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A new record of genus *Mesopodopsis* (Crustacea: Mysida) from Northern Arabia sea, Pakistan

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Abstract
The present research reports a new record of the genus *Mesopodopsis* from Pakistan (N 24.349533 E 67.608433). The Pakistani material is more closely related to *M. orientalis* described by the earlier authors but does not fully correspond to any descriptions. It is therefore, only tentatively described here as *M. orientalis*; the material at hand is compared with previous descriptions of *M. orientalis*.

Keywords: Pakistan, Ambro Creek, *Mesopodopsis orientalis.*

1. Introduction
The mysids are important in marine food chains since they occur in large numbers in inshore waters and estuaries. They have commercial importance in the aquarium pet industry and as food for penaeid shrimp and fish larvae in aquaculture. In addition, mysids are harvested for human consumption in India, Indonesia and Thailand [7, 16, 20].
Mysids have high calorific values (Kazmi & Sultana, 2008; Biju & Panampunnayil, 2009; Eusebio *et al*., 2010) [8, 14] and are considered an excellent experimental organism in aquatic toxicology (Nimmo & Hamaker, 1982) [19]. They are known to have negative impact, for example *Indomysis annandalei*, a carnivorous species, feeds on *Artemia* nauplii in the *Artemia* pond [17, 24].
Previously nine mysid genera and fifteen species have been reported from Pakistan [15]. We report the genus *Mesopodopsis*, a genus represented by eight species in the world [1, 10], for the first time from Pakistan.
The present material has been found from zooplankton samples collected from Ambro Creek (Ghorabari) in Indus Delta, Pakistan (Latitude 240 34' 9" N; Longitude 67° 60' 8" E). The collections have been made with the help of a scoop net (mesh size 0.5 mm) at random. The depth of water in deepest part of creek at high tide is 4.5 -6.0 meter, whereas at low tide is 0.9-2.4 meter. The parameters like temperature, salinity, pH, and D.O. have been recorded and mentioned under the head "Material examined".
The present material has been identified as *M. orientalis* (W. M. Tattersall, 1908) by Dr. Hanamura although the differences seemed to us enough to warrant a new species, but on his advice (QBK, pers. comm.) we have refrained from giving it a new name. *Mesopodopsis orientalis* occurs in large numbers in the tropical Asian waters and extensive work has been done on its biology [4, 6, 10, 11, 18, 23].
The Pakistani specimens of *M. orientalis* illustrated and discussed in the present paper are deposited in the Marine Reference Collection and Resource Centre, University of Karachi and also available with Dr. Hanamura, Japan International Research Center for Agricultural Science, Japan (now the National Research Institute of Fisheries Science: A few specimens were used for DNA analysis, but no data are available).

Systematics
Order MYSIDA, Haworth, 1825
Family MYSIDAE Haworth, 1825
Subfamily MYSINAE Hansen, 1910
Genus *Mesopodopsis* Czerniavsky, 1882
Mesopodopsis orientalis (Tattersall, 1908) (Figure 1)

Tattersall, 1908: 236; Pillai, 1968:16; Arawindakshan *et al*., 1988:15; Pinkaew *et al*., 2001;
Hanamura *et al*., 2008a: 2464; Biju and Panampunnayil, 2009:361; Anderson, 2010: 24

Material examined
Ambro Creek , November 7, 2006 , night collection, 26 0C, salinity 15 ppt, pH 8.0, DO 7.4 mg/l; 3 males 4.1-7.0 mm, 5 non ovigerous females 4.1- 4.8 mm. Ambro Creek , November 9, 2006, night collection, 28 0C, salinity 10 ppt, pH 8.0, DO 4.7 mg/l; 5 males 4.2- 6.7, 11 non ovigerous females 3.9 - 4.8 mm. Ambro Creek, November 12, 2006, night collection, 25 0C, salinity 05 ppt, pH 8.0, DO 7.6 mg/l, 15males 4.5-7.5 mm; 69 females including 19 ovigerous females 6.5-8.3 mm. Ambro Creek, November 14, 2006, 29 0C, salinity 09 ppt, pH 8.0, DO 5.3 mg/l; 20 males 4.3-6.7, 31 non ovigerous females. Ambro Creek, December 4, 2006, 26 0C, salinity 11 ppt, pH 8.1, DO 6.9 mg/l; 13 ovigerous females 5- 8.2 mm, 12 non ovigerous females 4-5.2 mm; 7 males 5-8 mm. Ambro Creek, December 12, 2006, 26 0C, salinity 12 ppt, pH 8.0, DO 7.0 mg/l; 6 non ovigerous females 5.9 -7.5 mm, 5 males 5.5-6.7 mm.

