

# Intertidal Amphipods (Crustacea: Amphipoda) from Pondicherry Mangroves, Southeast Coast of India

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## Abstract

Seven species of amphipod crustaceans from Pondicherry mangroves, (Southeast coast of India) are described and illustrated. *Eriopisa chilensis*, *Eriopisella* sp, belonging to family Gammaroidea. *Melita dentata* belonging to family Melitidae, two species of family Aoridae (*Grandidierella bonnieroides*, *G. pathyi*), one species of family Ampithoidae (*Cymadusa pathyi*) and one species of family Isaeidae (*Isala montagui*) were recorded. Head microsculpturing characters are the discriminating sets of characters useful for species identification.

**Keywords:** Amphipod, distribution, species, mangroves, Pondicherry

## 1. Introduction

Indian mangroves have a rich diversity of soil dwelling organisms which include micro, meio and macro forms and reports on these groups are limited to certain areas only. Gammarid amphipods are common and widely distributed macrofauna in marine and freshwater systems. Amphipods one of the most abundant marine crustacean groups is widely perceived to be difficult to identify. They are diversified, in terms of the numbers of species, the niches occupied and are classified according to habitats as epifaunal, infaunal and demersal planktonic amphipods. Amphipods are important in mangrove and sea grass ecosystems. They are significant not only as food for fishes and some larger crustaceans but also play an important function in the decomposition of wastes and in the cycle of nutrients (Robertson and Mann 1980). Amphipods being endemic in many environments, their biodiversity is used to assess the health of a biotope as well (Mondal *et al.* 2010). Amphipods also play different roles in the trophodynamic relationship, as primary consumers, omnivores, carnivores and opportunistic feeders, and change feeding modes according to food availability (Wongkamhaeng *et al.* 2009). The spatial distribution of species varies according to the availability of food and the protection against the predators and the waves. Availability of seaweeds and algae is an important determining factor to the species composition and the diversity of gammaridean amphipods in the brackish water environments (Fenchel and Kolding 1979). Surya Rao (1972) studied the intertidal amphipods from the Indian coast, and he only reported gammaridean species. Few studies have been performed about tropical gammarids (Lyla *et al.* 1998; Kathiresan 2000; Wongkamhaeng *et al.* 2009; Mondal *et al.* 2010). The potential for unrecorded biodiversity is illustrated by the number of new species recorded in recent partial surveys. This report presents the details on seven species of marine amphipod fauna – *E. chilensis*, *Eriopisella* sp, *M. dentata*, *I. montagui*, *G. bonnieroides*, *G. pathyi*, *C. pathyi* from Pondicherry mangroves (Pondicherry) Southeast Coast of India (Table 1). However the biodiversity of amphipods in the mangrove environment being poorly known, a key for identification of the group is detailed here in.

## 2. Materials and Methods

### 2.1 Study site

Geographically the study area lies within the boundaries of latitudes 11°46'03" to 11°53'40" N and longitudes 79°49'45" to 79°48'00" E. Mangrove exists as fringing vegetation over 168 ha distributed along the sides of Ariankuppam estuary, which is seasonally bar-built and semi diurnal type that flows eastwards and empties into the Bay of Bengal at Veerampatinam on the south east coast of India, carrying the wastes from the adjacent agriculture lands and industries in addition to domestic municipal and distillery effluents. The present investigation was carried out in four well formed stations: 1 Veerampattinam; 2 Thengaihittu; 3 Ariyankuppam; 4 Murungapakkam mangrove areas of Pondicherry (Figure 1.).

## 2.2 Data collection

Samples were collected from 4 stations along the Pondicherry mangroves on September 2008 to August 2009 during low tide period of the tidal cycle by using 100 x 100 cm quadrates. The remaining sediment samples were collected by using a van Veen grab (mouth area: 0.03 m<sup>2</sup>). The samples collected were washed through 0.5 mm mesh size sieve. Specimens were preserved in 10 % (w/v) formalin: seawater. Subsequent sorting and taxonomic identification of samples was carried out in the laboratory using a stereomicroscope. Fauna were identified to the lowest practical taxonomic level using standard references (Bousfield 1978; Lyla *et al.* 1998). The specimens are deposited at the Pondicherry Central University, Department of Ecology and Environmental Sciences (PUDEES- UGGMRP 02-09) and counted with a reference number to the database and collection.

