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Checklist of Crabs (Crustacea: Decapoda) of Vamsadhara Estuary in Srikakulam District of Andhra Pradesh, India

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Abstract: Checklist of Estuarine brachyuran crabs present in Vamsadhara Estuary of Srikakulam a north coastal District in Andhra Pradesh state in India is prepared based on a survey carried out for two years from January 2022 to December 2023. A total of 26 species belonging to 18 genera and 8 families are recorded. Out of the 8 families recorded, families Portunidae and Ocypodidae (22% Genera and 27% Species each) showed the highest species diversity (7 species, 4 genera each) followed by Sesamidae (5 species, 4 genera), Varunidae (2 species, 2 genera), Matutidae (2 species, 1 genus) and families Majidae, Grapsidae and Macrophthalmidae (1 species, 1 genus each). In the present study, we report five new species: *Doclea muricata* (Fabricius, 1787), *Thalamita prymna* (Herbst 1803), *Ocypode platytarsis* (A.Milne Edwards, 1837), *Dotilla intermedia* (de Man, 1888) and *Scopimera globosa* (Kemp, 1919) which are first time reported from the present study area. IUCN Status and common names are also provided for all the available Crab species.

Keywords: Brachyuran crabs, Checklist, Vamsadhara estuary, Species diversity

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Introduction

Research on coastal and estuarine faunal diversity and ecology along India's coastline has been a major focus due to the richness in biodiversity and high productivity of these areas. The significance of coastal fisheries, coupled with their diversity and exploitation, has further emphasized the need for coastal and estuarine studies. India's extensive coastline, dotted with numerous rivers that flow

into the sea, creates unique estuarine ecosystems characterized by mudflats, swamps, and vast mangrove forests, providing a diverse range of habitats for abundant faunal species. These specialized habitats, along with their commercial and social importance and aquaculture potential, have long attracted the interest of biologists seeking to document the fauna and study their

ecological roles. Though faunal studies on major estuaries viz., Ganges, Mahanadi, Godavari, Vellar, Kerala estuaries, Chilka and Pulicat lakes are available, information on minor and medium rivers and their estuaries are negligible. Very negligible research was done in the present study area as per the literature available in the recent times.

The Vamsadhara River is a minor, perennial river that originates at the border of Thuamul Rampur in the Kalahandi district and Kalyansinghpur in the Rayagada district of Odisha. It flows for about 254 kilometers, initially passing through Odisha before entering the Pathapatnam taluk in the Srikakulam district of Andhra Pradesh. After flowing eastward for approximately 30-40 kilometers in Srikakulam, the river empties into the Bay of Bengal at 18°21'N, 84°08'E, near Kalingapatnam, just north of Srikakulam town. At a place called Gotta, a barrage on this river has been constructed which stores most of its water for irrigation. Since this river is not a perennial one, it is very shallow, wide and its flow depends on rains. Very less water flowing through the river is seen during the year except in monsoon months. During rainy season heavy discharges from barrage leads to greater flows resulting in floods along its course. The river is quite wide of about 700 mts. and becomes much wider dividing into two branches about 2 km. upstream from its mouth, with an island like land mass in between and joining again, forming a single stream with a narrow opening into the sea. A sand bar formation was noticed at mouth region, making the mouth shallow during most of the year except rainy season.

The river Vamsadhara originating in hilly terrain and flowing a relatively short distance through the plains with limited freshwater discharge, does not deposit significant amounts of silt and clay at its mouth, unlike many other estuaries. The riverbed remains predominantly sandy up to the mouth, with only small muddy patches forming just before the mouth due to the minimal freshwater flow. Estuarine conditions are

confined to only 2-3 kilometers upstream from the mouth. The shallow nature of the river, coupled with limited freshwater discharge and a small estuarine area, prevents marine fauna from entering and settling in the estuary. As a result, only a few marine nektonic species are observed in the estuarine zone. Additionally, the absence of mudflats, swamps, and mangroves has restricted the colonization of benthic species, leading to reduced faunal diversity in this estuarine system.

