

Article

Brachyuran crabs diversity in Mudasal Odai and Nagapattinam coast of south east India

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Abstract

The brachyuran crabs diversity studied from Mudasal Odai (Lat.11°29'N; Long.79°46'E) and Nagapattinam (Lat.10°46'N; Long.79°59'E) coast of Tamil Nadu, south east India. We recorded 34 species, 15 genera and 7 families in Mudasal Odai and 31 species, 15 genera and 7 families in Nagapattinam coast. The most diverse families are Portunidae (17 species in Mudasal Odai, 15 species in Nagapattinam), and Leucosiidae (5 species in Mudasal Odai, 4 species in Nagapattinam). Out of 15 genera, *Charybdis* has more number of species (12 species in Mudasal Odai, 9 species in Nagapattinam). Both species (*Philyra globosa*, *Charybdis hoplites*) in two coasts, four species (*Philyra scabriuscula*, *Charybdis edwardsi*, *Charybdis natator*, *Charybdis variegata*) in Mudasal Odai coast and one species (*Portunus spinipes*) in Nagapattinam coast are dominant. Four species (*Charybdis granulata*, *Charybdis lucifera*, *Podophthalmus vigil*, *Portunus spinipes*) in Mudasal Odai and two species (*Philyra scabriuscula*, *Portunus gracilimanus*) in Nagapattinam are abundant. Three species in two coast, ten species in Mudasal Odai and nine species in Nagapattinam coast are co-abundant. There are nine species in both coasts, fourteen species in Mudasal Odai and seventeen species in Nagapattinam coast are present status. Among the 38 species, four was absent in Mudasal Odai and seven in Nagapattinam coast.

Keywords brachyuran crabs; Mudasal Odai coast; Nagapattinam coast; Portunidae; *Philyra globosa*; *Charybdis hoplites*; *Portunus spinipes*.

1 Introduction

Among benthic communities, crustaceans are important members because more number of species present for human consumption and a tremendous variety of small species contribute to the complexity and functioning of tropical ecosystems (Hendrickx, 1995). Brachyuran crabs are more diverse group of crustaceans alive today. They found at even 6000 m depths to seas shore and are dominant in many estuarine habitats where salinity and temperatures can fluctuate dramatically daily (Ng et al., 2008). Tropical and subtropical regions have more number of crab species compared to temperate and cold regions (Fransozo and Negreiros-Fransozo, 1996; Boschi, 2000a). Brachyuran crabs, comprise about 700 genera and 5000 to 10,000 species worldwide (Kaestner, 1970; Melo, 1996; Ng, 1998; Martin and Davis, 2001; Sternberg and Cumberlidge, 2001; Ng et al., 2008; Yeo et al., 2008), out of which 2,600 are present in Indo-West Pacific (Serene, 1968). Boschi (2000)

and Hendrickx (1995, 1999) prepared major species of crab lists for the Americas. In India 705 brachyuran crab species, 28 families, 270 genera have been reported (Venkataraman and Wafar, 2005). Tamil Nadu coast, one of the state in India has 404 species of crabs belonging to 26 families and 152 genera (Kathirvel, 2008). Maximum percentages of crab catches are landed from Gulf of Mannar, Palk Bay, Nagapattinam and Puducherry landings of Tamil Nadu coast in India (Rao et al., 1973). Chennai coast has witnessed an annual crab landings were over 1500 t (Thangaraj Subramanian, 1998).

There were number studies about the diversity of brachyuran crabs near our study area reported. In Chennai coast (Thangaraj Subramanian, 2001; Krishnamoorthy, 2007; Lakshmi Pillai and Thirumilu, 2008), Gulf of Mannar areas (Jeyabaskaran and Ajmal Khan, 2007), Pondicherry mangrove areas (Satheeshkumar and Khan, 2011), Pichavaram mangrove areas (Ajmal Khan et al., 2005; Ravichandran and Kannupandi, 2007) and Parangipettai coast (John Samuel et al., 2004; John Samuel and Soundarapandian, 2009) reported.

