

## Taxonomy and Distributional Range Extension for *Helleropenaeopsis Hardwickii* Miers, 1878 in Indian Water

Angsuman Chanda

PG Department of Zoology, Raja N. L. Khan Women's College, Midnapur, Paschim Medinipur, West Bengal, India

### Abstract

Present study reveals that the taxonomic status of the prawn *Helleropenaeopsis hardwickii* has been changed due to revision of the genus by Chanda from Indian water. Previously the species was under *Parapenaeopsis* which was heterogeneous as mentioned by Jalhial and Pathan as well as Perez Farfante and Kensley in their recent literature. The species has been described from Maharashtra coast. Still date from Miers, all Indian workers reported the species from Maharashtra, Keralla, Tamilnadu, Andhra Pradesh and Odisha coast that is the species was restricted in the lower reaches of both the Indian coasts. During the present study the species has been recorded from Andhra Pradesh, Tamil Nadu and Gujarat coast. As such present study extends the distribution of the species through Indian coastal water up to Gujarat.

### Introduction

Among a variety of edible decapods crustaceans, prawns contribute largely to the fishery wealth of many nations. Exploitation of prawn resource from the seas around each country is playing increasingly significant role in furthering their national economy [1-4]. In recent years, in spite of some ecological hazards, the demand for prawns and prawn products has increased so much that every country is making efforts to utilize hitherto unknown but usable stocks and expansion of prawn fisheries and industries near coast line is rightly being given the maximum encouragement in the development programme of each nation. In India, with the introduction of mechanization and due to the development of efficient export industries, prawn fishery has substantially improved during last three decades. The foreign exchange earnings by export of prawns and prawn products from the country have grown up considerably. In short, as in every prawn fisheries together with all the segments of the industry concerned with prawn products export are playing increasingly prominent role in the economy of the country. Given this economic significance and the fact that penaeid prawns occur in a wide variety of shallow-water marine, estuarine and back water habitats, knowledge on the ecology, feeding, reproduction, lifecycle, fecundity, prey predator relationship, behavior, population dynamics and fisheries potentials have vastly increased over the last three decades [5-9]. The knowledge of the systematics of prawns is an essential prerequisite for their wise management and exploitation. Earliest contribution on the penaeid prawn from Indian water was by Fabricius [10]. Some important contributions on the prawns of this region during nineteenth century were by Milne Edwards [11], Miers [12], Bate [13], Wood-Mason [14], Wood-Mason and Alcock [15] and Alcock and Anderson [16,17]. Alcock [7,18,19] and George [20] was the taxonomist of 20th century who tried to make a comprehensive study on the penaeid taxonomy. Beside these there are so many taxonomic works on the group like by Fischer and Bianchi [21], Paulinose [22], Achuthankutty and Parulekar [23], Reddy [24], Pathan and Jalihal [25], Chanda and

Bhattacharya [26-30], Chanda and Roy [31,32], Chanda [33-35], Kunju [36], Kurian and Sebastean [37], Radhakrishnan et al. [38], etc. has been reported from region.

In spite of these work, there are some lacuna on the penaeid systematics and distribution of Indian region. So, present work is an attempt to fill up one of such lacuna found by the author on distribution of *Helleropenaeopsis hardwickii* (Miers, 1878). The species was previously recorded only from middle of both east and west coast of India to Kanyakumarica by the above mentioned scientists working in Indian regions. Present work is the distributional range extension of the species from Odisha, Andhra Pradesh, Tamilnadu, Maharastra to Gujarat coast and this report will certainly enrich our knowledge on the diversity of penaeid prawn in Indian coast.

### Materials and Methods

Present study is mainly based on the specimens collected by the author from different fish landing centres through Indian coast line and the specimen preserved in the National Collection of the Zoological Survey of India, Kolkata, West Bengal, India.

The materials preserved in rectified spirit (90%) and body parts of taxonomic importance have been dissected and studied under a stereoscopic binocular microscope, if necessary. The detailed synonymies have been furnished to the species and also their diagnosis, distribution, taxonomic remarks have been furnished. In addition an attempt has been made to consult and cite an up to date literature and included in the Reference Section. For all citations of taxon, author's name and year of publication has been given.

### Systematics account

Subphylum: Crustacea Brunnich, 1772

Class: Malacostraca Latreille, 1802

Subclass: Eumalacostraca Grobben, 1892

Superorder: Eucarida Calman, 1904

Order: Decapoda Latreille, 1802

Suborder: Dendrobranchiata Bate, 1888.