The location of mouth area of the Vamsadhara River is shown in Figure 1. Collections from Vamsadhara were made at the two localities-- (1) Vamsadhara estuary-mouth area at Kalingapatnam - This point is very close to the mouth, with less freshwater discharge and sandy sediment. Tidal influx limited due to sand bar; and (2) Vamsadhara estuary - near Rajarampuram- This point is about 1 km. from mouth area; here the sediment is mixture of sand-silt; very shallow. At all the above localities very little estuarine fishing activity is observed except a few fishermen operating cast nets. While collecting samples, we observed varieties of benthic animals and among benthos, Polychaetes, Crabs, Hermit Crabs, Bivalves and Gastropods are predominant.

Information on the Malacostracan fauna of Indian estuaries remains limited, with early studies conducted by Balasubramanyan (1962) on the Vellar Estuary, Subrahmanyam (1969) on the Godavari Estuary, and Selvakumar and Ajmal Khan (1993) along the Parangipettai coast. More recent research includes studies by Bairagi (1995), Ghosh (1995), and Reddy (1995) on the Hugli Matla; Deb (1998) on the Mahanadi Estuary; Dev Roy and Bhadra (2001) on the Godavari Estuary; and Dev Roy and Nandi (2009) on the East Coast. Further work by Rath and Dev Roy (2008, 2010) focused on the Krishna Estuary. Despite these efforts, significant gaps remain, particularly for many estuaries like Vamsadhara in Andhra Pradesh India. Decade back information was there on the brachyuran fauna (collections made by Estuarine Biological Station, Zoological Survey of India, Berhampur during 2000-2003 and 2010 by

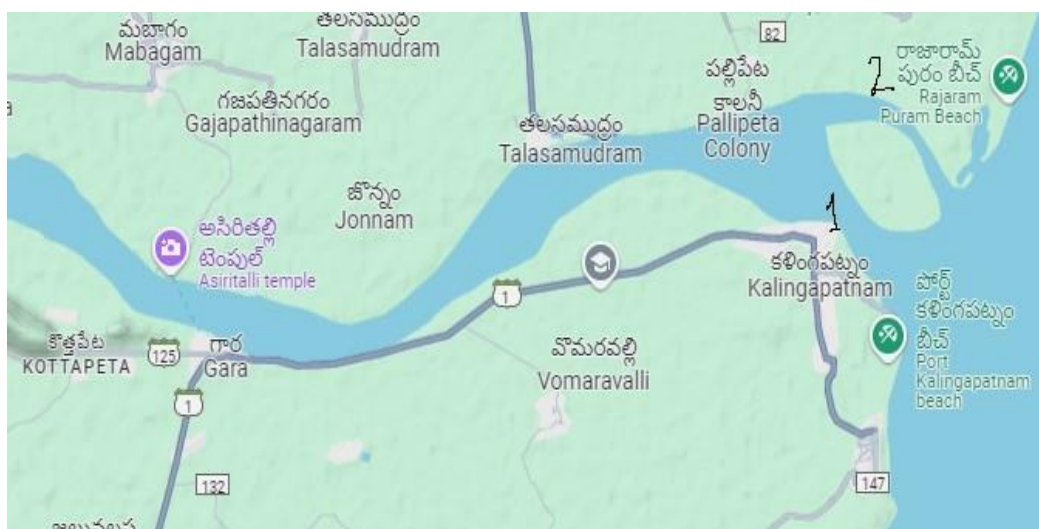


Fig. 1: Map showing 1.Kalingapatnam and 2.Rajarampuram Crab samples collecting Stations at Vamsadhara Estuary of Srikakulam District, A.P, India.