## 3. Results

### 3.1 List of species recorded in Pondicherry mangroves

Class: Malacostraca

Order Amphipoda

Family: Gammaroidea

#### ***Eriopisella* sp. (Chevreux, 1920)**

Diagnosis- Eye small with scattered clearly distinct 10-13 ocelli; 1<sup>st</sup> peduncular article of 1<sup>st</sup> antenna larger than 2<sup>nd</sup>, 1<sup>st</sup> antenna with few distal apical setae; 2<sup>nd</sup> bearing few setae; upper lip characteristic.

Colour: Whitish

Distribution: India, South Africa

Habitat: backwaters, from mud samples.

#### ***Eriopisa chilensis* (Chilton, 1921)**

Diagnosis-Eyes present, 1<sup>st</sup> peduncular article of 1<sup>st</sup> antenna smaller than 2<sup>nd</sup>; 2<sup>nd</sup> peduncular article of 1<sup>st</sup> antenna with long setae; 2<sup>nd</sup> epimeral plate with many plumose setae.

Colour: Dull whitish

Distribution: India, South Africa

Habitat: Mangroves, from mud samples

Family: Melitidae

#### ***Melita dentada* (Kroyer, 1842)**

Diagnosis: The elongate outer rami of uropod 3 and medial setae on gnathopod 2 are characteristic of this genus. The dactyl of gnathopod 2 always closes on the medial margin.

Colour: Greenish Yellow

Distribution: India, Maldives, South Africa, Sri Lanka

Habitat: Lagoon, rubble zone, under rocks.

Family: Ampithoidae

#### ***Cymadusa pathyi* (Peethambaran, 1998)**

Diagnosis: Eyes medium and pinkish red, 2 articulated accessory flagellum; gnathopod 1<sup>st</sup> longer than 2<sup>nd</sup>, cox large with setose ventral margin, basis elongate, ischium small and merus small, roughly triangular, carpus elongate, propodus slightly expanded medially, margin with dissimilar setae, dactylus long and with serrate inner border; in uropod 3, peduncle longer than rami with broad setulose inner proximal borders, 3 sets of long setae present towards outer margin, 1<sup>st</sup> with 1, 2<sup>nd</sup> with 2 and 3<sup>rd</sup> with 3 setae, median inner margin with 1 stout spine, distolateral apices with 5 stout spines ventrally and 4 long setae dorsally, outer ramus smaller than inner with serrulate outer margin carrying 1 submarginal setae, inner ramus with 1 submarginal spine towards median inner margin, apex with 3 stout spine and 4 long setae.

Colour: Pale yellowish

Distribution: China, India, Thailand

Habitat: Mangroves, from mud samples

Family: Aoridae

#### ***Grandidierella bonnieroides* (Stephensen, 1948)**

Diagnosis: Eyes medium, black; carpus of male 1<sup>st</sup> gnathopod with more than 1 median process at inner distal apex, 2<sup>nd</sup> gnathopod in both sexes without long plumose setae, dactylus of male 1<sup>st</sup> gnathopod serrate with flat spines on inner margin; males with atleast one sterna process on 1<sup>st</sup> pereon segment.

Colour: Pale yellowish

Distribution: North America, Cuba, Brazil, India, Philippines

Habitat: Vellar-Coleroon estuarine complex, algal living gammarid.

***Grandidierella pathyi* (Chilton, 1921)**

Diagnosis: Eyes medium rounded and black; carpus of male 1<sup>st</sup> gnathopod with more than 1 medium process at inner distal apex, 2<sup>nd</sup> gnathopod in both sexes slender with very long plumose setae on merus, carpus and propodus, dactylus of male 1<sup>st</sup> gnathopod dentate on inner margin; males without any sternal process.

