Checklist of the Porcellanidae (Crustacea: Decapoda: Anomura) of India

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ABSTRACT: Although the porcellanid fauna of Indian waters has been studied for more than 150 years, diversity of this family remains underestimated. In order to complement the knowledge on the porcellanid fauna of India, an annotated checklist is herein provided on the basis of published literature. A total of 30 species belonging to 11 genera are currently known from Indian waters. The distribution of two porcellanid Porcellanella haii and Pseudoporcellanella manolionsis indicate that they are endemic, as they are, so far, known only from their type locality (Gulf of Mannar, Tamilnadu). The list is arranged alphabetically by genus and species with information on species’ distribution and ecology.

INTRODUCTION

The family Porcellanidae is distinguished from other anomuran families by a crab-shaped body with a flattened abdomen. This family includes 30 genera and about 280 species around the world, mainly known from tropical to temperate waters (Osawa and McLaughlin 2010). Species of Porcellanidae generally occur from shore to continental shelf edges (<200 m), being more common in the intertidal and shallow subtidal zones of rocky and coral reefs. The species living in intertidal areas occupy narrow spaces between rocks or dead coral blocks, or on muddy bottoms (Werding and Hiller 2004) whereas, sub-tidal species occasionally live in association with other invertebrates (Werding 1983; Hiller et al. 2004; Hiller et al. 2006; Osawa and Chan 2010).

The studies on the porcellanids in India have a long history, with the first local report by Heller (1862) from the Nicobar Islands. However, the porcellanid fauna in India has not been satisfactorily explored. Thus, the present initiative was taken to provide an updated checklist on porcellanids of Indian waters with the hope to further contribute to the knowledge on the diversity of this family.

MATERIALS AND METHODS

The present checklist is compiled based on the published records of porcellanids from India between the years 1862 and 2013. Species names mentioned in the checklist follow Osawa and McLaughlin (2010). The list is arranged alphabetically by names of genera and species, with literature on distributional and ecological information. A map of India with the localities cited in the checklist is shown in as Figure 1. The published records from Indian waters include 30 species in 11 genera. In the checklist, species with the mark * have the distribution restricted to the Indian subcontinents (Hiller et al. 2010), ** indicates that the species are endemic to type locality. Species with numbers in parentheses refer to additional remarks referring to taxonomic changes (see Table 1).

RESULTS

Additional Remarks

(1) Sankolli (1963a) assumed that Pachycheles sp. recorded from the Gulf of Mannar by Gravely (1927) probably belongs to his new species, Porcellana gravelei. Later, Haig (1978) established the genus Ancylocheles for the latter species.

(2) The records of Porcellana ornatus by Gravely (1927) and Sankolli (1968) are referred to those of Enostoeiderns ornatus (Stimpson, 1858), not Petrolisthes ornatus (Paulson 1875).

(3) Southwell (1906) firstly recorded this species as Porcellana quadrilobata from India. Porcellana quadrilobata now belongs to the genus Lissoporcellana Haig (1978) as the type species of the genus. Southwell (1909) also described Porcellana gaekwari from Gulf of Mannar, India, but it is now considered as a junior synonym of L. quadrilobata, which is a associate of sponges.

(4) Sankarankutty (1963) reported this species as Petrolithes ohshimai (Miyake 1937). This species is now considered as a junior synonym of Neopetrolithes maculatus (H. Milne Edwards 1837).

(5) Heller (1862) reported this species from the Nicobar Islands as Porcellana barbata.

(6) Gravely (1927) and Sankarankutty (1963) reported/misidentified this species as Porcellana serratifrons and Pidiaspinulifrons from Gulf of Mannar.

(7) Gravely (1927) reported this species as Polyonyx tubercullosus from the Gulf of Mannar.

(8) P. splendidus and P. hendersoni represented a distinct genus, but taxonomic revision was not undertaken (Werding, 2001).

(9) Only single species was recognized worldwide. Although the year of the issue was printed as “1961,” there was a delay in publication and it was actually issued in October 1962 (Low and Ng 2012).

DISCUSSION

Compared to the very exhaustive works on Brachyura by Alcock (1899a, 1899b, 1901) and later workers (Gravely 1927; Chhagar 1957; Sethuramalingam and Ajmal Khan 1991), Porcellanidae has been less studied as far as Indian region is concerned. Classical contributions
from India are those by Heller (1862, 1865) (6 species), Henderson (1893) (5 species), Gravely (1927) (8 species), Sankolli (1963a, b, 1965, 1968) (10 species) and Southwell (1906, 1909) (8 species) respectively. Recent studies on porcellanids of Indian waters reported 10 species from Goa (Hiller et al. 2010) and 4 species from Lakshadweep (Prakash et al. 2013). The published information on this family likely underestimates the biodiversity of the Indian Peninsula. The present checklist indicates that most of the species were collected from the intertidal area and extended up to the deeper waters of 180 m (see Table 1). Most porcellanids are associates of other invertebrates like corals, sponges, hydrozoans, anthozoans and ascidians etc.