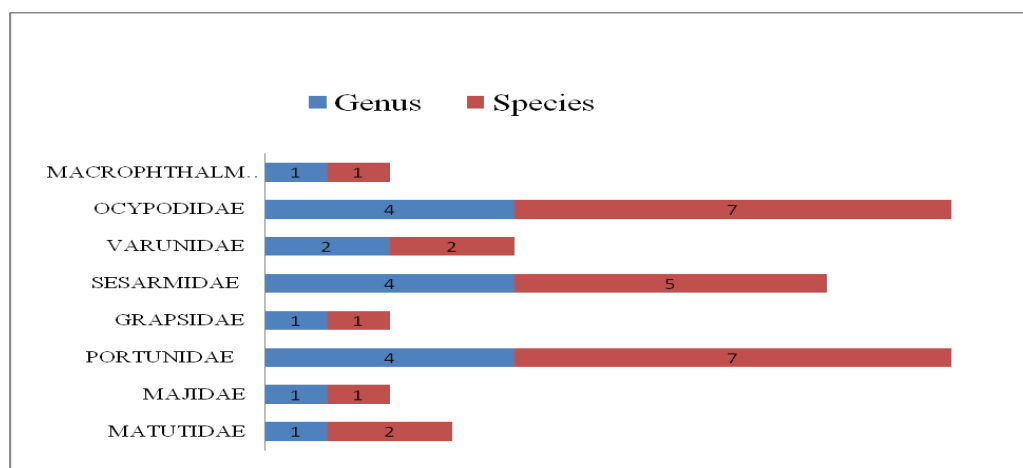


Fig. 2: Family wise Number of Genus and Species Composition of Crabs of Vamsadhara Estuary, Srikakulam.

Rath and Dev Roy) of Vamsadhara estuary. No recent studies have been conducted on the Crab species of Vamsadhara estuary. Therefore, the present study was undertaken to address this gap.

Materials and Methods

The present study is based on collections of crab samples from the Vamsadhara estuary (Fig. 1) through a survey carried out for two years from January 2022 to December 2023 to investigate crab diversity and to prepare checklist of Crabs present in the Vamsadhara estuary. Crab species were collected around Kalingapatnam and Rajarampuram estuarine areas of Vamsadhara

river in Srikakulam district of Andhra Pradesh, India. Methodology of collection, preservation and measurement etc. adopted in this work are as reported by Dev Roy and Das (2000) and Rath and Dev Roy (2009). Section, family and generic diagnosis followed herein are after Barnard (1950), Sakai (1976) and Dev Roy and Das (2000).

Results and Discussion

In this study, a total of 168 crab specimens were examined, leading to the identification of 26 species from 18 genera and 8 families, and a detailed checklist (Table 1) was compiled. Among the 8 recorded families, Portunidae and Ocypodidae exhibited the highest species diversity

Table 1: Checklist of Crab Species reported from Vamsadhara Estuary of Srikakulam