Super family: Penaeioidea Rafinesque-Schmaltz, 1815.

Family : Penaeidae Rafinesque – Schmaltz, 1815.

### **Helleropenaeopsis hardwickii (Miers, 1878)**

*H. hardwickii* was originally described as *Penaeus hardwickii* by Miers (1878) from Maharastra coast, Arabian Sea. A brief history of the species with special reference to Indian contributions has been given below.

1878 *Penaeus hardwickii* Miers, Proc. Zool. Soc. London, 1878: 298-310.

1906 *Parapeneopsis sculptilis hardwickii* Alcock Cat. Indian Deca. Crust. Part III Mac. Fas. I: 1-55.

1934 *Parapeneopsis hardwickii* Burkenroad, Bull. Bingham. Oceanogr. Coll., 4(7): 1-109; Hall, 1961, Bull. Raffles Mus. No. 26: 76-119; 1962, Fish. Publ. Colonial Off. London, 17: 1-229.

1949 *Parapeneopsis hardwickii* Kubo, J. Tokyo Coll. Fish., 36(1): 1-467; Cheung, 1960, Hong Kong Univ. Fish. J., 3 : 61-69; Kunju, 1960, J. mar. biol. Ass. India, 2 (1): 127-129; George, 1969, Bull. Cent. Mar. Fish. Res. Inst., 14: 5-

48; 1979, Contribution to marine science dedicated to Dr. C.V. Kurian, 21-59, Muthu, 1971, Indian J. Fish., 15 : 145-154; Johnson, 1976, J. mar. biol. Ass. India, 18(1): 1-54; George & Suseelan, 1982, Proc. Symp. Coast. Aquacul., 1 : 273-284.

2016 *Helleropenaeopsis hardwickii* Chanda, Poult Fish Wildl Sci 4: 147. doi:10.4172/2375-446X.1000147.

**Type species:** *Penaeus hardwickii* Miers, 1878. Proc. Zool. Soc. London, 1878: 298-310.

**Type Locality:** Maharashtra coast, Arabian sea, India.

**Material Examined:**

1 male (60 mm.) and 4 females (60-100 mm.), ZSI. Reg. No. C4834/2, Lawsem's Bay Visakhapatnam, Andhra Pradesh, 14.9.1995, A. Chanda; 1 male (78 mm.), ZSI. Reg. No. C4775/2, Ratnagiri, Maharashtra, 23.4.1983, H.C. Ghosh and Party; 1 male (60 mm.) and 5 females (60 – 100 mm.), ZSI. Reg. No. C4832/2, Ramakrishna Beach, Visakhapatnam, Andhra Pradesh, 15.9.1995, A. Chanda; 3 males (60-95 mm.) and 3 females (62-101 mm.), ZSI. Reg. No. C4938/2, Dwarka F.L.C. Gujarat, 14.3.1994, P.K. Moorthy.

**Diagnosis of the species:**

Body minutely setose; rostrum sexually dimorphic, with 8-9+1 dorsal teeth, sigmoidal in female, distal half toothless, upcurved, extending beyond antennular peduncle, in male rostrum slightly down curved, not extending beyond antennular peduncle; adrostral carina ending between epigastric and penultimate rostral tooth, sulcus below epigastric tooth; epigastric tooth conspicuously separated from penultimate tooth; postrostral carina extending upto posterior border of carapace; orbital spine very minute, hepatic and antennal spine prominent, antennal carina very short, cervical sulcus distinct, ending below longitudinal suture, hepatic sulcus slopes anteroventrally towards pterygostomian angle, carina accompanied with sulcus below the level of hepatic spine, pterygostomian angle rounded, longitudinal suture extend upto gastric region posteriorly, transverse suture at the level of third pereopod, branchiocardiac carina indistinguishable; dorsal carina on abdominal somite starts from third somite, ends at posterior margin of sixth somite with a sharp spine; three cicatrices present on sixth somite; telson armed with 3-5 pairs of lateral movable spine; antennular flagella equal in length in both sexes; epipod and basal spine present on first and second pereopod, basis of third pereopod unarmed; distomedian projections of median lobe of petasma wing like, as long as broad, just above lateral lobe, anterior margin crenulated, distolateral projection of lateral lobe of petasma with tapering tip below distomedian projection; anterior plate of thelycum concave ventrally, anterior margin rounded, broader than long; posterior plate flat, with a pair of anterolateral tooth like projection, anteromedian margin convex, bearing a transverse row of long hairs.

**Distribution:**

India: Gujarat, Maharashtra, Goa, West coast and Ganjam, Orissa; Andhra Pradesh; Chennai, Pondicherry, East coast.

