

**PODOPHTHALMUS VIGIL (CRUSTACEA: BRACHYURA: PORTUNIDAE), A NEW
RECORD OF MARINE CRAB IN BANGLADESH**

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This study describes the long-eyed swimming crab, also known as the sentinel crab, *Podophthalmus vigil* Fabricius 1798, on the basis of three specimens collected in February 2018 from a location 45 km off the coast of Khulna Sundarbans at northern Bay of Bengal. External characteristics were examined, and photographs and illustration of the species are provided. *P. vigil* is the first representative of the genus *Podophthalmus* from Bangladesh.

An early study on the brachyuran crab diversity along the coasts of Cox's Bazar, and Moheshkhali, Sonadia, Kutubdia islands reported 10 crab species belonging to families Calappidae, Leucosiidae and Portunidae (Chowdhury and Hafizuddin 1991). Later, Siddiqui and Zafar (2002) described 15 species of crabs in five families, i.e. Grapsidae, Leucosiidae, Ocypodidae, Portunidae and Potamonidae (= Potamidae; Ng and Rodriguez 1995) from the Chakaria Sundarban mangrove forests, of which the family Potamidae includes non-marine species. IUCN Bangladesh (2015) documented 34 species of marine crabs under nine families, i.e. Calappidae with a new record of *Calappa bilineata* Ng, Lai and Aungtonya 2002 (Akash and Hossain 2017), Daldorfiidae (accepted as Parthenopidae; IRMNG 2019), Dotillidae, Grapsidae, Leucosiidae, Matutidae, Ocypodidae, Portunidae and Sesarmidae. Recently, one species of fiddler crab *Uca (Austruca) Bengali* (accepted as *Austruca bengali* Crane 1975; WoRMS 2019a) belonging to the family Ocypodidae and one species of buckler crab *Cryptopodia angulata* H. Milne Edwards and Lucas 1841 belonging to the family Parthenopidae were described (Akash and Chowdhury 2017, Sharifuzzaman *et al.* 2018). These numbers in comparison with the global diversity of ~6800 species (93 families) of

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brachyurans (Ng *et al.* 2008) and 226 species (39 families) of marine crabs of the west coast of India (Roy 2013) suggest that carcinological fauna (i.e. crabs and other crustaceans) of Bangladesh did receive little attention. We describe herein *Podophthalmus vigil*, for the first time, from Bangladesh. Previously, in a conference abstract, Sabbir *et al.* (2017) tentatively reported *P. vigil* based on the analysis of a cheliped collected from beach seine net operating at the St. Martin's Island. The present study confirms the taxonomic identification of *P. vigil* and its presence in Bangladesh marine water.

Specimens of the long-eyed swimming crab were collected in February 2018 during demersal survey cruise of 'RV Meen Sandhani' operated by the Department of Fisheries, Government of Bangladesh. Using bottom trawl net of 40 mm mesh at cod end, the crabs were caught from a location 45 km off the Sundarbans coast and on the west bank of the submarine canyon Swatch-of-no-Ground at the geographic location 21.29058°N, 89.33883°E (21°17'26.09"N, 89°20'19.79"E) (Fig. 1). One of three specimens did not have the chelipeds and used for photographic purpose only. Temperature and salinity of the location were measured by a CTD (conductivity, temperature and depth)-profiler. The crabs were photographed, one while still alive and the other two after preservation. The voucher specimens were preserved in 10% formalin followed by 70% ethanol and subsequently deposited in the museum of Institute of Marine Sciences, University of Chittagong. Identification followed the taxonomic key of Ng (1998), Poore (2004) and Naderloo (2017). The crabs were measured with the help of a vernier caliper to the nearest 0.1 millimeter (mm) and morphometric features are provided in Table 1.