2 Materials and Methods

Crabs collected from Mudasal Odai (Lat.11°29'N; Long.79°46'E) and Nagapattinam (Lat.10°46'N; Long.79°59'E) landing centres, south east coast of India. Mudasal Odai 150 trawlers are operated in two shifts during day and night. Nagapattinam 500 fishing trawlers are operated during night and day. Trawlers operate the trawl nets at the depth of 10–30 m depth. Sampling was made randomly from 5 heaps in Mudasal odia and 10 heaps in Nagapattinam contributing 100 kg. Samples of each species were collected from 4 to 5 heaps from single trawl. About 100 kg of heaps were randomly sampled every week and consolidated as weekly total. Monthly on their performance calculated and repeated. The results were given above 400 individuals were dominant (++++), individual numbers 200–400 were abundant (+++), the individual numbers 100–200 were co-abundant, the individual number were below 100 are present (+). The samples were brought to the laboratory, cleaned with brush and identified using appropriate reference (Sakai, 1976; Sethuramalingam and Ajmal Khan, 1991).

3 Results

The crabs were registered from two landing centres 7 families, 15 genera and 38 species (Table 1). The number of species per family varies considerably (1 to 17 species). The most diverse families were Portunidae (17 species in Mudasal Odai, 15 species in Nagapattinam), followed by Leucosiidae (5 species in Mudasal Odai, 4 species in Nagapattinam), Callapidae (4 species in Mudasal Odai, 3 species in Nagapattinam), Miidae (2 species in Mudasal Odai, 4 species in Nagapattinam), Majidae (3 species in Mudasal Odai, 2 species in Nagapattinam) and Dromiidae (1 species in Mudasal Odai, 1 species in Nagapattinam). Among the 38 species, four species (*Charybdis callianasa*, *Portunus gladiator*, *Parathenope* sp, *Paramithrax aculeatus*) were absent in Mudasal Odai and seven species (*Philyra corallicola*, *Doclea hybrida*, *Charybdis cruciata*, *Charybdis edwardsi*, *Charybdis hellerii*, *Portunus whitei*) were absent in Nagapattinam landing centre. Six species (*Philyra globosa*, *Philyra scabriuscula*, *Charybdis edwardsi*, *Charybdis hoplites*, *Charybdis natator*, *Charybdis variegata*) in Mudasal Odai and three species (*Philyra globosa*, *Charybdis hoplites*, *Portunus spinipes*) in Nagapattinam coast were dominant.

Table 1 Crabs recorded trash fish of Mudasal Odai and Nagapattinam landing Centre

S. No.	Species Name	Mudasal Odai	Nagapattinam
Dromiidae			
1	<i>Dromia dehaanii</i> (Rathbun, 1923)	+	+
Leucosiidae			
2	<i>Ixa cylindrus</i> (Fabricius, 1777)	+	+
3	<i>Leucosia pubescens</i> Miers, 1886	++	+
4	<i>Philyra corallicola</i> Alcock, 1896	++	-
5	<i>Philyra globosa</i> Fabricius, 1798	++++	++++
6	<i>Philyra scabriuscula</i> (Fabricius, 1798)	++++	+++
Calappidae			
7	<i>Calappa calappa</i> (Linnaeus, 1758)	+	-
8	<i>Calappa lophos</i> (Herbst, 1782)	++	++
9	<i>Matuta lunaris</i> (Forsk. 1775)	+	+
10	<i>Matuta planipes</i> Fabricius, 1798	+	+
Majidae			
11	<i>Doclea gracilipes</i> (Stimpson, 1857)	++	++
12	<i>Doclea hybrida</i> (H. Milne Edwards, 1834)	+	-
13	<i>Doclea ovis</i> (Herbst, 1788)	++	++
Dorippidae			
14	<i>Dorippe astute</i> Fabricius, 1793	++	+
15	<i>Dorippe dorsipes</i> (Linnaeus, 1758)	+	+
Portunidae			
16	<i>Charybdis callianasa</i> (Herbst, 1801)	-	++
17	<i>Charybdis cruciata</i> (Herbst, 1794)	+	-
18	<i>Charybdis edwardsi</i> Leene and Buitendijik, 1952	++++	-
19	<i>Charybdis feriata</i> (Linnaeus, 1758)	+	+
20	<i>Charybdis granulata</i> (De Haan 1835)	+++	++
21	<i>Charybdis hellerii</i> (A. Milne Edwards, 1867)	+	-
22	<i>Charybdis hoplites</i> (Wood-Mason, 1877)	++++	++++
23	<i>Charybdis lucifera</i> (Fabricius, 1798)	+++	+
24	<i>Charybdis miles</i> (de Haan, 1835)	++	+
25	<i>Charybdis natator</i> (Herbst, 1789)	++++	++
26	<i>Charybdis truncata</i> (Fabricius, 1798)	++	++
27	<i>Charybdis variegata</i> (Fabricius, 1798)	++++	+
28	<i>Podophthalmus vigil</i> (Fabricius, 1798)	+++	++
29	<i>Portunus gracilimanus</i> (Stimpson, 1858)	++	+++
30	<i>Portunus gladiator</i> (Fabricius, 1798)	-	+
31	<i>Portunus sanguinolentus</i> (Herbst, 1783)	+	++
32	<i>Portunus spinipes</i> (Miers, 1886)	+++	++++
33	<i>Portunus whitei</i> (Milne Edwards, 1872)	++	-
34	<i>Thalamita crenata</i> (Milne Edwards, 1861)	+	+
Miidae			
35	<i>Galene bispinosa</i> (Herbst, 1783)	+	+
36	<i>Oreophorus rugosus</i> (Stimpson, 1858)	+	+
37	<i>Parthenope</i> sp. (Weber, 1795)	-	+
38	<i>Paramithrax aculeatus</i> (Alcock, 1895)	-	+