S. No.	Crab Species	Common Name	IUCN Status
	Subphylum: Crustacea (Pennant, 1777) Class: Malacostraca (Latreille, 1806) Subclass: Eumalacostraca (Grobber, 1892) Superorder: Eucarida (Calman, 1904) Order: Decapoda (Latreille, 1803) Suborder: Pleocyemata (Burkenroad, 1963) Infraorder: Brachyura (Latreille, 1803) Section: Oxystomata (H.Milne Edwards, 1834) Subsection: Heterotremata (de Haan, 1833) Superfamily: Calappidae (de Haan, 1833) (i) Family: Matutidae (de Haan, 1835) Subfamily: Matutinae (de Haan, 1835)		
1	<i>Ashtoret lunaris</i> (Forska1, 1775)	Yellow moon crab	NE
2	<i>Ashtoret miersi</i> (Henderson, 1887)	Miers' Moon Crab	NE
	Section: Oxyrhyncha (Latreille, 1803) Superfamily: Majoidea (Samouelle, 1819) (ii) Family: Majidae (Samouelle, 1819) Subfamily: Pisinae (Dana, 1851)		
3	<i>Doclea muricata</i> (Fabricius, 1787)	Muricate Spider Crab	NE
	Section: Eubrachyura (Latreille, 1802) Super family: Portunoidea (Rafinesque, 1815) (iii) Family: Portunidae (Rafinesque, 1815) Subfamily: Necronectinae (Rafinesque, 1815)		
4	<i>Scylla serrata</i> (Forskal, 1775)	Giant Mud Crab	DD
5	<i>Portunus pelagicus</i> (Linnaeus, 1758)	Blue Swimmer Crab (Flower Crab)	LC
6	<i>Portunus sanguinolentus</i> (Herbst, 1790)	Three-spot Swimming Crab	LC
	Subfamily: Thalamitinae (Paulson 1875)		
7	<i>Charybdis rostrata</i> (A. Milne Edwards, 1861)	Rostrate Swimmer Crab	DD
8	<i>Charybdis affinis</i> (Dana, 1852)	Affinis Swimmer Crab	DD
9	<i>Thalamita crenata</i> (Latreille, 1829)	Crenate Swimming Crab	DD
10	<i>Thalamita prymna</i> (Herbst 1803)	Prymn's Swimming Crab	DD
	(iv) Family: Grapsidae (Mac Leay 1838)		
11	<i>Metopograpsus messor</i> (Forska1, 1775)	Common Shore Crab	LC
	(v) Family: Sesarmidae (Dana, 1851)		
12	<i>Parasesarma plicatum</i> (Latreille, 1803)	Red-clawed Mangrove Crab	DD
13	<i>Perisesarma bidens</i> (De Haan, 1835)	Two-spined Fiddler Crab	DD
14	<i>Episesarma nederi</i> (H. Milne Edwards, 1853)	Neder's Mud Crab	DD
15	<i>Muradium tetragonum</i> (Fabricius, 1798)	Four-spined Mud Crab	DD
16	<i>Metasesarma obesum</i> (Dana, 1851)	Obese Mud Crab	DD
	(vi) Family: Varunidae (H.Milne Edwards, 1853)		
17	<i>Metaplex distincta</i> (H. Milne Edwards, 1852)	Distinctive Crab	DD
18	<i>Varuna litterata</i> (Fabricius, 1798)	Litterate Swimmer Crab	LC
	Superfamily: Ocypodoidea (Rafinesque, 1815) (vii) Family: Ocypodidae (Rafinesque, 1815) Subfamily: Ocypodinae (Rafinesque, 1815)		
19	<i>Ocypode macrocera</i> (A. Milne Edwards, 1837)	Long-horned Ghost Crab	DD
20	<i>Ocypode platytarsis</i> (A. Milne Edwards, 1837)	Broad-tarsus Ghost Crab	DD
21	<i>Ocypode ceratophthalma</i> (Pallas, 1772)	Horned Ghost Crab	LC
22	<i>Uca lactea</i> (De Haan, 1835)	White-patched Fiddler Crab	LC
23	<i>Uca triangularis</i> (A. Milne Edwards, 1873)	Triangular Fiddler Crab	DD
	Sub family: Dotillinae (Stimpson, 1858)		
24	<i>Dotilla intermedia</i> (de Man, 1888)	Intermediate Dotilla Crab	DD
25	<i>Scopimera globosa</i> (Kemp, 1919)	Globose Sand Bubbler Crab	DD
	(viii) Family: Macrophthalmidae (Dana, 1851)		
26	<i>Macrophthalmus tomentosus</i> (Souleyet, 1841)	Hairy Mud Crab	DD

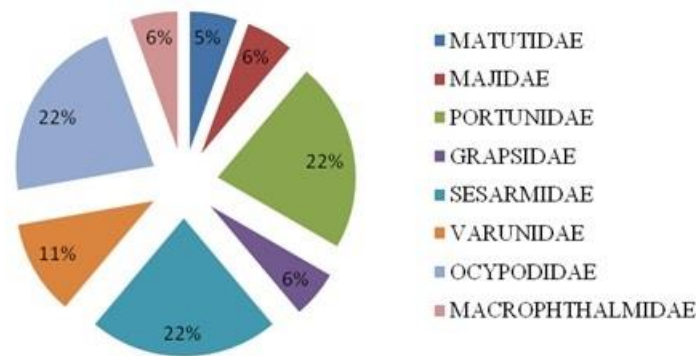


Fig. 3: Family wise percentage of genus composition of crabs of Vamsadhara Estuary, Srikakulam.