Systematics:

Order: Decapoda (Latreille 1802)

Infraorder: Brachyura (Linnaeus 1758)

Family: Portunidae (Rafinesque 1815)

Genus: *Podophthalmus* (Lamarck 1801)

Species: *Podophthalmus vigil* (Fabricius 1798)

(Fig. 2A, B, C, D)

Material examined: Two specimens were examined. One male, carapace length and width: 20.5 by 47.5 mm; one female, carapace length and width: 36 by 85.7 mm (Table 1); 21.29058°N, 89.33883°E, the coast of Khulna Sundarbans at northern Bay of Bengal (Bangladesh), February 2018.

Table 1. The morphometric features of Podophthalmus vigil

Character	Male	Female
Carapace width	47.5	85.7
Carapace length	20.5	36.0
Frontal width	0.9	3.0
Abdomen width	13.2	25.9
Abdomen length	15.0	32.2
Sternum width	21.6	37.0
Orbit length	21.7	43.4
Telson length	3.0	6.0
Chela length	28.6	53.8
Dactyl length	12.5	22.7
Merus length	21.9	41.1
1st walking leg length	41.3	70.0
2nd walking leg length	44.7	77.0
3rd walking leg length	41.0	68.0
Swimming leg length	25.8	47.0
Wet weight	8.3	37.9
No. of lateral spine on each side	2	2

The length and width are expressed in millimeter (mm), and the weight is expressed in gram (g)

Description: The long-eyed swimming crab or the sentinel crab is easily identified by its extremely long eyestalks, reaching to lateral edge of carapace that bears two anterolateral spines, the second being much smaller than the first. The carapace is uneven dorsally and distinctly wider than long, where the anterior much broader compared to the posterior margin. The merus bears 3–4 spines on anterior and 2 on posterior border. Chelipeds are unequal, right one slightly heavier than left. The propodus and dactylus of the last pair of walking legs are flattened, paddle-like. The colour of the dorsal surface greenish-dark gray, gradually paling toward the posterior end; ventral side white; eyeball white and eyestalk translucent white; walking legs yellowish-white at the base, gradually turning purple to crimson toward the tip; swimming leg semi-transparent, no distinct pattern on them, brownish-opaque around the edges.

Habitat: Marine, at water depths of 18 m and found to live on muddy areas of the southwest coast of Bangladesh at northern Bay of Bengal (Fig.1). The water temperature and salinity were 25.4°C and 20.94‰ near the bottom, and 26.2°C and 19.18‰ at the top of the water column, respectively.

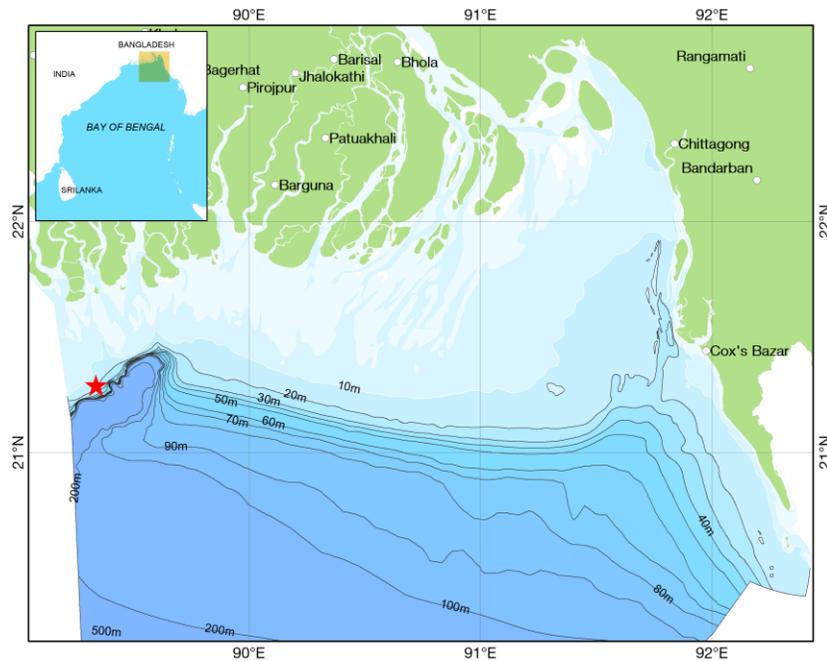


Fig. 1. The sampling location (★) of *Podophthalmus vigil* in the northern Bay of Bengal, Bangladesh.