++++: Dominant; +++: Abundant; ++ Co abundant; +: Present; -: Not recorded

Among 15 genera, seven of them were single species, three of them were two species, two of them were three species, one of genera (*Portunus*) has five species and another one genera (*Charybdis*) has twelve species in Mudasal Odai landing centre. Among 15 genera in Nagapattinam coast, ten of them were single species, four of them were two species, one of them was four species and one more genera was nine species in Nagapattinam landing centre. Three species (*Charybdis granulata*, *Charybdis lucifera* and *Podophthalmus vigil*) were abundant in Mudasal Odai coast and two species (*Philyra scabriuscula*, *Portunus gracilimanus*) were abundant in Nagapattinam coast.

There were three species (*Calappa lophous*, *Doclea gracilipes*, *Doclea ovis*) co-abundant in both landing centre. Ten species (*Leucosia pubescens*, *Philyra corallicola*, *Calappa lophos*, *Doclea gracilipes*, *Doclea ovis*, *Dorippe astute*, *Charybdis miles*, *Charybdis truncata*, *Portunus gracilimanus*, *Portunus whitei*) co-abundant in Mudasal Odai coast. Nine species (*Calappa lophos*, *Doclea gracilipes*, *Doclea ovis*, *Charybdis callianasa*, *Charybdis granulata*, *Charybdis natator*, *Charybdis truncata*, *Podophthalmus vigil*, *Portunus sanguinolentus*) were co-abundant in Nagapattinam coast. Nine species (*Dromia dehaanii*, *Ixa cylindrus*, *Matuta lunaris*, *Matuta planipes*, *Dorippe dorsipus*, *Charybdis feriata*, *Thalamita crenata*, *Galene bispinosa*, *Oreophorus rugosus*) were present status in both coastal areas. Fourteen species (*Dromia dehaanii*, *Ixa cylindrus*, *Calappa calappa*, *Matuta lunaris*, *Matuta planipes*, *Doclea hybrida*, *Dorippe dorsipus*, *Charybdis cruciata*, *Charybdis feriata*, *Charybdis hellerii*, *Thalamita crenata*, *Galene bispinosa*, *Oreophorus rugosus*) were present status in Mudasal Odai coast. Seventeen species (*Dromia dehaani*, *Ixa cylindrus*, *Leucosia pubescens*, *Matuta lunaris*, *Matuta planipes*, *Dorippe astute*, *Dorippe dorsipus*, *Charybdis feriata*, *Charybdis lucifera*, *Charybdis miles*, *Charybdis variegata*, *Portunus gladiator*, *Thalamitta crenata*, *Galene bispinosa*, *Oreophorus rugosus*, *Parthenope* sp, *Paramithrax aculeatus*) were present status in Nagapattinam coast.