Elsewhere: Bangladesh; Pakistan; Malaysia; Singapore; Borneo, Gulf of Tonkin; South China sea; Taiwan; Japan.

**Conclusion:**

This species is being recorded for the first time from Gujarat coast and thus extends the distributions northwards in the Western coast and certainly improve our knowledge about the macro-faunal diversity of Indian coastal water.

### **Acknowledgements:**

Author is thankful to the Director, Zoological Survey of India for awarding a research fellowship during which the study has been done. Author is also thankful to Professor Tanmay Bhattacharya, Ex-Emeritus Professor of Zoology, Dept. of Zoology, Vidyasagar University, Midnapur, Paschim Medinipur, West Bengal for his valuable advice and guidance during the preparation of manuscript.

### **References:**

1. Kubo I (1949) Studies on penaeids of Japanese and its adjacent waters. Tokyo College of Fisheries 36: 1-467.
2. Stimpson W (1858) Prodrômus descriptionis animalium evertibratorum quae in expeditione ad oceanum pacificum sententrionalem a republica federata missa, cadwaladaro ringgold et Johanne Rodgers Ducibus observavit et descripsit. Proceedings of the Academy of Natural Sciences of Philadelphia 9: 216-221.
3. Holthuis LB (1955b) Crustacea Decapodes Macrures. Result Sci Exped Oceanogr Belge Atl Sud 3: 1-88.
4. Starobogatov YI (1972). Peneid (sem Peneidae Crustacea Decapoda) Tonkinskogo Zaliva Penaeidae (Crustacea Decapoda) of Tonking Gulf. Explor Fauna Seas 10: 359-415.
5. Holthuis LB (1980) FAO species catalogue vol1 shrimps and prawns of the world. FAO Fisheries Synopsis 1: 1-271.
6. Burkenroad MD (1983) Natural classification of Dendrobranchiata, with a key to recent genera. Crustacean Phylogeny 1: 279-290.
7. Alcock A (1905) A revision of the "Genus" Peneus with diagnoses of some new species and varieties. Annals and Magazine of Natural History 16: 508-532.
8. Hayashi KI (1992) Dendrobranchiata crustaceans from Japanese waters. Tokyo Seibutsu Kenkyusha 1: 1- 300.
9. Farfante IP, Kensley B (1997) Penaeoid and sergestoid shrimps and prawns of the world. Keys and diagnoses for the families and genera. Memoires du Museum National d'Histoire Naturel 175: 1-233.
10. Fabricius JC (1798) Supplementum Entomologiae systematicae: (Hafniae, apud Proft et Storch).
11. Milne Edwards, H (1834). Histoire naturelle des crustacés comprenant l'anatomie la physiologie et la classification de ces animaux: (Librairie encyclopédique de Roret), Paris.
12. Miers EJ (1878). Notes on the penaeidae in the collection of the British Museum with descriptions of some new species. Proceedings of the Zoological Society of London 1878: 289- 310.
13. Bate CS (1888) Report on the crustacea macrura collected by H.M.S. challenger during the years 1873-1876. Report Scientific Results Voyage Challenger 24: 1-942.

