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NOTES AND NEWS

ON *PLESIONIKA QUASIGRANDIS* CHACE, 1985 (DECAPODA, CARIDEA, PANDALIDAE) FROM SOUTHWESTERN INDIA

BY

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INTRODUCTION

The recent development of commercial deep-sea fisheries in India has mainly been off the southern coast and is based on shrimps (Rajan et al., 2001; Kurup et al., 2008; Rajool Shanis et al., 2014b). One of the dominant species in these catches is a pandalid shrimp previously reported as "*Parapandalus* (or *Plesionika*) *spinipes*" (e.g., Suseelan & Mohamed, 1968; Suseelan, 1974; Rajan et al., 2001; Kurup et al., 2008; Rajool Shanis et al., 2012; with the genus *Parapandalus* Borradaile, 1899 now generally synonymized with *Plesionika* Bate, 1888 (see Chace, 1985; De Grave & Fransen, 2011). Rajool Shanis et al. (2014a, b) later showed that this name was a misidentification of *Plesionika quasigrandis* Chace, 1985, which has the ventral rostral teeth more densely packed as opposed to *P. spinipes*, where the dorsal rostral teeth are more densely packed (see Chace, 1985; Chan & Crosnier, 1991). Although *P. quasigrandis* is one of the most important deep-sea shrimps in India from a commercial point of view, no proper taxonomic account has been given for the Indian material. The present study provides detailed taxonomic information of *P. quasigrandis* from India, together with molecular barcoding data.

MATERIAL AND METHODS

Plesionika quasigrandis material was collected from Sakthikulangara fishing port (fishing off Ponnani 8°56′60.78″N 76°32′34.27″E), City of Kollam, Kerala,

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and Kalamukku fishing port (fishing off Cochin 9°59′02.91″N 76°14′33.14″E), City of Cochin, Kerala, during 2013-2014 by trawling at depths of 200-300 m. Voucher specimens, preserved in ethanol, are deposited at the Marine Biodiversity Referral Museum, Central Marine Fisheries Research Institute (CMFRI), Cochin, India. Synonymies provided are restricted to key taxonomic and local reports. The carapace length (CL) measurement refers to the dorsal distance between the posterior margin of the orbit to the posterior margin of the carapace.

Molecular sequences of the samples were retrieved by extracting total genomic DNA from the pleopods using the DNeasy® Blood & Tissue Kit (Qiagen, Valencia, CA, U.S.A.) according to the manufacturer's protocol with some modifications. The mitochondrial markers (16S rDNA and COI) were amplified using universal primers (Palumbi et al., 1991; Folmer et al., 1994). The nuclear gene marker PEPCK was amplified using universal primers (Tsang et al., 2008). Analysis of more than one genetic marker can help to avoid misleading results from the possible presence of nuclear mitochondrial pseudogenes (numts, Song et al., 2008). The gene sequences obtained were deposited in GenBank (accession nos: COI, KJ401314, KM096444-KM096463, KF938650; 16S, KJ380892, KM057395-KM057414; PEPCK, KJ380893).

As DNA barcoding identification mainly employs the genetic marker COI (e.g., Hajibabaei et al., 2007), all COI sequences of *Plesionika* >554 bp available in the GenBank as well as topotypic (Philippines) *P. quasigrandis* and the closely related species *P. grandis* Doflein, 1902, were included in constructing a Bayesian inference (BI) phylogenetic tree. Topotypic Philippines *P. quasigrandis* material used was recently collected from the "PANGLAO 2005" deep-sea expedition (Li & Chan, 2013, GenBank accession nos. KR819887, KR819888) and deposited at the NTOU. *Plesionika grandis* material used was sampled from Taiwan and also deposited at the NTOU (GenBank no. KR819889). Phylogenetic tree construction follows the methods used in the most recent barcoding identification of *Plesionika* species by Landeira et al. (2014).

