



E-ISSN: 2347-5129

P-ISSN: 2394-0506

(ICV-Poland) Impact Value: 5.62

(GIF) Impact Factor: 0.549

IJFAS 2021; 9(3): 186-189

© 2021 IJFAS

www.fisheriesjournal.com

Received: 11-03-2021

Accepted: 16-04-2021

Pradnya D Bandekar

Department of Studies in Marine
Biology, Karnatak University
Post Graduate Centre, Kodibag,
Karwar, Karnataka, India

Tree-climbing mangrove crabs of Karwar west coast of India

Pradnya D Bandekar

DOI: <https://doi.org/10.22271/fish.2021.v9.i3c.2476>

Abstract

Several species of the mangrove brachyuran crab families of Sesarmidae and Grapsidae are known to climb mangrove trees. They show diverse degrees of dependence on arboreal life, only few of them thriving in the tree canopies and feeding on fresh leaves. Some of the Sesarmid tree dwelling crabs share a number of morphological characters. The tree climbing crab included Karwar (6-stations) arboreal crab species with several representatives of ground-living forms. In spite of the large ecological study of tree-climbing mangrove Sesarmid crabs in other countries, the Karwar mangrove tree crab representatives appear to have not been investigated extensively. This paper presents on the nature of the crab habitats, arboreal climbing behavior in different mangrove areas of Karwar.

Keywords: Mangrove, tree-climbing crab, grapsidae, sesarmidae, Karwar

Introduction

Mangrove tree crabs are commonly seen in red mangroves. Tree crabs are adapted to climb on mangrove trees, sharp tips at the end of the legs are one such adaptation. Leaf consuming mangrove crabs have a key role in the initial processing of litter. Because of the herbivorous nature of the Sesarmid crabs they can be considered as a vital factor in the degradation and thus in biochemical cycles. Mangrove forests constitute the habitat with the richest diversity of land-dwelling crabs. These forests offer a wide variety of ecological niches for crabs that often segregate in space and time to reduce interspecific competition for food (Kathiresan and Bingham, 2001) [8]. Two of the dominant taxa of crabs, in terms of the number of species that occur in mangroves are the families of Grapsidae and the Sesarmidae (Schubart, 2002) [12]. Most Sesarmidae rely mainly on fallen leaves for food, whereas the Grapsidae are usually algivorous and carnivorous (Fratini 2000 a) [2]. All Grapsoid mangrove crabs remain within their tidal zone in response to tidal cycles. During high tide, some crab species hide in their burrows or within the mangrove root system. While others remain out of the water by climbing up mangrove trees. Climbing the trees allows the crabs to avoid aquatic predators while making use of other feeding sites (Sivasothi, 2000, Erickson 2003) [14]. The purpose of the present paper is to list out the tree-climbing brachyuran crabs of mangroves of Karwar.

Materials and Methods

The collection and observation sites of the study included: The arboreal climbing and burrowing behavior, feeding ecology as to dependence on mangroves. The mangrove crabs were collected during low tide by handpicking and with the use of scoop nets and locally made traps. Collections were made during low tide, both in the morning and in the evening from the six mangrove areas along rivers, creeks, inlets and the buffer zones or marginal strips of the coastline of Karwar, in one site each for the study areas from January 2019 to January 2020. The two morphological characters are shared by all tree-climbing crabs are:

1. Their overall body shape (carapace) is conspicuously flattened, and
2. (2) Their walking legs have relatively long propodi (second most distal segment) and short dactyli (most distal segment) compared with ground-dwelling species.

The shape of the dorsal carapace differs greatly among arboreal mangrove crabs.

Corresponding Author:

Pradnya D Bandekar

Department of Studies in Marine
Biology, Karnatak University
Post Graduate Centre, Kodibag,
Karwar, Karnataka, India

