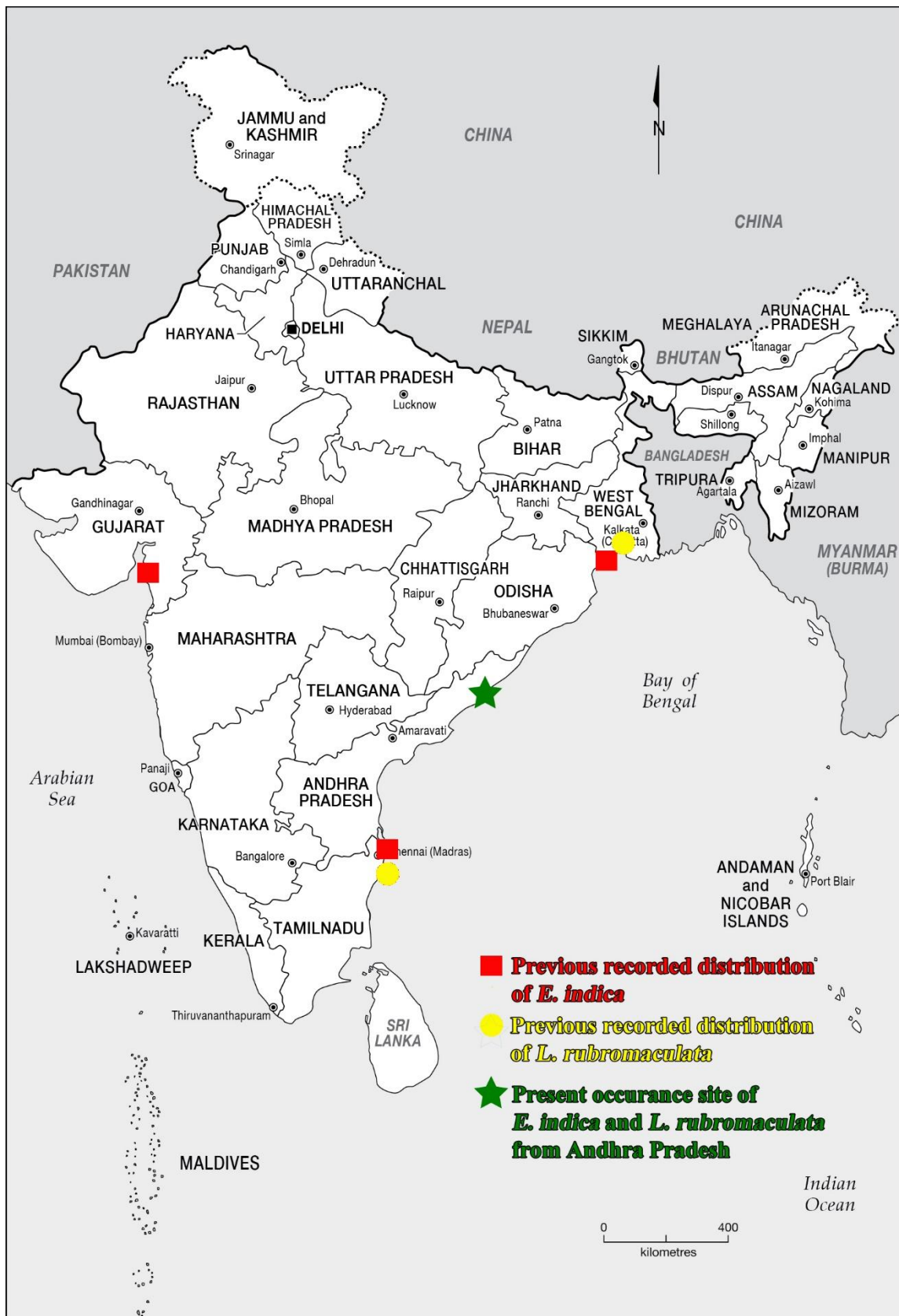


Fig. 1. Present Occurrence site and distributions of *E. Indica* & *L. rubromaculata* from India