Remarks: Worldwide *P. vigil* is the only member of the genus *Podophthalmus* (WoRMS 2019b). This study thus extends the geographical distribution of *P. vigil* by reporting it from the northern Bay of Bengal. *P. vigil* inhabits sandy to muddy bottoms in offshore marine waters, 10–70 m water depth (Ng 1998, Naderloo 2017), and distributed in the Red Sea, Persian Gulf, Gulf of Oman and Indian Ocean. The geographical locations include Australia, Cambodia, China, Hawaii, India, Indonesia, Iran, Japan, Malaysia, Mauritius, Philippines, South Africa, Thailand and UAE (Ng 1998, Poore 2004, Naderloo 2017). *P. vigil* is a commercially lucrative fishery species, but irregularly caught by offshore trawlers and in small numbers (Ng 1998). The carapace width of *P. vigil* at which 50% of the individuals attain sexual maturity was reported to be 11.5 cm for male and 9.5 cm for female, with fecundity $312,614 \pm 89,835$ eggs (Ikhwanuddin et al. 2015). Peak spawning of *P. vigil* takes place in October and January along the Indian coast (Subramanian 2001). Morphologically *P. vigil* shows some degree of similarity with its previously known congener *P. nacreus* Alcock 1899 (now *Vojmirophthalmus nacreus* Alcock 1899; WoRMS 2019b), but can be easily distinguished by having eyestalks up to the large lateral spine of carapace (vs. eyestalks reach to beyond the large lateral spine of carapace in *P. nacreus*) and by a much broadened carapace (vs. less broadened carapace in *P. nacreus*) (Fig. 2D, F). However, *P. nacreus* is not known to occur in Bangladesh.