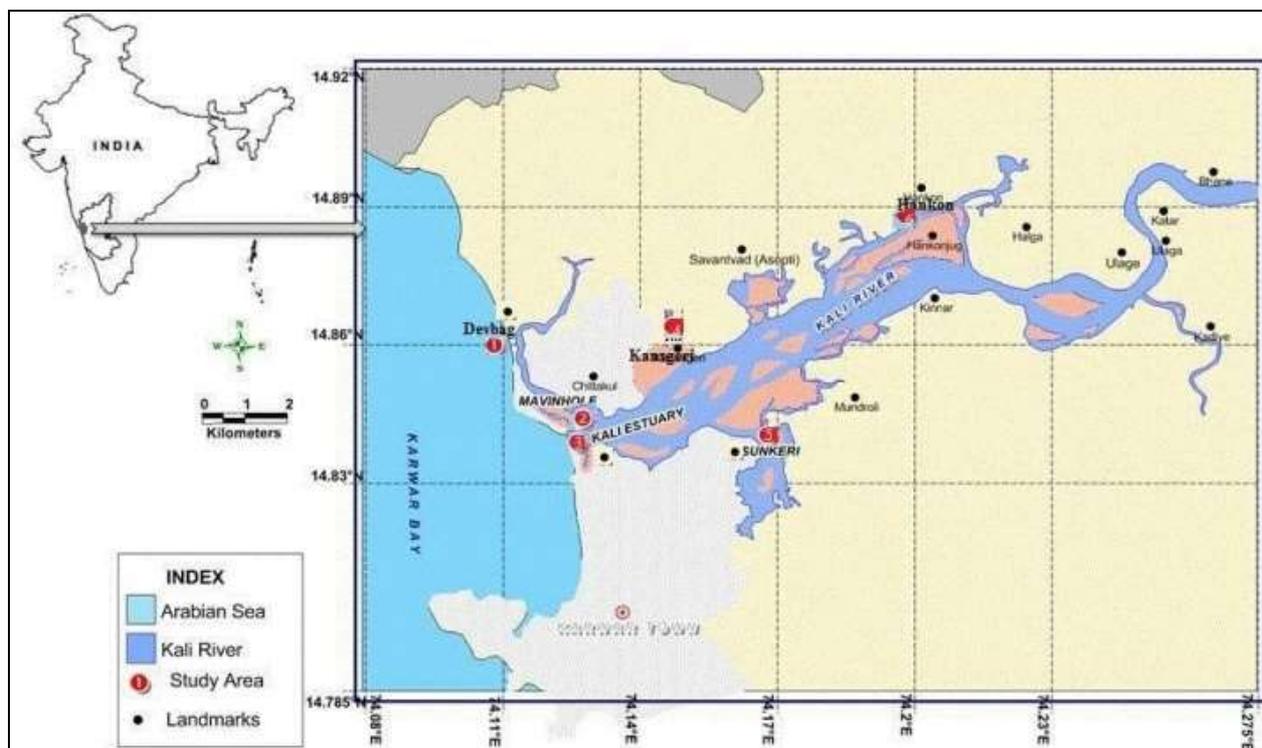


Fig 1: Map showing the locations of the mangroves area in (Kali estuary) Karwar Coast.

Table 1: Locations of the study sites in mangroves of Karwar

St. No.	Sampling sites	Mangrove zonations	Location (coordinates)
1	Devbag (Mangrove/marine)	Rhizophora zone	14° 50'41"N,70° 07'18" E
2	Mavinhole	Sonneratia and Avicennia zone	14° 50'39"N,74° 07'44"E
3	Kodibag (estuarine mouth)	Sonneratia and Rhizophora zone	14°50'20.7"N,74°07'42.6"E
4	Kansageri	Rhizophora zone	14°51'28"N,74° 09'08"E
5	Sunkeri	Sonneratia And Rhizophora zone	14° 50'18" N, 74 1°0'03" E
6	Hankon	Rhizophora zone	14° 52'53"N,741°0'47"E

Results and Discussion

Table 2: Checklist of tree-climbing crabs of Karwar mangroves (+ = present, - = absent)

Sl. No.	Species and families	Stations					
		1	2	3	4	5	6
	Grapsidae						
1.	<i>Metopograpsus latifrons</i> (White, 1847)	+	+	+	+	-	-
2.	<i>Metopograpsus messor</i> (Forskal,1775)	+	+	+	+	+	+
3.	<i>Parasesarma plicatum</i> (Latreille,1803)	+	+	+	+	+	+
4.	<i>Clistocoeloma lanatum</i> (Alcock,1900)	+	+	+	+	+	+
5.	<i>Pseudosesarma edwardsi</i> (de Man,1887)	+	+	+	+	+	+
6.	<i>Episesarma versicolor</i> (Tweedie,1940)	+	+	-	-	+	-