From the biogeographical aspect a few species are endemic to the type localities. Two porcellanid species Porcellanella haigae and Pseudoporcellanella manoliensis as they are, so far, known only from the Gulf of Mannar, Tamilnadu (type locality) and there are certain endemics to Indian subcontinents such as P. loimicola, P. splendidus and Raphidopus indicus are considered to be endemic to the Indian subcontinents. Compared to the species, all genera are evenly distributed on east coast (Gulf of Mannar and Nicobar islands) and west coast (Gulf of Kutch and Okha) of India except Neopetrolisthes, Porcellanella and Pseudoporcellanella, which are restricted to the Gulf of Mannar only. Species richness is higher in the Gulf of Mannar (17 species) and it suggests that the same number of species or more may present from the other reef areas such as Andaman & Nicobar Island, Lakshadweep, Gulf of Kutch and Ratnagiri due to the presence of similar habitats (rocky intertidal and coral reefs). The Nicobar Islands considered as one of the richest coral biodiversity hotspots (Venkataraman et al. 2004), but Heller (1862, 1865) only reported 6 species. A recent report on porcellanids from Goa (Hiller et al. 2010) included 10 species belonging to 6 genera collected from the rocky intertidal and sub-tidal shallow waters. Prakash et al. (2013) reported only 4 species of porcellanids under the genus Petrolisthes from Lakshadweep and the collection are confined to the rocky intertidal region.

Other crustaceans like brachyurans and parasitic isopods (Cymothoidae) have been widely studied and collected throughout the Indian waters (Dev Roy 2008; Trilles et al. 2011). Recent checklists on brachyurans from coral reefs and mangrove regions of India include 389 species, in which Andaman & Nicobar Islands holds a high diversity of 196 species followed by the Gulf of Mannar with 156 species, Lakshadweep with 107 species, Gujarat with 50 species and Goa with 17 species and it suggests that the diversity of true crabs is more in coral reefs compared to mangroves as far as Indian region is concerned (Dev Roy, 2008). The checklist on parasitic isopods of the family Cymothoidae includes 36 valid species throughout the Indian waters (Trilles et al. 2011). Hence, it is concluded that Porcellanidae has been quite explored and seems to the case for brachyurans and other crustaceans and in future it is necessary that more sampling is required because the diversity of procellanids in India is probably underestimated.