4 Discussion

In the present study 34 species, 15 genera and 7 families in Mudasal Odai and 31 species, 15 genera and 7 families in Nagapattinam coast were recorded (Table 1, Figures 1 and 2). On sixties the marine crab catch in India around 4,000 t, it was increased to 25,000 t by the nineties due to expansion of trawl fisheries (Sukumaran and Neelakantan, 1996). During 1975-1981, the average crab landings in Indian coast were 21,310 t per year, forming 10.4% of the total crustacean landings (Kathirvel, 1983). Crab resources in Indian seas were estimated 43,000 t and half of the resources are being exploited presently (Rao et al., 1973). A total of 96 brachyuran crab species were reported during a period (1976–1977) from Bahia de Cartagena and adjacent areas, on the north coast of Colombia (Lemaitre, 1981). Sixty eight species of Brachyuran crabs including nine species Portunidae family reported in shallow marine and estuarine water from southern Bahia coast of Brazil (Almeida et al., 2010). Hundred and sixty two species of brachyuran crabs recorded in the state of Bahia in eastern Brazil comprises more than 12% of the entire Brazilian coast (Almeida and Coelho, 2008). The total annual crab landings of the Parangipettai coast reported (John Samuel et al., 2004).

A checklist of brachyuran crabs of the world 6,793 species 1,271 genera and 93 families prepared by Ng et al. (2008). Bertini et al. (2004) recorded 79 brachyuran species representing 9 superfamilies (4 Dromioidea, 1 Homoloidea, 2 Calappoidea, 5 Leucosioidea, 20 Majoidea, 7 Parthenopoidea, 17 Portunoidea, 18 Xanthoidea and 5 Pinnotheroidea) and 41 genera in sublittoral bottom on the northern coast of Sao Paulo state in Brazil. In Taiwan waters 548 species belonging to 36 families including twenty new records reported by Ng et al. (2001). A total of 450 species, belonging to 181 genera reported on the west coast of America (Hendrickx, 1995). Kazmi (1984) recorded 47 species pertaining to 8 families and 34 genera at northern Arabian Sea (Pakistan).

There were about 482 species recorded in Portunidae family during (1970-1997) along the southern Somalian coast (Vannini and Innocenti, 2000), 17 species recorded on that family during our collection (Table 1, Figures 1 and 2).

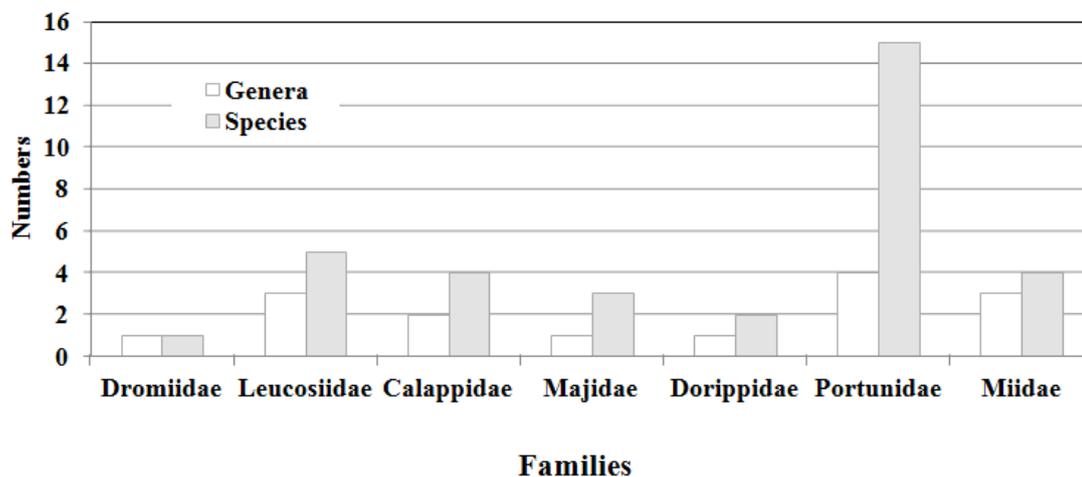


Fig. 1 The number of families, genera and species of crabs recorded on Mudasal Odai coast