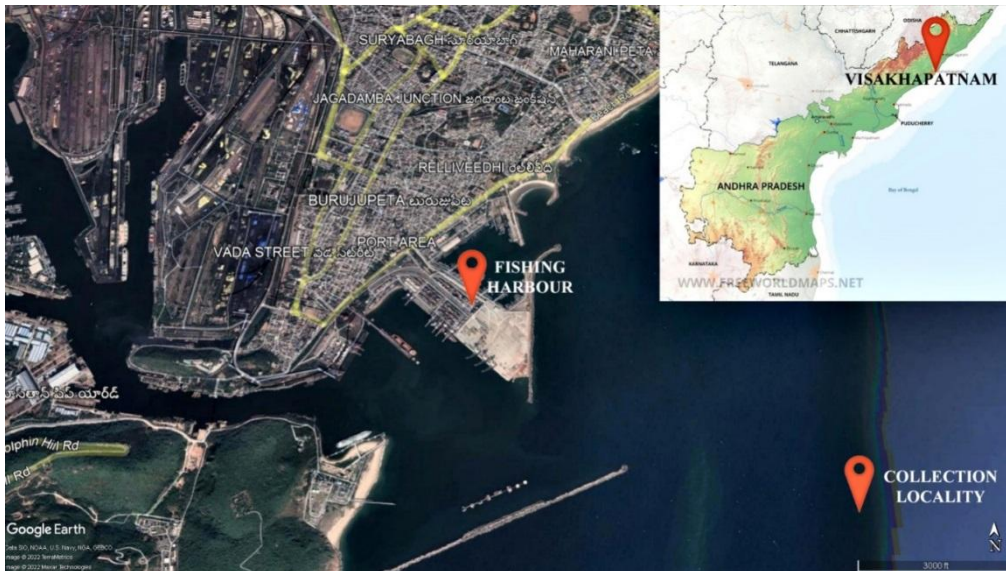


Fig. 2. Collection site of *E. Indica* & *L. rubromaculata* from Andhra Pradesh, India

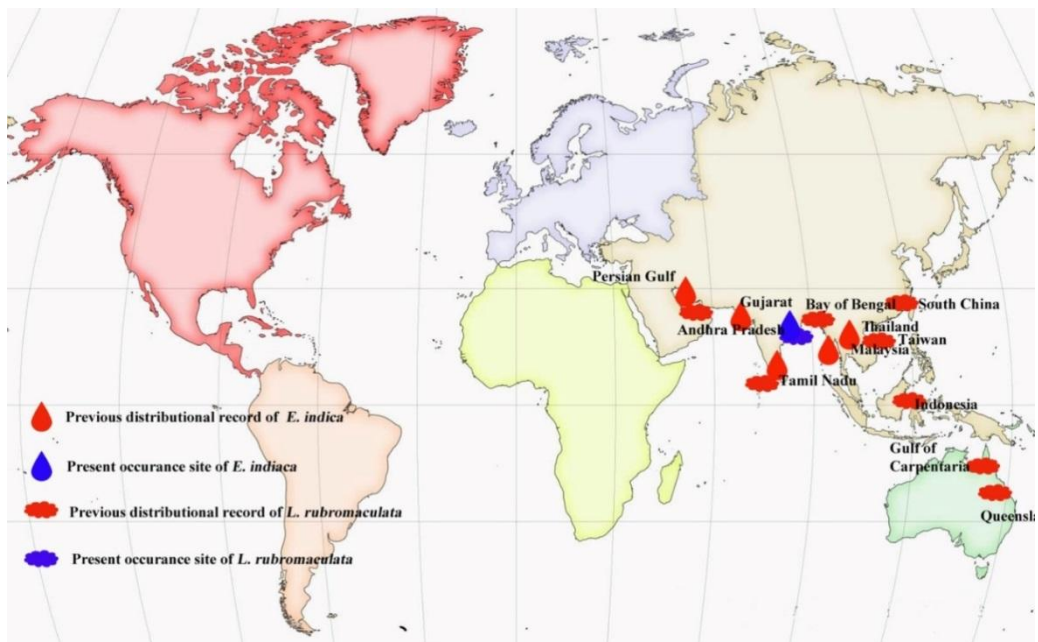


Fig. 3. Distributions of *E. Indica* & *L. rubromaculata* in the world

### 3.4 Distributions

World distribution: Persian Gulf, India, Andaman Sea coasts of Thailand, and Peninsular Malaysia [11] (Fig. 3). In India (fig.1): Gujarat (Trivedi et al, 2018), Tamilnadu [10, 11, 12, 8], Andhra Pradesh (Present study).

