



## RESEARCH ARTICLE

# New distributional record of deep-water *Phos gemmulifer* Kilburn, 2000 (Buccinoidea: Nassariidae) from the Andaman Sea

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**Abstract:** The present paper records the occurrence of *Phos gemmulifer* Kilburn, 2000 in the Great Nicobar Islands, Andaman Sea. The record of the specimen from the Andaman Sea shows the extended distribution of the species from Mozambique, East Africa, to the Andaman and Nicobar Islands.

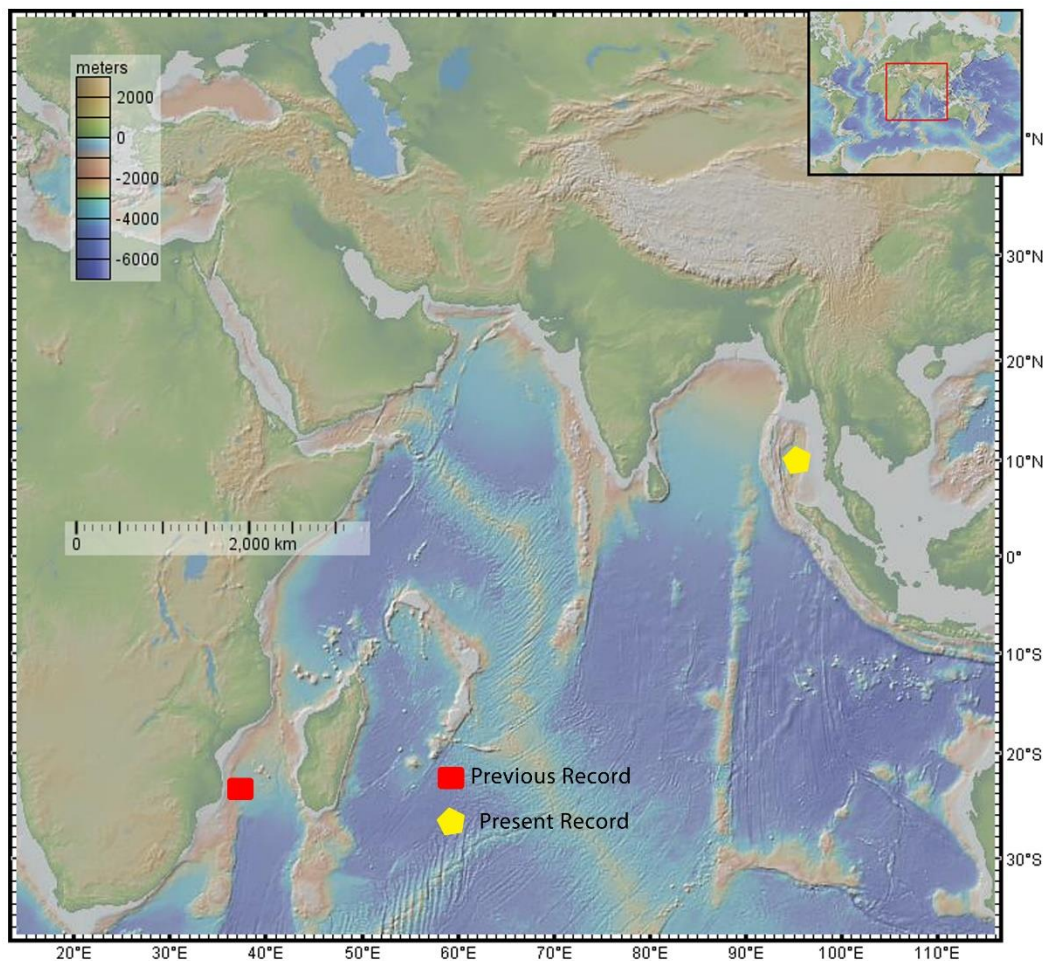
**Keywords:** geographic distribution, Indian Ocean, Neogastropoda, range extension.