SYSTEMATIC ACCOUNT

Plesionika quasigrandis Chace, 1985
(fig. 1)

Pandalus (*Parapandalus*) *spinipes* — Alcock, 1901: 100. [**non** Bate, 1888]

Parapandalus spinipes — George & Rao, 1966: 330; Suseelan, 1974, fig. 2, *Parapandalus spinipes*. [**non** Bate, 1888]

Plesionika quasigrandis Chace, 1985: 104: figs. 47-48 (type locality: Philippines); Chan & Crosnier, 1991: 421, figs. 2b, 3c-d; De Grave & Fransen, 2011: 450; Li & Chan, 2013: 147, fig. 3G; Rajool Shanis et al., 2014a: 2, fig. 2.

Plesionika spinipes — Rajan et al., 2001: 7, unnumbered photograph; Rajool Shanis et al., 2012, tables 1, 2 (list). [**non** Bate, 1888]

Material examined.— India, Kerala, Sakthikulangara fishing port, City of Kollam, fishing off 8°56′60.78″N 76°32′34.27″E, 250-300 m, 2 Feb. 2014, 3 males CL 18-20 mm, 7 ovigerous females CL 19-24 mm (CMFRI); Kalamukku fishing port, City of Cochin, fishing off Cochin 9°59′02.91″N 76°14′33.14″E, 200-300 m, 2 Feb. 2014, 1 ovigerous female CL 20 mm (CMFRI).

Description.— Body size moderately large for the genus. Rostrum 1.1-1.5 times as long as carapace, densely armed with abutting fixed teeth along almost entire dorsal and ventral margins; bearing 38-53 dorsal (including 4-7 teeth on carapace) and 31-44 ventral teeth; posterior 10 ventral teeth corresponding to 5.5-8 dorsal teeth. Eye with cornea wider than long and with distinct ocellus. Orbital margin regularly concave. Antennal spine stronger than pterygostomian spine. Stylocerite sharply acute and with outer margin barely curving upward. Scaphocerite 0.7-0.9 times as long as carapace. Maxilliped III without epipod, overreaching scaphocerite by terminal segment and little penultimate segment; penultimate segment 1.2-1.4 times as long as terminal segment, 2 segments combined more or less as long as carapace. Pereiopods without epipods. Pereiopod I overreaching scaphocerite by chela and about 1/3 of carpus, carpus 0.8-0.9 times as long as carapace. Pereiopod II subequal, carpus composed of 21-22 articles. Pereiopods III-V very far overreaching scaphocerite. Dactylus of pereiopod III somewhat paddle-shaped and 1/3-1/7 times as long as propodus, with minute accessory distal spine. Abdomen with somite III posteriorly unarmed, without median dorsal carina; pleura IV and V with acute ventral denticle; somite VI 1.7-1.8 times longer than somite V. Telson 1.2-1.4 times longer than abdominal somite VI, armed with 3 pairs of dorsolateral spines and 3 pairs of terminal spines.

Coloration.— Overall pale pinkish red. Eggs light blue.

Distribution.— Indo-West Pacific from Japan to the Philippines, Indonesia, Australia, India and Gulf of Aden; at depths of 164-501 m. In India known from the southwest coast, Cape Comorin, Gulf of India and Gulf of Mannar.

Remarks.— *Plesionika quasigrandis* is the dominant species among the deep sea shrimps landed in Kerala state. The Indian material examined (fig. 1) generally agrees well with the description of this species provided by Chace (1985) and Chan & Crosnier (1991), based mainly on the material from its type locality in the Philippines. The available COI sequences of *Plesionika* showed that the Indian material forms a robust monophyletic clade with topotypic *P. quasigrandis* specimens (fig. 2). Nevertheless, there is 5.8-8.4% COI sequence divergence between the Indian and Philippines specimens, as compared to 0-2.6% divergence amongst the 22 Indian specimens sequenced and 0% divergence in the two Philippines specimens sequenced. While this suggests that we may be dealing with a cryptic species, the large genetic divergence between the Indian and Philippines