Among the tree-climbing crabs, find different degrees of dependence on the arboreal habitat and different levels of climbing abilities. Three main groups with increasing levels of tree-climbing abilities: non-arboreal species or only occasionally seen on roots; species that mostly or exclusively live on tree trunks; the most specialized species, which thrive in the tree canopy and often feed on fresh leaves. Arboreal mangrove crabs can be found worldwide along the tropical coastlines of the major oceans. Most of them, and the best known examples, belong to the family Sesaridae, with a few also belonging to the family Grapsidae. The Sesarid species that live almost exclusively on mangrove trees, which is restricted to *Rhizophora* of the Karwar mangroves. The genus *Parasesarma*, which are very abundant in the mangroves of Karwar migrating regularly between mangrove trees (stems and canopy) and their burrows in the soft sediment surrounding the root system. Several species of the genus

Metopograpsus thrive among the roots and the lower trunk of mangrove trees. However, one species, *M. latifrons*, is another specialized arboreal representative that often climbs on aerial roots. The crabs of the family Sesaridae are known by various workers to have significant ecological role in mangals (Gillikin & Schubart 2004, Gillikin 2004) [5].

1. *Metopograpsus latifrons* (White, 1847): Diagnosis: Lateral margin of the carapace entire, free edge of the post-frontal lobes sharp. Post-frontal region smooth without ridges. A narrow pubescent area along the anterior side near the lower margin of the propodus of the second and third walking legs. Periopods larger, dactylus shorter than propodus; lateral margin of carapace less convergent posteriorly, last segment of the male abdomen trilobed; free edges of postfrontal lobes sharp; postfrontal region smooth, without any ridge. Chitinous projection of the male pleopod obliquely T-shaped, its distal margin curved and serrated. Carapace length 21to 28mm.

2. *Metopograpsus messor* (Forskål, 1775): Diagnosis: Lateral margins of the carapace entire and distinctly convergent posteriorly. Free edges of the post frontal lobes rounded and blunt, post frontal region with distinct ridges. The exposed surface of the base of the antenna not densely pubescent. Sub-orbital tooth acute and strongly keeled from tip to base. Sixth segment of the male abdomen shorter in length than the fifth segment. No aperture of the female. Carapace length 5 to 20mm.

3. *Parasesarma plicatum* (Latreille, 1803) [7]: Diagnosis: Carapace square, hairy and broader than long. Front crenulate, strongly haired. Four to five cardinal grooves running to postero-lateral region. Chelipeds equal in size, bright red in colour. Antero-lateral spine absent. Orbital crescent shaped, ending with sharp lateral spines pointing towards the front. Propodus and dactylus of chelipeds grainy. Post frontal margin with four distinct similar lobes separated narrow grooves. Cardiac region well defined. Carapace length: 17.9mm.

4. *Clistocoeloma lanatum* (Alcock, 1900): Diagnosis: The inner border of arm does not end in a large spine or lobe, no pectinated ridges on the upper surface of palm, no spine at the inner angle of the wrist; carapace and appendages covered with a short but dense fur, amid which are prominent tubercle-like tufts of hair; lateral borders cut into three blunt lobes, including the orbital angle, of equal size. Carapace length: 8mm-13mm.

5. *Pseudosesarma edwardsi* (De Man, 1888): Diagnosis:

Carapace quadrate, deepish, its length decidedly less than its breadth between the antero-lateral angles, its sides nearly parallel never markedly convergent backwards. Frontal margin wide. The outer surface of chela gently convex. The inner border of arm does not end in a large spine or acute lobes, through it is little dilated distally; there are no oblique pectinated ridges on the upper surface of the palm, and the upper surface of the movable finger of the male is not milled; a tooth at the inner angle of the wrist and on the antero-lateral border of the carapace behind the orbital angle. The male abdomen is singularly broad. Carapace length: 9-19mm.

6. *Episesarma versicolor* (Tweedie, 1940): Carapace is slightly more square shaped. Chela is purple or violet colour. The dactylus or pollen is white in colour. White finger tips. Dorsal margin of dactylar finger of adult male chela with between 65 to 85 tubercles. Maximum length is 5.0 cm on size at maturity.