## INTRODUCTION

The members of the family Nassariidae Iredale, 1916 (1835), are commonly known as Nassa mud snails or dog whelks, mostly inhabiting soft bottoms and rocky shores. Over 1320 species have been described (Galindo et al. 2016). In India, three subfamilies, 12 genera, and 72 species were recorded (Tripathy & Mukhopadhyay 2015). The subfamily Photinae Gray, 1857 comprises seven genera, namely *Antillophos* Woodring, 1928, *Engoniophos* Woodring, 1928, *Metaphos* Olsson, 1964, *Neoterion* Pilsbry & H. N. Lowe, 1932, *Northia* Gray, 1847, *Phos* Montfort, 1810 and *Strombinophos* Pilsbry & Olsson, 1941 (MolluscaBase 2022a). The genus *Phos* Montfort, 1810 consists of 55 valid species (MolluscaBase 2022b) of which eight species are recorded from India. These are *Phos blainvillei* (Deshayes, 1833), *P. nodicostatus* A. Adams, 1851, *P. retecosus* Hinds, 1844, *P. roseatus* Hinds, 1844, *P. rufocinctus* A. Adams, 1851, *P. senticosus* (Linnaeus, 1758), *P. textilis* A. Adams, 1851, and *P. textus* (Gmelin, 1791) (Smith 1878; Standen & Leicester 1906; Nagabhushanam & Rao 1972; Appukuttan et al. 1989; Rao & Rao 1991; Rao & Dey 2000; Hylleberg & Kilburn 2002; Rao 2003; Venkataraman et al. 2004, 2012; Apte 2014; Ravinesh & Biju Kumar 2015; Edward et al. 2022). In this paper, we report the first record and occurrence of *Phos gemmulifer* Kilburn, 2000 from the Andaman Sea, off Great Nicobar Island, India.

## MATERIAL AND METHODS

The specimens of *Phos gemmulifer* were collected during the deep-sea exploratory fishery surveys of FORV Sagar Sampada (FORV SS) conducted by the Centre for Marine Living Resources and Ecology (CMLRE) along the Nicobar Islands. The specimens were collected by a High-Speed Demersal Trawl-Crustacean Version (HSDT-CV) operated at a speed of 2.5 knots, off the Andaman coast of India (11°13.8' N, 93°30'07' E). Targeted organisms were segregated from the trawl catch and preserved in 70% ethanol. The specimens herein reported were identified using the keys suggested by Kilburn (2000). Cleaned specimens were photographed and shell length (SL) and shell width (SW) measurements were taken in millimetres (mm) using a Vernier calliper. The specimens are deposited in the National Zoological Collections of Zoological Survey of India, Andaman and Nicobar Regional Centre, Port Blair (ZSI/ANRC) and the Department of Aquatic Biology & Fisheries, University of Kerala (DABF/UK). The map indicating the localities (Fig. 1) was generated using GeoMapApp (<http://www.geomapapp.org>).



**Figure 1.** Distribution of *Phos gemmulifer*. Yellow pentagon indicates the present record in the Andaman Sea, and the red square represents the previous known record in East Africa.

## TAXONOMY

**Superfamily Buccinoidea Rafinesque, 1815**

**Family Nassariidae Iredale, 1916 (1835)**

**Subfamily Photinae Gray, 1857**

**Genus *Phos* Montfort, 1810**

*Phos gemmulifer* Kilburn, 2000

(Fig. 2)

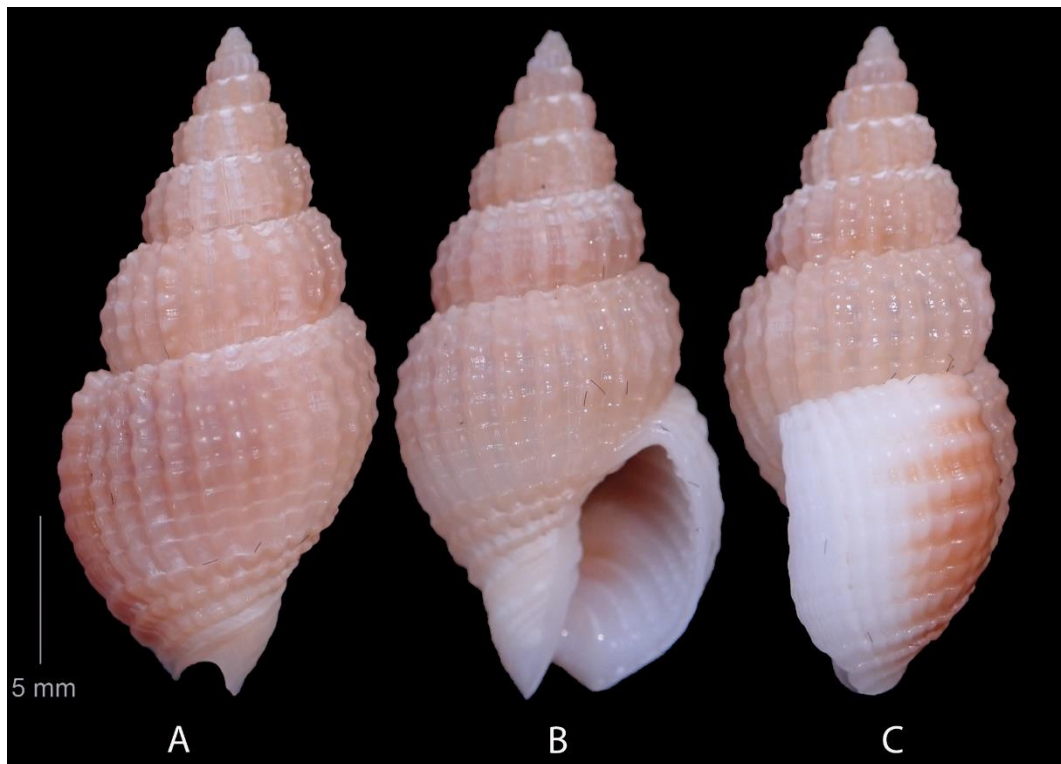
*Phos (Phos) gemmulifer* Kilburn, 2000: 204, 205, figs. 1, 2.

