

Misidentification in fishery: the case of deep-sea pandalid shrimp *Plesionika spinipes* (Spence Bate, 1888) from Indian waters

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Abstract *Plesionika* (Spence Bate, 1888) is the most species diverse genus in the family Pandalidae and has wide geographic distribution all over the world. *Plesionika spinipes* Spence Bate, 1888 is one of the most important shrimps in the commercial deep-sea shrimp trawl fleet in the southern coast of India. The present study confirms that all previous records of *P. spinipes* in Indian fishery correspond to the closely similar species *P. quasigrandis* Chace, 1985. A table of morphological characters separating both species is provided.

Keywords Deep-sea shrimp; Misidentification; Pandalidae; *Plesionika*; India

Introduction

The genus *Plesionika* Spence Bate, 1888 has wide distribution all over the world and it is one of the most species rich genera in the family Pandalidae with 92 described species (De Grave and Fransen, 2011). The deep-sea habitat of *Plesionika* species makes their distribution more restricted than that of the pelagic shrimps, which contributes to speciation within the genus (Cardoso Irene, 2011). Eleven species of *Plesionika* are reported to occur in Indian waters (Rajool Shanis *et al.*, 2012), most of them are rare in the fishery, except *P. martia* (A. Milne-Edwards, 1883) and the so called *P. spinipes* Spence Bate, 1888. In the deep-sea shrimp fishery of India, *P. spinipes* is one of the most dominant species (Rajool Shanis *et al.*, 2012; Radhika, 2004; Rajan *et al.*, 2001). The *Plesionika narval* (Fabricius, 1787) group consists of fourteen species including *P. spinipes* and the closely related *P. grandis* Doflein, 1902 and *P. quasigrandis* Chace, 1985 (Chan and Crosnier, 1991). The *P. narval* group is characterized by the rostrum being very long and armed with numerous closely set teeth along almost the entire length of both dorsal and ventral sides. The species in this group are very similar morphologically, often causing misidentification. Chan and Crosnier (1991) and Fransen (2006) doubted the validity of *Pandalus (Parapandalus) spinipes* reported by Alcock

(1901) from Kanyakumari and the taxonomic description of the species provided by George and Vedavyasa Rao (1966) from the southwest coast of India and suggested that the species in Indian waters may be *P. grandis* or *P. quasigrandis*. This report provides morphological characters for the three species in question to discuss the identity of *P. spinipes* in Indian waters.

1 Materials and Methods

Samples of *Plesionika* spp. were collected from deep-sea shrimp trawler landings at Kollam and Cochin fisheries harbour (Kerala), Southwest coast of India, Arabian Sea and Tuticorin fisheries harbour (Tamilnadu), Southeast of India, Bay of Bengal (Figure 1). Measurements were taken using a digital caliper to the nearest 0.01 mm and the total length (TL) measured from the tip of rostrum to tip of telson and carapace length (CL) from the orbital margin to the posterior dorsal edge of the carapace. The identification and description of species in the present study are in accordance to Chan and Crosnier (1991) and Chace (1985). Specimens examined in the present study are deposited in the collection of National Bureau of Fish Genetic Resources, Cochin Unit, Cochin, India (NBFGR CH) and Pelagic Fisheries Division in Central Marine Fisheries Research Institute (CMFRI, PFD), Cochin, Kerala, India.

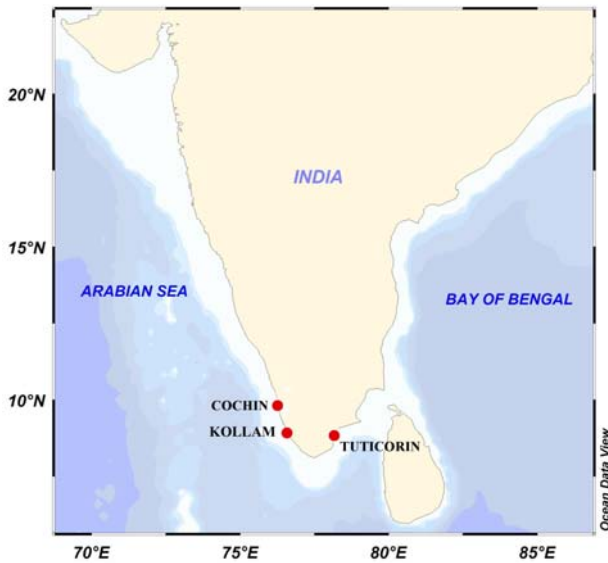


Figure 1 Map of the location of the fisheries harbour where the specimens of *Plesionika quasigrandis* were collected.

Materials examined: *Plesionika quasigrandis*, NBFGR

CH 1142, ovigerous female, CL 22.92 mm, CMFRI PFD CR 133-140, 8 specimens, 5 female, CL 17.2-24.8 mm (3 ovigerous and 2 non-ovigerous) 3 male, CL 18.9-23.2 mm, off Kollam, Kerala coast, India, Arabian Sea, 220-300 m depth, CMFRI PFD CR 141-146, 6 specimens, 4 female, CL 18.3-23.8 mm (3 ovigerous and 1 non-ovigerous) 2 male, CL 119.1-23.6 mm, off Tuticorin, Tamil Nadu coast, India, Bay of Bengal, 200-280 m depth.