Colour: Brownish yellow

Distribution: India, Thailand

Habitat: Backwaters, builds small flat tubes in the mud and silt, associated with the shells of oyster.

Family: Isaeidae

***Isala montagui***

Diagnosis: Eyes are very large, set very close to anterior margin of lateral lobe, Epidermal plate 3 with distal tooth, posterior margin straight.

Colour: Brownish yellow

Distribution: India, Thailand

Habitat: Mangroves, from mud samples

**4. Discussion**

In the present investigation seven species of amphipods were recorded from Pondicherry mangroves. The Gammaroidea species *Eriopisella* sp and *E. chilensis* are collected at the mouth of Veerampattinam and Thengaithittu stations. Melitidae species *M. dentata* and Ampithoidae species *C. pathyi* were recorded at station 3 and 4. Aoridae species *G. bonnieroides*, *G. pathyi*, *I. montagui* are recorded only at station 4. Amphipod fauna of India is relatively depauperate with similar areas in Indian mangroves. Subramanian *et al.* (1984) had first reported amphipods of Pitchavaram mangroves and later Kathiresan (2000) recorded 4 species of amphipods from the same Pitchavaram mangroves. Only 2 species of amphipods - *Photis geniculata* and *Pedocercus* sp - were reported from Sundarban mangroves (Bhunia & Choudhry 1991). In Vellar estuary mangroves, Mondal *et al.* (2010) reported 10 species of amphipods. The authors herein suggest that future biodiversity inventories and surveys be undertaken with regard to selective criteria. Due to limited dispersion capabilities and habitat specificity of amphipods, they may be of use in biogeography and environmental monitoring in mangrove ecosystem. The significance of such amphipod fauna in biodiversity processes is worthy of future studies.

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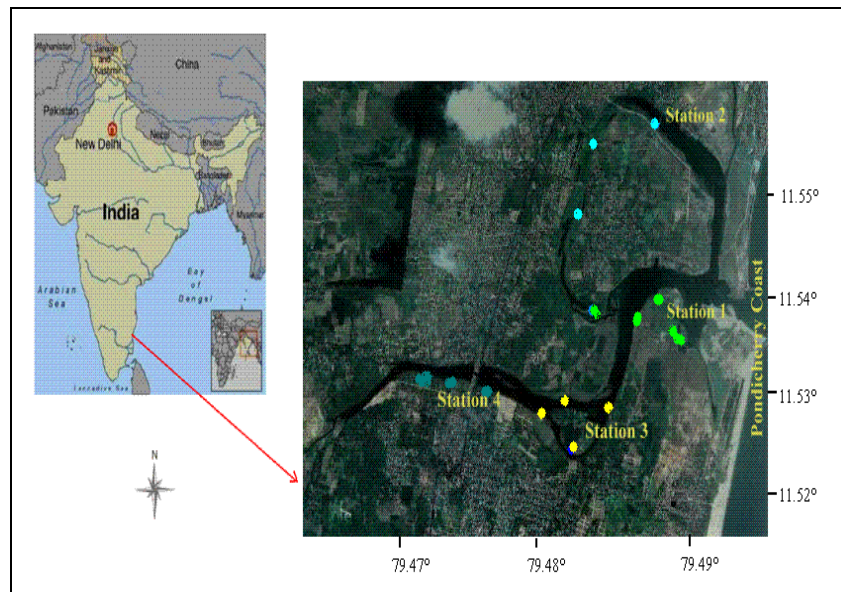


Figure 1. Monitoring stations in Pondicherry mangroves

Table 1. List of amphipod species recorderd in Pondicherry mangroves

S.No	Species Name	Station 1	Station 2	Station 3	Station 4
1	<i>Eriopisella sp</i>	+	+	-	-
2	<i>Eriopisa chilkensis</i>	+	+	-	-
3	<i>Melita dentada</i>	-	-	+	+
4	<i>Isala montagui</i>	-	-	-	+
5	<i>Grandidierella bonnieroides</i>	-	-	-	+
6	<i>G. pathyi</i>	-	-	+	+
7	<i>Cymadusa pathyi</i>	-	-	-	+

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