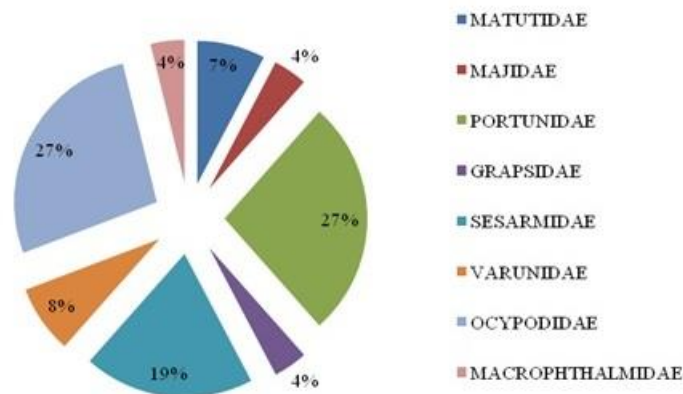


Fig. 4: Family wise percentage of species composition of crabs of Vamsadhara Estuary, Srikakulam.

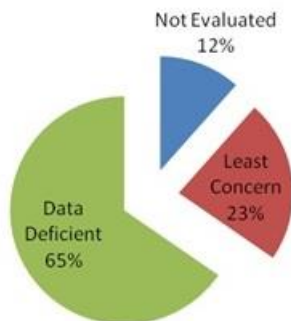


Fig. 5: IUCN status of crabs of Vamsadhara Estuary, Srikakulam.

(each comprising 22% of the genera and 27% of the species), with 7 species across 4 genera each. They were followed by Sesarmidae (5 species, 4 genera), Varunidae (2 species, 2 genera), Matutidae (2 species, 1 genus), and Majidae, Grapsidae, and Macrophthalmidae (each with 1 species and 1 genus). Figure 2-4 clearly depict the

percentage of composition of Genus and species of Crabs. Five Crab species namely *Doclea muricata* (Fabricius, 1787), *Thalamita prymna* (Herbst, 1803), *Ocypode platytarsis* (A. Milne Edwards, 1837), *Dotilla intermedia* (de Man, 1888), and *Scopimera globosa* (Kemp, 1919) are reported for the first time from the study area.

Regarding IUCN status (Fig. 5), the present study indicates that the majority of crab species found in the Vamsadhara estuary lack sufficient data for accurate extinction risk assessments by the IUCN. Specifically, 17 species (65%) fall under the Data Deficient (DD) category, 6 species (23%) are classified as Least Concern (LC), and 3 species (12%) are listed as Not Evaluated (NE). IUCN Status and common names also provided for all the available species (Table 1) along with the detailed checklist of Crab species.

Conclusion

The present checklist of crab species provides an important contribution to the understanding of biodiversity of Vamsadhara estuary. This checklist serves as a crucial baseline for future taxonomic, ecological, and conservation studies. However, the lack of sufficient data on several species calls for more comprehensive research to assess their conservation status and potential threats. Continuous monitoring and further studies are necessary to address gaps in knowledge, particularly in relation to habitat degradation and climate change, which could significantly impact the estuarine ecosystems where these species thrive. The checklist will aid in informing conservation strategies and management plans, ensuring the protection of this vital group of organisms.

Ethical Statement

This study was approved by the Research Committee of Department of Zoology, Govt. Degree College for Men, Srikakulam.

Author Contributions

Each author has equally contributed to the field work, literature survey, data curation, preparation of illustrations, manuscript drafting and final editing. All authors have read and agreed to the published version of the manuscript.

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Conflict of Interest

The authors declare no conflicts of interest.

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