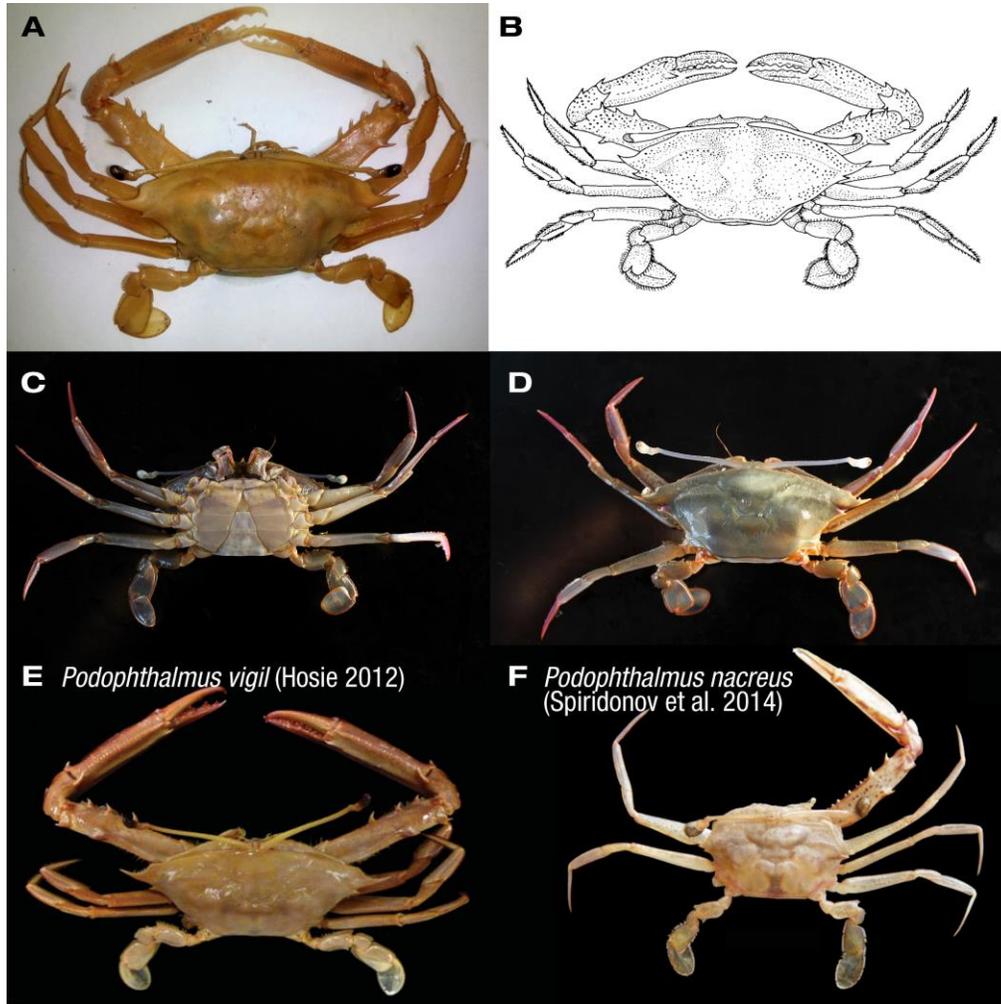


Fig. 2. *Podophthalmus vigil* – (A) formalin-preserved specimen, dorsal view (female, 85.7 × 36 mm, from the coast of Khulna Sundarbans at northern Bay of Bengal, Bangladesh; present study); (B) an illustration (source: Poore 2004); (C, D) freshly-caught specimen, ventral view and dorsal view (male; present study); (E) *Podophthalmus vigil* (male, 127.9 × 52.1 mm) from Exmouth Gulf, Western Australia (source: Hosie 2012); and (F) *Podophthalmus nacreus* (male, 20.5 × 11.1 mm) from Nhatrang Bay, Vietnam (source: Spiridonov *et al.* 2014).

Crabs and other fauna of the northern Bay of Bengal are poorly known and studied. Many of these biotic resources are very important from a nutritional and fisheries point of view, but currently under threat due to unreported and unregulated fishing, environmental pollution and climate change. Therefore, the

outcome of this study and related research, such as biology, ecology and population dynamics of crabs, would greatly enhance our knowledge for effectively managing and conserving the regional/global marine biodiversity.

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LITERATURE CITED

- AKASH, M. and CHOWDHURY, G.W. 2017. First record of the Bengal fiddler crab *Uca (Austruca) bengali* Crane, 1975 (Brachyura: Ocypodidae) from Kuakata National Park, Bangladesh. *Dhaka Univ. J. Biol. Sci.* **26**(2): 199-203.
- AKASH, M. and HOSSAIN, M.A.R. 2017. First record of the two-striped box crab *Calappa bilineata* Ng, Lai & Aungtonya, 2002 (Brachyura: Calappidae) from St. Martin's Island, Bangladesh. *J. Threat. Taxa* **9**(1): 9771-9773.
- CHOWDHURY, S.H. and HAFIZUDDIN, A.K.M. 1991. Crab fauna of Bangladesh. Part 1. Some marine crabs from the Bay of Bengal. *Chittagong Univ. Stud. Part II: Science* **15**(2): 65-77.
- HOSIE, A.M. 2012. First records of *Podophthalmus nacreus* (Brachyura: Portunidae) from Western Australia. *Mar.Biodiv. Rec.* **5**(e21): 1-4.
- IKHWANUDDIN, M., KHAIRIL, I.O., AZRA, M.N. and WAIHO, K. 2015. Biological features of sentinel crab *Podophthalmus vigil* (Fabricius, 1798) in Terengganu coastal water, Malaysia. *J. Fish. Aquat. Sci.* **10**(6): 501-511.
- IRMNG. 2019. Daldorfiidae Ng and Rodriguez, 1986. Interim Register of Marine and Nonmarine Genera. Accessed through <http://irmng.org/aphia.php?p=taxdetails&id=106510> on 23-10-2019.
- IUCN BANGLADESH. 2015. Red List of Bangladesh, Volume 6: Crustaceans. International Union for Conservation of Nature (IUCN), Bangladesh Country Office, Dhaka.
- NADERLOO, R. 2017. *Atlas of crabs of the Persian Gulf*. Springer Verlag, Heidelberg.
- NG, P.K.L. 1998. Crabs. In: Carpenter, K.E. & Niem, V.H. (Eds.) *FAO species identification guide for fishery purposes. The Living Marine Resources of the Western Central Pacific. Volume 2. Cephalopods, Crustaceans, Holothurians and Sharks*. Food and Agriculture Organization of the United Nations (FAO), Rome, pp. 1045-1155.
- NG, P.K.L. and RODRIGUEZ, G. 1995. Freshwater crabs as poor indicators: a critique of Bănărescu (1990). *Crustaceana* **68**(5): 636-645.
- NG, P.K.L., GUINOT, D. and DAVIE, P. 2008. Systema brachyurorum: part I. An annotated checklist of extant brachyuran crabs of the World. *Raffles Bull. Zool. (suppl.)* **17**: 1-286.