14. Wood-Mason J (1891) Natural history notes from H.M. Marine Surveying Steamer 'Investigator'. Ann Mag nat Hist 13: 321-334.
15. Wood-Mason J, Alcock A (1891) Natural history notes from H.M. Indian marine survey steamer 'Investigator' commander RF Hoskyn RN commanding No 21 note on the results of the last season's deep-sea dredging. Ann Mag nat Hist 7: 1-19.
16. Alcock A, Anderson AR (1894) Natural history notes from H.M. Indian marine survey steamer 'Investigator', commander CF Oldham RN commanding series 11 No 14 an account of the recent collection of deep-sea crustacea from the Bay of Bengal and Laccadive Sea. J Asi Soc Bengal 63: 141-185.
17. Alcock A, Anderson AR (1899) Natural history notes from H.M. Royal Indian marine survey ship 'Investigator' commander TH Heming RN commanding series III No 2 an account of the deep-sea crustacea dredged during the surveying-season of 1897-98. Ann Mag nat Hist 7: 278-292.
18. Alcock A (1901) A descriptive catalogue of the Indian deep-sea Crustacea Decapoda Macrura and Anomala, in the Indian Museum.
19. Alcock A (1905) Catalogue of the Indian Decapod Crustacea in the collection of the Indian Museum part III Macrura. Fasciculus I the prawns of the penaeus group. Indian Museum 19: 127-127.
20. George MJ (1979) Taxonomy of Indian prawns (Crustacea, Decapoda, Penaeidae) "in contribution to Marine Science" dedicated to Dr. C.V. Kurian: 21-59.
21. Fischer W, Bianchi G (1983) FAO Identification Sheets for Fishing Purposes. Western Indian Ocean Fishing 5.
22. Paulinose VT (1986) Larval and postlarval stages of *Atypopenaeus* Alcock (Decapoda, Penaeidae, Penaeinae) from Indian Ocean Mahasagar. Bull Nat Inst Oceanogr 19: 257-264.
23. Achuthankutty CT, Parulekar AH (1986) Growth of penaeid prawns in Goa waters. Indian J mar Sci 15: 117-120.
24. Reddy KN (1995) Estuarine Ecosystem Series, Part 2: Hugli Matla Estuary. (Zool Surv) India.
25. Pathan DI, Jalihal DR (1997) Proposed taxonomic revision of some important penaeid prawn genera (Crustacea, Decapoda) of Konkan coast (west coast of India). J Bombay Nat Hist Soc 94: 496-514.
26. Chanda A, Bhattacharya T (2002) *Melicertus similis* a new species of prawn Decapoda Penaeidae from India. J B Nat Hist Society 99: 495-498.
27. Chanda A, Bhattacharya T (2003) *Fenneropenaeus Konkani* a new species of prawn (Decapoda: Penaeidae) from Indian Coast. Sci and Cult 69: 229-230.
28. Chanda A, Bhattacharya T (2004) A new species of the genus *Parapenaeopsis* Alcock 1901 (Penaeoidea: Penaeidae) from Orissa. India Proc Zool Soc Calcutta 57: 23-27.

29. Chanda A, Bhattacharya T (2009) Zoogeographic Distribution of Indian penaeidae proscidings of the International seminar on modern trends in biological sciences. (Raja N.L.Khan Women College Midnapore WB), India.
30. Chanda A, Bhattacharya T (2014) A systematic study on Indian records of *Atypopenaeus* Alcock 1905 with special reference to extended distribution of *Atypopenaeus stenodactylus* (Stimpson, 1860). *Int J Sc Tech* 2: 11-14.
31. Chanda A, Roy T (2004) Prawns of Gujarat Coast. *Zool Surv India State Fauna Series 8 Fauna of Gujarat* 211-218.
32. Chanda A, Roy T (2005) CRUSTACEA DECAPODA PANAEOIDEA. *Zool Surv India State Fauna Series 5 Fauna of Andhra Pradesh* 5: 537-550.
33. Chanda A (2014a) First Record of Two Australian Species One under *Metapenaeopsis* and Another under *Metapenaeus* from Indian Water their diagnosis and distribution. *J Ento Zoo Studies* 2: 18-20.
34. Chanda A (2014c) Revision to the diagnostic characters of *Trachypenaeopsis minicoyensis* Thomas1972. *Int J Sc Tech Res* 3: 369-370.
35. Chanda A (20115) A study on the Indian records of the species under genus *Megokris* Perez Farfante & Kensley 1997. *International Journal of Current Research* 7: 14920-14923.
36. Kunju MM (1967) Observations on the prawn fisheries of Maharashtra coast. *Proc Symp Crustacea* 4: 1382-1397.
37. Kurian, Sebastian (1993) Prawns and Prawn Fisheries of India. Hindustan publishing corporation, Delhi, India , pp. 1-280.
38. Radhakrishnan E. V. et al. (2012).Prawn fauna (Crustacea: Decapoda) of India - An annotated checklist of the Penaeoid, Sergestoid, Stenopodid and Caridean prawns. *J. Mar. Biol. Ass. India*, 54 (1), 50-72.
39. Perez Farfante, I. & B. Kensley, 1997. Penaeoid and sergestoid shrimps and prawns of the world. Keys and diagnoses for the families and genera. *Mm. Mus. Natn. Hist. nat.*, 175: 1-233.
40. Maa, K. Y., Chan, T.Y. & Chu, K.H. 2011. Refuting the six-genus classification of *Penaeus* s.l. (Dendrobranchiata, Penaeidae): a combined analysis of mitochondrial and nuclear genes. *Zoologica Scripta* (Online 20 July, 2011).
41. Kagwade, P.V. 1967. Prawn catches by mechanised vessels in the trawling grounds of Bombay and Saurashtra. *Proc. Symp. Crustacea, Mar. biol. Ass. India*, 4: 1348-1381.