The grapsoid sesarmid crabs, *Perisesarma* sp. and *Episesarma* sp. were found to be herbivores and omnivore/deposit feeders, eating mangrove litter and water plants. *Episesarma versicolor* feed on calyx and leaves and crop on leaf litters, then bring fragments to the burrows. *Parasesarma* feed on the mangrove litter, composed of fallen mangrove leaves of *Rhizophora*, seedlings, calyx and twigs that fall from the trees on the forest floor and into the water. *Episesarma versicolor* feed on calyx and leaves and crop on leaf litters, then bring fragments to the burrows. This study confirmed that the leaves of the mangroves, *Rhizophora marina*, *Rhizophora apiculata* were devoured by the generally observed herbivorous/omnivorous crabs such as *Perisesarma* sp.



1. *Metopograpsus latifrons*



2. *Metopograpsus messor*



3. *Parasesarma plicatum*



4. *Clistocoeloma lanatum*



5. *Pseudosesarma edwardsi*



6. *Episesarma versicolor*

Plate 1: Tree climbing mangrove crabs

References

1. Bandekar PD, Kakati VS. Biodiversity of crabs in Karwar mangrove environment West Coast of India. Recent Research in Science and Technology 2011;3(4).
2. Fratini S, Cannicci S, Abincha LM, Vannini M. Feeding,

temporal and spatial preferences of *Metopograpsus thukuhar* (Decapoda; Grapsidae): an opportunistic mangrove dweller. J. Crust. Biol 2000a;(20):326-333.

3. Fratini S, Cannicci S, Vannini M. Competition and interaction between *Neosarmatium smithii* (Crustacea, Grapsidae) and *Terebralia palustris* (Mollusca,

- Gastropoda) in a Kenyan mangrove. *Mar. Biol* 2000b;(137):309-316.
4. Ganesh Manikantan, Syed Ajmal Khan, Somasundarannair Lyla, Mohamed Esa Syed Abdul Rahman, Mathanraj Victorraj. Occurrence of violet vinegar crab *Episesarma versicolor* Tweedie, 1940 (Crustacea: Decapoda: Brachyura) in mangroves of Pichavaram and Vellar, Tamil Nadu. *International Journal of Fisheries and Aquatic Studies* 2016;4(2):166-169.
 5. Gillikin DP, Schubart CD. Ecology and systematics of mangrove crabs of the genus *Perisesarma* (Crustacea: Brachyura: Sesarmidae) from East Africa. *Zoological Journal of the Linnean Society* 2004;141(3):435-445.
 6. Kakati VS. Studies on crabs of Karwar, Ph. D. thesis, Karnatak University, Dharwad 1980.
 7. Shanij K, Praveen VP, Suresh S, Mathew M, Oommen, Nayar TS. Tree climbing and temporal niche shifting: an anti-predatory strategy in the mangrove crab *Parasesarma plicatum* (Latreille, 1803). *Current science*, 2016;(111)7; DOI: 10.18520/cs/v111/i7/1201-1207. <https://www.researchgate.net/publication/310504895>.
 8. Kathiresan K, Bingham BL. Biology of mangroves and mangroves ecosystems. *Adv. Mar. Biol* 2001;(40):84-251.
 9. Khan SA, Raffi SM, Lyla PS. Brachyuran crab diversity in natural (Pitchavaram) and artificially developed mangroves (*Vellar estuary*). *Current Science* 2005;88(8):1316-1324.
 10. Sara Fratini, Marco Vannini, Stefano Cannicci, Christoph D Schubart. Tree-climbing mangrove crabs: a case of convergent evolution. *Evolutionary Ecology Research* 2005;(7):219-233
 11. Schubart CD, Neigel JE, Felder DL. Use of the mitochondrial 16S rRNA gene for phylogenetic and population studies of Crustacea. *Crustacean Issues*, 2000;(12):817-830.
 12. Schubart CD, Cuesta JA, Felder DL. Glyptograpsidae, a new brachyuran family from Central America: larval and adult morphology, and a molecular phylogeny of the Grapsoidea. *J. Crust. Biol* 2002;(22):28-44.
 13. Sivasothi N, Murphy DH, Ng PKL. Tree climbing and herbivore of crabs in the Singapore mangroves. In *Mangrove Fisheries and Connections. Proceedings of the ASEAN Australian Marine Science Project: Living Coastal Resources Workshop1 (A. Sasekumar,)*, Ipoh, Malaysia 1993, 220-237.
 14. Sivasothi N. Niche preferences of tree-climbing crabs in Singapore mangroves. *Crustaceana* 2000;(73):25-38.
 15. Tan CG, Ng PK. An annotated checklist of mangrove brachyuran crabs from Malaysia and Singapore. *Hydrobiologia* 1994;285(1-3):75-84.