### 3.5 Remarks

The present, examined male specimen from the Andhra coast agrees with the original description

by castro and NG [11], Also with silambrasan et al, [12]. Carapace coloration pattern slightly different from the silambrasan et al, [12]; [18]; but agreed with Castro and Ng PKL [11].

Present Species, *Eucrate indica* was confused earlier with *Eucrate alcocki*. *E. indica* is geographically distributed in the Persian Gulf, Indian Ocean, and the Andaman Sea, while *E. alcocki* can be seen on the Gulf of Thailand and the western Pacific Ocean. Shape and colour pattern slightly differs in *E indica* and *E. alcocki*.

*E. alcocki* contains six large red or brown red spots on the middle portion of the carapace, whereas *E. indica* contains six red large spots arranged transversely on the median portion of the carapace. Numerous smaller spots are distributed on the anterior portion of the carapace in both of the species. In addition, the carapace in *E. indica* is much wider than *E. alcocki*. *E. indica* has more prominent frontal margin, a distinct median notch rather than *E. alcocki* [11].

Order: Decapoda Latreille, 1802  
 Infraorder: Brachyura Latreille, 1802  
 Family: Xanthidae Macleay, 1838  
 Genus: Liagore De Haan, 1833  
*Liagore rubromaculata* (De Haan, 1883)

### 3.6 Material Examined

One male specimen (Fig. 4. C&D) collected by trawl catch, Visakhapatnam Fishing Harbour, Bay Of Bengal, Andhra Pradesh, India, (N 17.696022, E 83.302603), 22.01.2022, Collector: Dr J. S. Yogesh Kumar, Accession No: ZSI/ SbRC/ KN 5111 (Deposited in the National Zoological Collections of ZSI- Sunderban Regional Centre).

### 3.7 Diagnostic Characters

Carapace of *L. rubromaculata* is oval shaped, smooth, no granules present on the carapace. The anterolateral margin is smooth, it contains

no teeth. Eye stock is stout and short. Fronto-orbital width is moderately wide. Chelipeds are symmetrical, Well-developed, H-shaped groove present on the middle of the carapace. The dorsal side of Chelipeds, pereopods and carapace is covered with numerous brownish-red spots (Fig. 4. C&D).

### 3.8 Distribution

World Distribution: Northern Indian Ocean; Persian Gulf, Bay of Bengal [17], Taiwan, South China, Java, Indonesia, Gulf of Carpentaria, north-western Queensland, Australia (Ng and Chen 2004) (Fig. 3) . In India: Tamilnadu [14, T Vaitheeswaran 2019), West Bengal (T Vaitheeswaran 2019), Andhra Pradesh (Present Study) (Fig.1).

### 3.9 Remarks

The present, examined male specimen from the Andhra coast completely agrees with the description by Ng and chen 2010. *L. rubromaculata* can be differentiated from *L. erythematica* mainly in the anterolateral margin. *L. erythematica* has lobes on the anterolateral margin. Where the anterolateral margin of *L. rubromaculata* is completely smooth and unarmed [19]. In *L. rubromaculata*, no trace of lobes can be found regardless of the size of the specimens [20].

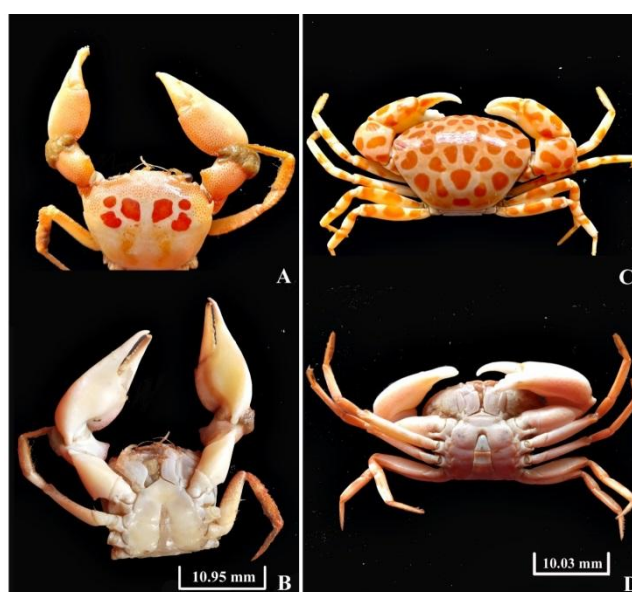


Fig. 4. A & B Dorsal and Ventral view of the male specimen of *Eucrate indica* Castro & P.K.L. Ng, 2010. Male (24.1× 20 mm), Visakhapatnam, Andhra Pradesh. C&D dorsal and ventral view of the male specimen of *Liagore rubromaculata* (De Haan, 1983). Male Specimen (30.1 × 22 mm), Visakhapatnam, Andhra Pradesh