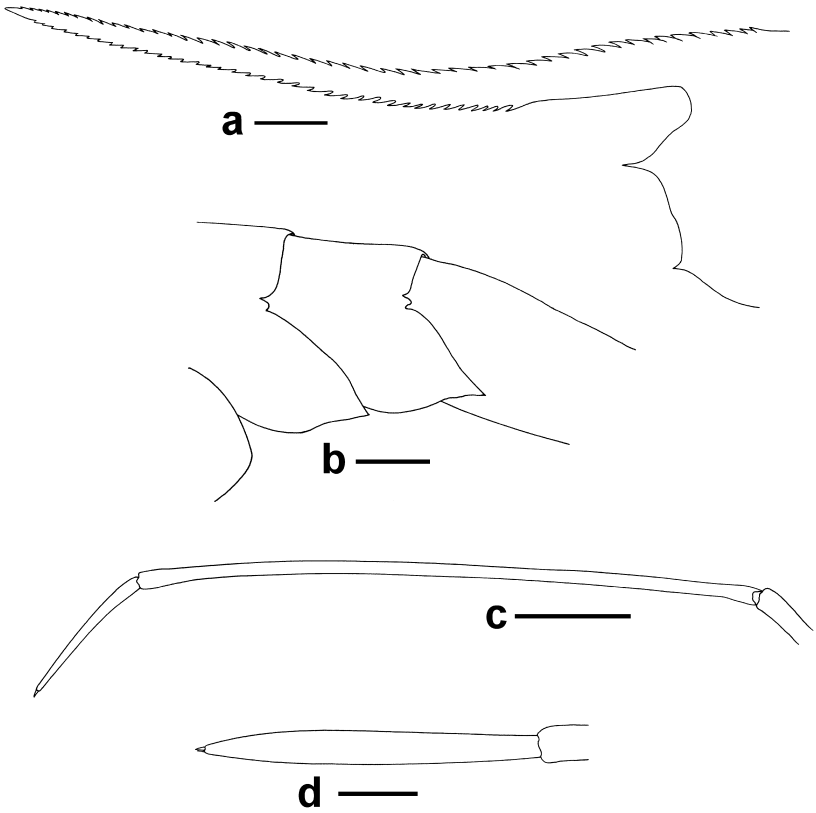

Fig. 1. *Plesionika quasigrandis* Chace, 1985, from Kalamukku fishing port, India, ovigerous female, CL 20 mm (CMFRI): a, rostrum and anterior carapace, lateral; b, abdominal pleura IV and V, lateral; c, left pereiopod III, propodus and dactylus, lateral; d, dactylus of left pereiopod III, ventral. Scale bars: a-c = 3 mm, d = 1 mm.

populations is not accompanied by any noted morphological differences, including coloration. *Plesionika quasigrandis* is characterized by having a rather uniform pinkish red coloration without particular stripes or markings on the body, equal for the Indian and Philippines material (see Li & Chan, 2013, fig. 2G; Rajool Shanis et al., 2014a, fig. 2). Although a COI sequence divergence higher than 3% has been generally considered as representing a different species in crustaceans (e.g., Chan et al., 2009; Radulovici et al., 2009), species delimitation using COI data alone is still rather controversial for *Plesionika* (see Zuccon et al., 2012; Matzen da Silva et al., 2013), mainly because this is a very large genus (at present containing 93 species: De Grave & Fransen, 2011; Komai & Tsuchida, 2014), with many species complexes that include widely distributed but closely related species (see Chan & Crosnier, 1991, 1997; Chan, 2004). More studies on the connectivity between the Indian and Philippine populations, preferably with material from intermediate