2 Results and Discussion

The *Plesionika narval* group is generally considered to be a taxonomically complex species cluster. According to Chan and Crosnier (1991), *P. spinipes*, *P. grandis* and *P. quasigrandis* belongs to the *P. spinipes* subgroup within the *P. narval* group. The species in this subgroup possess the fourth abdominal pleuron pointed. These three species bear great morphological similarity and this led to doubts about the records of *P. spinipes* in India.

Table 1 Comparisons of morphological characters of *Plesionika spinipes*, *P. grandis* and *P. quasigrandis*.

<i>Plesionika spinipes</i> Spence Bate, 1888*	<i>Plesionika grandis</i> Doflein, 1902*	<i>Plesionika quasigrandis</i> Chace, 1985 (Present study)
Rostrum with 46-54 dorsal and 24-36 ventral teeth.	Rostrum with 26-51 dorsal and 19-35 ventral teeth	Rostrum with 40-49 dorsal and 31-40 ventral teeth.
Posterior 10 ventral rostral teeth usually corresponding to dorsal teeth	Posterior 10 ventral rostral teeth usually corresponding to 9-14 dorsal teeth	Posterior 10 ventral rostral teeth corresponding to 6- 8 dorsal teeth
Stylocerite sharply acute and with outer margin not curved upwards	Stylocerite sharply acute and with outer margin not curved upwards.	Stylocerite sharply acute and with outer margin barely curving upward.
Penultimate segment of third maxilliped 1.6-2times longer than terminal segment	Penultimate segment of third maxilliped 1.55-1.85times longer than terminal segment	Penultimate segment of third maxilliped 1.2 -1.4 times longer than terminal segment
Carpus of first pereiopod 0.85-1.05 times as long as carapace	Carpus of first pereiopod 0.9-1 times as long as carapace	Carpus of first pereiopod 0.85-0.90 times as long as carapace
Dactylus of third pereiopod elongated and conical and 1/7-1/13 times as long as propodus	Dactylus of third pereiopod elongated and conical or somewhat paddle shape and 1/4-1/7 times as long as propodus	Dactylus of third pereiopod rather paddle shape and 1/3-1/7 times as long as propodus
Telson 1.1-1.3 times longer than sixth abdominal somite	Telson 1.1-1.4 times longer than sixth abdominal somite	Telson 1.2-1.4 times longer than sixth abdominal somite
Wider longitudinal red strips present on each side of abdomen	Narrow longitudinal red strips on each side of abdomen	No strips on the abdomen

*Source (Chan and Crosnier, 1991)

Plesionika quasigrandis was originally described by Chace (1985) from Philippine waters based on materials from 245-320 m depths. *Plesionika quasigrandis* is nearly similar to *P. grandis* and Chace (1985) observed the variations barely in the number of rostral teeth on ventral part and the proportional length of the distal two segments of third maxilliped (Table 1). The relative spacing of the rostral teeth on the dorsal and ventral borders indicated a clear distinction between the two species (Chan and Crosnier, 1991). In *P. quasigrandis*, the ventral teeth are distinctly more closely packed than those on the dorsal border, while the dorsal teeth are usually more closely set in *P. grandis*.

Plesionika quasigrandis differs from *P. spinipes* in several important characters including morphometry, colour pattern and geographical distribution. The pattern and range of rostral teeth is different in the two species. In *P. spinipes* the range of rostral teeth on the ventral side is between 24-36 and the posterior ten ventral rostral teeth usually corresponds to more than thirteen dorsal teeth, while in *P. quasigrandis* these are 31-40 and eight or less, respectively. The dorsal and ventral rostral teeth count of *P. quasigrandis* in the present study differs from the description provided by Chace (1985), Chan and Crosnier (1991), Hanamura and Evans (1996) and Fransen (2006). A deep notch is present in the distal margin of the endopod of the first male pleopod of *P. spinipes*, which is absent in the same pleopod of *P. quasigrandis*. The important morphological differences among the *P. spinipes*, *P. grandis* and *P. quasigrandis* are given in the Table 1.

The taxonomic position of *P. grandis* has been disputed in relationship to *P. spinipes* (De Man 1920; Chace 1985). However the study conducted by Chan and Crosnier (1991) and Li and Komai (2003) observed that the two types are specifically distinct. The major difference between the two species regards the relative length of the dactylus of third pereiopod and the spacing of the rostral teeth.

The body of *P. quasigrandis* is pale pinkish in color with no stripes on the abdomen (Figure 2), whereas *P. spinipes* has longitudinal stripes on each side of the abdomen. The stripes present in *P. spinipes* are slightly wider than those of *P. grandis* (Figure 21 and 22 in Chan & Crosnier, 1991). The species *P. quasigrandis*



Figure 2 *Plesionika quasigrandis* Chace, 1985, ovigerous female, off Kollam (Arabian Sea), India

and *P. grandis* have a wide distribution in the Indo-west Pacific region. The *P. spinipes* is reported from Eastern Australia, Kai islands, north of New Guinea, New Britain, Chesterfield islands, New Caledonia, Loyal islands and French Polynesia; however its distribution is not extended to Indian waters.

On close examination of the morphological characters and coloration of the specimens collected from southern coast of India during the present study, it is confirmed that the species occurring in Indian waters is *P. quasigrandis* and not *P. spinipes*.

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