Description
Frontal lobe dome shaped. (Figure 1a) reaching slightly beyond base of ocular peduncle, bearing minute but sharp spines, each placed at lateral parts just behind ocular peduncles; antero-lateral corner nearly triangular.
Telson (Figure 1b) lateral margins with up to 5 pairs of spines, each mounted on a projection, posterior most spines larger than others. Apex produced less than half of total length of telson with its margin armed on side with about 44 pairs of closely set row of spines, larger ones at posterior end, the exact number has not been illustrated in Figure 1b.
Eyes (Figure 1c) longer than broad; barely reaching end of second segment of antennular peduncle; cornea well pigmented, broader than stalk width; no ocular tubercle present. Antennules sexually dimorphic; in male (Figure 1d), first segment longest; longer than combined length of distal two segments, armed with a few slender setae of unequal lengths at distolateral part; second segment shortest, slightly widened distally; third segment also widened distally; male lobe well armed with numerous fragile setae along median margin and short setae on its distal projection; accessory flagellum with basal thickened part occupying three-fourths of male lobe and armed with four sensory setae on mesiodistal part then continuing to slender flagellum; lateral flagellum slightly thickened at base, armed with several sensory setae on mesiobasal part; in female, peduncle is slightly more slender than that of male, with several long setae at distoventral part of third segment.
Antenna (Figure 1e) with scale extending beyond antennular peduncle in male, narrow and somewhat lanceolate, broad at its base narrowing distally with a suture at distal end, setose all around its margin; in female, slightly longer and extending beyond antennular peduncle by almost whole length of distal lobe of scale. Mandible and maxillulae as illustrated (Figure 1f- h)
Third to eighth thoracopods are similar in shape; exopods with nine to ten segments; endopods with eight to nine segmented carpopopodites; outer setae only partly spiny; a sickle shaped seta present on the para penultimate lash segments of female third endopod only (Figure 1i).
First, second, and fifth pleopods (Figure 1j) of male unsegmented, simple lobe, increasing in length posteriorly. Third pleopod quite thick and bilobed; endopod shorter than exopod, unsegmented; exopod unsegmented, slender, curving near base, with moderately long setae on margins and distally. Fourth pleopod (Figure 1k) bilobed and strongly elongated, sympod broad spiny along inner margin; endopod rudimentary, unsegmented with three short terminal setae; exopod stout and elongated, barely reaching end of sixth abdominal somite except for terminal setae, two segmented, a faint articulation sometimes present near basal part; distal segment shorter than penultimate with one apical spine with 22 to 23 barbs and one outer apical, curved and smooth stout seta. Uropod (Figure 1l) over reaching telson, endopod slightly more than two thirds length of exopod, bearing several setae along lateral and mesial margins.

Remarks
The present Pakistani material of *Mesopodopsis* is only tentatively identified as *M. orientalis*. In a recent report on mysids from Maharashtra and Gujrat, India, by Biju & Panampunnayil (2009) [4], the work of Hanamura *et al*. (2008a) [10] was missed; the re-assessment made by the latter authors is also not included, despite the fact that this reassessment includes Indian material that belonged to the Bay of Bengal and the east Indian coast (Kolkata, Chilka Lake, Chennai, India). Reassessment made by Hanamura *et al*. (2008) [10] revealed that conventionally identified *M. orientalis* comprises two stem lineages, they also reanalysed earlier records of *M. orientalis* from India and Southeastern Asia, the identity of the widely distributed *M. orientalis* was redefined, and a new species, *M. tenuipes* was subsequently proposed on the basis of the further morphological and DNA analyses. Since Pillai's material of 1968 was suggested at variance with the description of type material from Bengal and Hanamura *et al*., (2008) [10] attributed it to *M. tenuipes,* they however ignored Kaliamurthy's (1972) [13] paper on specimens collected from Pulicat Lake. They also suggested that earlier records of *M. orientalis* from India should be reanalysed to rectify confusion with M. zeylanica Nouvel, 1954.

Morphological Variation
Pakistani specimens of *M. orientalis* differ morphologically from previous descriptions in a number of ways. The segments of mandibular palp are more slender in Pakistani material than shown in Hanamura *et al*., 2008 [10] (Figure 4A). According to Tattersall (1908) [25], the third to eighth thoracic endopods have 6-9 carpopodus segments in female and the eighth endopod of males have only five carpopodus segments. Kaliamurthy's (1972) specimens collected from Pulicat Lake, India, have 6-9 carpopodus segments in the thoracic endopods of both sexes. In Biju & Panampunnayil (2009) [4] material there are seven carpopodus segments in the third thoracic endopod, eight segments in fourth to seventh endopods and five to six in eighth endopod in both sexes. The endopods of seventh and eighth thoracopods of our specimens have more (8) and longer segments than those found in Hanamura *et al*. (2008) [10].
The partition of the exopod of the third pleopod of the male is very indistinct in the present specimens unlike in the Hanamura *et al*. (2008a) [10] material of *M. orientalis*. According to Biju & Panampunnayil (2009) [4], the short terminal spine on the exopod of the fourth pleopod of male is provided with16-20 pairs of barbs; in the Pakistani material there are 22 to 23 pairs of barbs.

Biju & Panampunnayil (2009) [4] reported that posterior lobe of the telson has 30 to 36 pairs of spines. In our material the lobe is provided with the largest number i.e. 43- 44 of pairs of spines on its outer margin. The present specimens may prove to be another variation of *M. orientalis*.