- POORE, G.C.B. 2004. *Marine decapod crustacea of southern Australia: A guide to identification*. CSIRO publishing, Melbourne.
- ROY, M.K.D. 2013. Diversity and distribution of marine brachyuran crab communities inhabiting west coast of India. In: Venkataraman, K., Sivaperuman, C. & Raghunathan, C. (Eds.) *Ecology and conservation of tropical marine faunal communities*. Springer-Verlag, Berlin Heidelberg, pp. 147-169.
- SABBIR, S., ISLAM, S., AKASH, M., HAQUE, A.B. and CHOWDHURY, GW. 2017. New report on a marine crustacean species *Podophthalmus vigil* (Fabricius, 1798) (Decapoda: Portunidae) from St. Martin's Island. In: *Proceedings of the 20th International Biennial Conference and Annual General Meeting, Zoological Society of Bangladesh, 9-10 December 2017*. Abstract No. 51, pp. 73.
- SHARIFUZZAMAN, S.M., CHOWDHURY, S.R., SADEK, M.A., FUAD, M.T.I. and HOSSAIN, M.S. 2018. First description of buckler crab *Cryptopodia angulata* (H. Milne Edwards and Lucas 1841) from Bangladesh marine water. *Bangladesh J. Zool.* **46**(2): 275-280.
- SIDDIQUI, M.Z.H. and ZAFAR, M. 2002. Crabs in the Chakaria Sundarban area of Bangladesh. *J. NOAMI* **19**(2): 61-77.
- SPIRIDONOV, V.A., NERETINA, T.V. and SCHEPETOV, D. 2014. Morphological characterization and molecular phylogeny of Portunoidea Rafinesque, 1815 (Crustacea: Brachyura): implications for understanding evolution of swimming capacity and revision of the family-level classification. *Zoologischer Anzeiger* **253**(5): 404-429.
- SUBRAMANIAN, V.T. 2001. On the exploitation of portunid crab *Podophthalmus vigil* (Weber) along the Chennai coast in Tamil Nadu. *Indian J. Fish.* **48**(4): 431-434.
- WoRMS. 2019a. *Uca (Austruca) bengali* Crane, 1975. World Register of Marine Species. Accessed through <http://www.marinespecies.org/aphia.php?p=taxdetails&id=882104> on 02-11-2019.
- WoRMS. 2019b. *Podophthalmus* Lamarck, 1801. World Register of Marine Species. Accessed through <http://www.marinespecies.org/aphia.php?p=taxdetails&id=205693> on 02-11-2019.

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