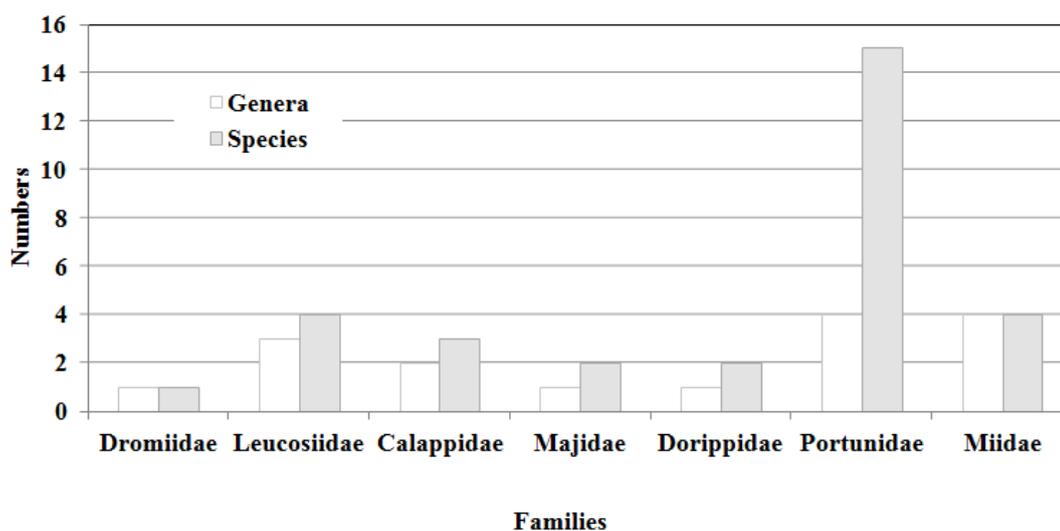


Fig. 2 The number of families, genera and species recorded on Nagapattinam coast

In Indian mangrove areas of Gulf of Kutch, Gujarat state 19 species of brachyuran crabs have been recorded (Trivedi et al., 2012). Mangrove areas of Pondicherry coast 15 species of brachyuran crabs belonging to 10 genera and 7 families were recorded (Satheeshkumar and Khan, 2011). Krishnamoorthy (2007) reported 54 species (excluding those belonging to family Portunidae) crabs from Chennai coast. In different areas of Gulf of Mannar such Manauli Island (32 species), Appa Island (26 species); Nallathanni Island (22 species) and Karaichalli Island (18 species) have been reported (Jayabaskaran and Ajmal Khan, 2007). A total of 38 species of brachyuran crabs (Ajmal Khan et al., 2005) and 46 species of crabs (Ravichandran and Kannupandi, 2007) were reported from Picharvaram mangrove areas.

At Chennai coast *Podophthalmus vigil* annual catch over 100 t during 1992-95, a maximum catch of 217.5 t in 1994-95, the catch declined drastically 22 tons in 1996-97 and further to 6 t in 1997-98 (Thangaraj Subramanian, 2001). During the present study *Charybdis feriata* was a present status in both coasts. On 13th December 2004, *Charybdis feriata* was recorded for the first time from the Mediterranean Sea, based on a single adult female caught in a gillnet off Barcelona at the depth of 60-70 meter (Abello and Hispano, 2006). Portunid crab species *Charybdis feriata* widely distributed in the Indo-Pacific (Japan, China, Australia, southern Africa, Gulf of Oman, Pakistan, India, Sri Lanka and Indonesia) regions (Stephenson et al., 1957; Stephenson, 1972a; Ng, 1998; Apel and Spiridonov, 1998). In the present study *Podophthalmus vigil* recorded as a abundant species in Mudasal Odai and co-abundant species in Nagapattinam coast (Table 1, Figures 1 and 2).

Portunidae crab *Charybdis hellerii* widespread in the whole Indo-Pacific, migrated to Mediterranean through the Suez Canal (Steinitz, 1929). *Charybdis hellerii* has been successfully introduced in the central western Atlantic Ocean (Lemaitre, 1995; Dineen et al., 2001). The species of genus *Charybdis* (*Charybdis hellerii*) is known to have been introduced as Lessepsian migrants into the Mediterranean Sea and occur in self-sustaining population with a distribution area stretching from Egypt to Turkey (Galil et al., 2002). *Charybdis hellerii* was recorded in Mudasal Odai coast as a present status, but it was absent in Nagapattinam coast during present study (Table 1).

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