Note on ecology

Mesopodopsis orientalis is a euryhaline species with a salinity range of 13–32 ppt. In northwestern Peninsular Malaysia and probably in Thailand, this species usually inhabits shallow coastal waters as well as the lower reaches of rivers, and is occasionally encountered in upper streams of estuarine rivers, coexisting with *M. tenuipes* although the latter usually inhabits inner estuaries or less saline waters compared with *M. orientalis* (Hanamura *et al*., 2008a) [10]. However, this species has been recorded from a wide range of salinity conditions from fresh water to salt pans [5, 10, 12, 13].

Hanamura *et al*., (2008b) [10], noted some differences in the life history features among populations, particularly between coastal and estuarine habitats. Estuarine males normally had a proportionately longer fourth pleopod than those found in coastal areas. On Mahrashtra and Gujrat coasts of India, *Mesopodopsis orientalis* occurs with *Acanthomysis macrops*, Pillai 1973, *Acanthomysis platycauda* (Pillai, 1964), and *Rhopalophthalmus mumbayensis* Panampunnayil & Biju, 2006, collected from 0 to 8 m depth from clay/ silt bottoms at 28.6 °C 33.5 ppt (Biju & Panampunnayil, 2009). The Pakistani material was collected from low salinity waters (7-10 ppt) of Ambro Creek in Sindh province and was mixed with *Indomysis annandalei* Tattersall (*Indomysis nybini* Biju & Panampunnayil, 2010), the most abundant mysid of Pakistan and Bahrain [9] (see Grabe *et al*., 2004) along with *Acetes* spp, *Palaemon semmilinki* and *Lucifer* spp.

Distribution

Known from the western and eastern coasts of India, Bay of Bengal, west coast of Malaysian Peninsula, Gulf of Thailand, and Indonesia. This species also exists in the Philippines [8]. The present new record extends the genus range farther to west and north.

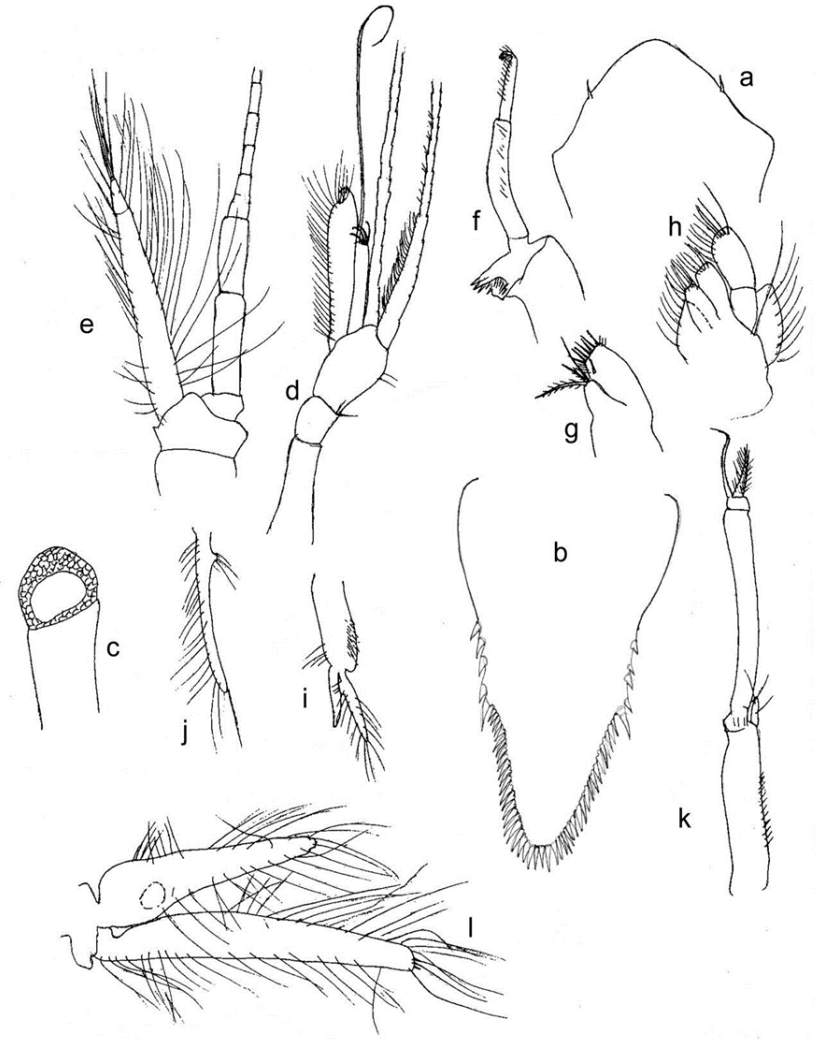

Fig 1: *Mesopodopsis orientalis*. a−rostrum. b−telson. c−eye. d−antennule. e−antenna. f−mandible. g−maxillule. h−maxi lla. i−male third pleopod. j−male fifth pleopod. k−male fourth pleopod. l−uropod

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