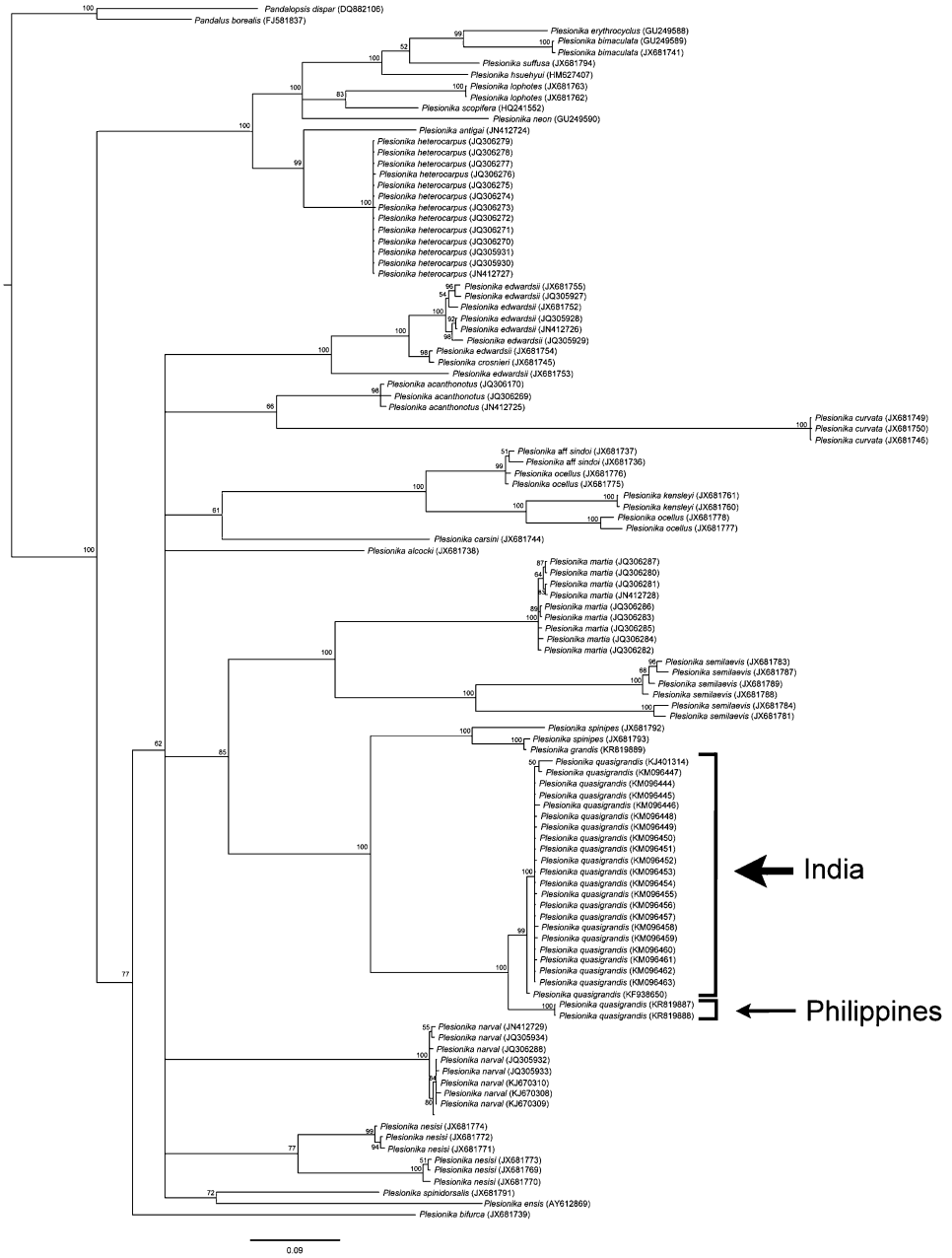

Fig. 2. Bayesian phylogenetic tree from partial sequences (554-657 bp) of COI gene amongst available *Plesionika* species downloaded from GenBank and generated in the present work. Posterior probability estimated by Bayesian inference shown on branches. *Plesionika quasigrandis* Chace, 1985 specimens are indicated with an arrow.

localities, will be necessary to fully evaluate the taxonomic implications of the present genetic data.

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