**Table 1. Morphometric measurements of *Eucrete indica* Castro & P.K.L. Ng, 2010 and *Liagore rubromaculata* (De Haan, 1983)**

Morphometric Characters	<i>Eucrete indica</i>	<i>Liagore rubromaculata</i>
<b>Carapace Data (mm)</b>	24.1	30.1
Carapace Width	20	22
Carapace length	7.1	9
Frontal Width	19.5	18.5
Posterior width of carapace	15.1	16
Abdominal length		
<b>Cheliped Data (in mm)</b>		
Propodus length	23.2	22.9
Propodus width	12.8	10.7
Dactylus length	15.6	9.9
Merus Length	11.9	10.1

#### 4. DISCUSSION

*E. indica* was first described by Castro and NG [11] from Thailand. Ng and Castro described a single male holotype along with three female and two male paratypes. This species is distributed in the Persian Gulf, India, Thailand and Peninsular Malaysia [17]. In India, it has been reported from Gujarat [8], and Tamilnadu [11,12]. Present study reports the availability of *E. indica* from Andhra Pradesh.

According to Ho, PH [20], family Xanthidae is a widely distributed species containing family. Family xanthidae MacLeay, 1838, genus *Liagore* presents three species, *L. erythematica*, *L. rubromaculata*. Among them, *L. erythematica* and *L. rubromaculata* have been found in Indian waters and *L. pulchella* has been found in Vanuatu, Oceania [21]. *L. rubromaculata* is distributed in Northern Indian Ocean; Persian Gulf, Bay of Bengal [17], Taiwan, South China, Java, Indonesia, Gulf of Carpentaria, north-western Queensland, Australia (Ng and Chen 2004), India. According to Ng PKL [22], previously, genus *Liagore* has been placed into the family Carpiliidae, later it has been placed into the family Xanthidae, because, it's character is much closer to the family xanthidae than the family Carpiliidae. Distribution pattern of these two species *E. indica* and *L. rubromaculata* show a peculiar distribution. Distribution is particularly restricted in the Indian Ocean, Bay of Bengal, Philippine Sea, and South Pacific Ocean. This distribution pattern might be a reason for a particular environmental temperature or the habitat suitability of these two species, which fulfils the criteria of their living. Crabs from the Family Xanthidae Macleay, 1838, contain the most colorful crabs, generally called Rubble Crabs, Stone Crabs, and Rock Crabs. Family

xanthidae is characterized by subhexagonal to transversely oval-shaped carapace. The carapace is broader than long, regions are well-defined, and anterolateral margins are convex [17]. Table.1. shows the morphometric measurement of two entitled crabs. According to Wisespongpan [23], cheliped shape of crab tells about their feeding habit. By observing the shape of their cheliped, it can be said that, these two crabs are meat eaters.

#### 5. CONCLUSION

According to Naderloo [17], Family Xanthidae represents mainly coral reef-associated crabs. Most crabs from this family can be found in shallow subtidal regions, rocky/ cobble substrate, oyster banks and sandy beaches. Crabs from the family Euryplacidae can be found in the Intertidal zone, subtidal zone, rocky/cobble and sandy beach areas. *E. indica* can be found in the shallow subtidal region and sandy beach.

These two crabs were collected from the trash in the fishing harbour; Visakhapatnam is new addition to the reported brachyuran crab diversity in this region. According to the fishermen, these crabs were trawled at 20-30 m depth. Visakhapatnam coast contains sandy, rocky beaches, in addition, it consists of patchy coral reefs. The availability of these two species in this region shows the abundance of diverse brachyuran crabs in this region.

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## ETHICS APPROVAL AND CONSENT

Consent and approval was obtained from the Zoological Survey of India, Sunderban Regional Centre, Canning, WB, India for conducting a survey to collect, preserve & identify faunal specimens for better knowledge of the diversity, as well as preparation of the brachyuran catalogue of the state of Andhra Pradesh following the mandate of Zoological Survey of India.

Informed consent was obtained from all individual participants included in the study for publication of the data.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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