**Figure 1.** Map of India showing the localities cited in the records of porcellanids.
<table>
<thead>
<tr>
<th>SPECIES NAME</th>
<th>DISTRIBUTION RANGE</th>
<th>ECOLOGY</th>
<th>LITERATURE SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ancylocheles graveli</em> (Sankolli, 1963a)</td>
<td>Indian Ocean, Pakistan, Australia. India: Gulf of Mannar (Tamil Nadu), West coast of India, Goa</td>
<td>Abundant in lower intertidal area, inhabits interstices of stones and rubbles overgrown by sponges and other fouling organisms</td>
<td>Gravely 1927; Sankolli 1963a; Haig 1965; Siddiqui and Kazmi 2003; Hiller et al. 2010</td>
</tr>
<tr>
<td><em>Enosteoides ornatus</em> (Stimpson, 1858)</td>
<td>Pakistan, Bay of Bengal, Gulf of Thailand, through south China sea, Taiwan strait, Southern Japan and Australia. India: Goa, Gulf of Mannar, Ratnagiri (Maharashtra)</td>
<td>Intertidal to 54 m deep; under rocks, from dead coral bases and sponges</td>
<td>Gravely 1927; Sankolli, 1968; Haig 1981; Hiller et al. 2010</td>
</tr>
<tr>
<td><em>Lissoporcellana quadrilobata</em> (Miers, 1884)</td>
<td>Indo-west Pacific from Persian Gulf, east coast of Africa, from Indian Ocean to Malay peninsula and Australia. India: Gulf of Kutch and Gulf of Mannar</td>
<td>Shore to 128 m deep; sandy and muddy bottoms; found in association with corals and gorgonians</td>
<td>Southwell 1906, 1909; Osawa and Chan 2010; Siddiqui and Kazmi 2003; Hiller et al. 2010</td>
</tr>
<tr>
<td><em>Neopetrolisthes maculatus</em> (H. Milne Edwards, 1837)</td>
<td>Indo-west Pacific. Japan, south to New Caledonia, Fiji and Samao. India: Gulf of Mannar</td>
<td>Shallow, subtidal water; coral and rocky reefs; associated with large sea anemones and often found in pairs</td>
<td>Sankaranarayanan 1963; Osawa and Chan 2010</td>
</tr>
<tr>
<td><em>Pachycheles natalensis</em> (Krauss, 1843)</td>
<td>Western Indian ocean to Red sea, eastern Arabian sea, African coast, southward to Mozambique including Madagascar. India: Ratnagiri, Gulf of Mannar; Goa</td>
<td>Found in the deeper intertidal zone inhabiting interstices of stones and rubbles held together by sponges</td>
<td>Sankolli 1968; Hiller et al. 2010</td>
</tr>
<tr>
<td><em>Pachycheles pisoide</em> (Heller, 1865)</td>
<td>Indian Ocean: Madagascar. Seychelles and Western Australia, Taiwan, Ryukus and Hawaiian islands. India: Nicobar Islands</td>
<td>Intertidal to 3.6 m deep; interspaces of branches of dead and living corals (Acropora, Porites etc.)</td>
<td>Heller 1865; Osawa and Chan 2010</td>
</tr>
<tr>
<td><em>Pachycheles sculptus</em> (H. Milne Edwards, 1837)</td>
<td>Indo-west Pacific. Japan, south to New Caledonia, Fiji and Samao. India: Gulf of Mannar</td>
<td>Intertidal to 180 m deep; interspaces of branches of dead and living corals and sponges</td>
<td>Southwell 1906; Osawa and Chan 2010</td>
</tr>
<tr>
<td><em>Pachycheles tomentosus</em> Henderson, 1893</td>
<td>Western Indian ocean, Pakistan, South Africa, Madagascar, Red sea, Gulf of Aden and Persian Gulf. India: Southern India, Western India</td>
<td>In holes and crevices of rocks near low water mark</td>
<td>Mustaquim 1972; Siddiqui and Kazmi 2003</td>
</tr>
<tr>
<td><em>Petrolisthes boscii</em> (Henderson, 1893)</td>
<td>Indo-west Pacific. Pakistan, Taiwan, Hon Kong, Gulf of Thailand, Japan, Australia, Red sea and Persian Gulf. India: Rameswaram, Gulf of Kutch, Gulf of Mannar; Okha Mandal, Goa</td>
<td>Shallow water to 18.3 m depth; from rocks, boulders and corals</td>
<td>Henderson 1893; Southwell 1999; Gravely 1927; Sankolli 1968; Siddiqui and Kazmi 2003; Hiller et al. 2010</td>
</tr>
<tr>
<td><em>Petrolisthes coccineus</em> (Owen, 1839)</td>
<td>Indo-west Pacific. Japan, south to Indoneisa, eastern African, Tuamato archipelago and Hawaiian islands. India: Nicobar Islands, Goa, Lakshadweep Archipelago</td>
<td>Intertidal to 7.2 m deep; under the rocks and boulders</td>
<td>Heller 1862; Osawa and Chan, 2010; Hiller et al. 2010; Prakash et al. 2013</td>
</tr>
<tr>
<td><em>Petrolisthes hastatus</em> Stimpson, 1858</td>
<td>Indian Ocean, Malay archipelago, Singapore to Japan, New Caledonia, Fiji and Samao. India: Nicobar Islands</td>
<td>Intertidal, under rocks</td>
<td>Heller 1862; Osawa and Chan 2010</td>
</tr>
<tr>
<td><em>Petrolisthes lamarckii</em> (Leach, 1820)</td>
<td>Indo-west Pacific. Eastern Africa coast and Red sea and Tuamato island. India: Nicobar Islands, Rameswaram, Gulf of Mannar, Ratnagiri, Goa, Lakshadweep Archipelago</td>
<td>Intertidal, found under rocks</td>
<td>Heller 1865; Henderson 1893; Gravely 1927; Sankolli 1968; Hiller et al. 2010; Prakash et al. 2013</td>
</tr>
<tr>
<td><em>Petrolisthes moluccensis</em> (Man De, 1888)</td>
<td>Indian Ocean: Red sea, Gulf of Aden, Oman and Persian Gulf and India</td>
<td>Subtidal to 180 m deep; often associated with corals on shallower depths</td>
<td>Heller 1862; Henderson 1893; Southwell 1906; Gravely 1927; Haig 1964, 1979; Siddiqui and Kazmi 2003</td>
</tr>
<tr>
<td><em>Petrolisthes tomentosus</em> (Dana, 1852)</td>
<td>Indo-west Pacific, Madagascar, Western Australia, Taiwan to New Caledonia, Chesterfield islands and Tuamato Archipelago. India: Nicobar Islands, Lakshadweep Archipelago</td>
<td>Lower intertidal to 11m deep. Found under rocks, on dead corals and bases of living corals</td>
<td>Heller 1865; Osawa and Chan 2010; Prakash et al. 2013</td>
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</table>
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and molecules, and evolutionary interrelationships between this complex and other Porcellanidae (Crustacea: Decapoda: Anomura). Molecular Phylogenetics and Evolution 40: 547-569.


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