*Antillophos gemmulifer*: Kilburn et al. 2010: 25.

*Phos gemmulifer*: Fraussen et al. 2020: 147, 148, figs. 1D, E.

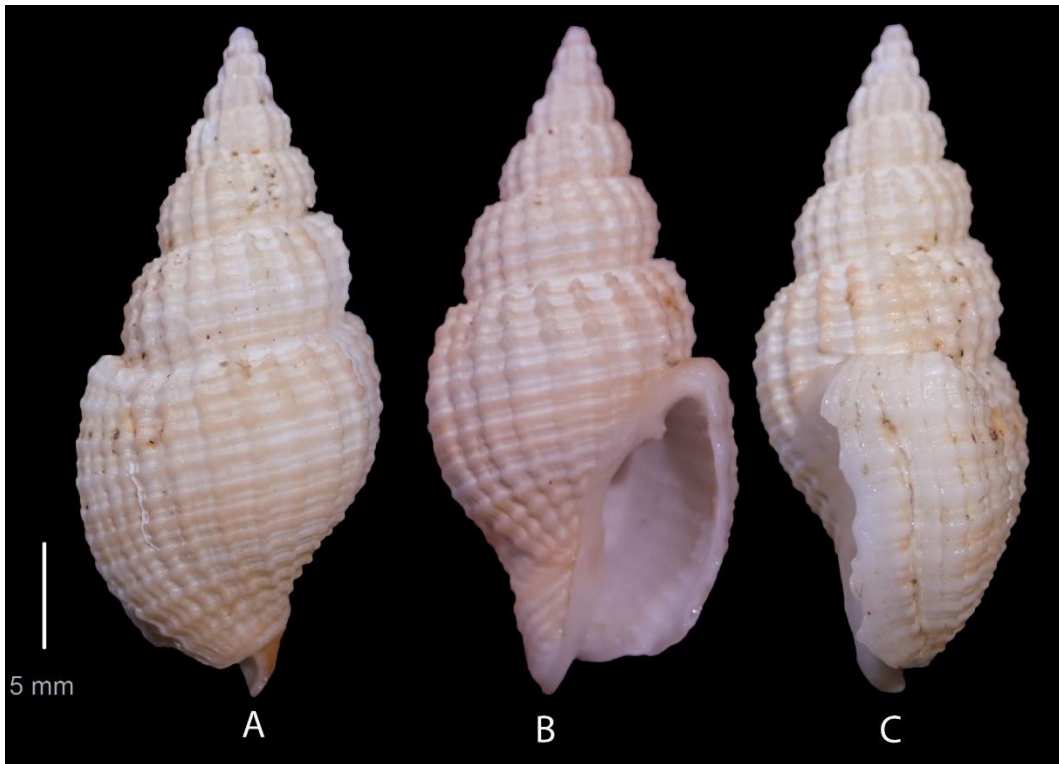
**Material examined:** 1 ex. SL 23 mm × SW 11 mm (ZSI/ANRC-23592), 1 ex. SL 23 mm × SW 11 mm (DABFUK, no. 1424), 1 ex. SL 21 mm × SW 10 mm (DABFUK, no. 1424), Andaman Sea, off Great Nicobar Island, India, 11°01'38.4" N, 93°30'00.7"E, 400–450 m depth on the sandy bottom, collected by K. K. Bineesh 18/Nov/2018.

**Diagnosis:** Shell c. 23 mm in length. Shape broadly fusiform with moderately high spire, strongly convex whorls and deep suture, cancellated sculpture. Widely spaced axial ribs form big rounded knobs crossing the broad, flattened spiral cords. Outer lip thick with 9 or 10 thin but moderately sharp internal lirae, low lirae extending into aperture. Inner lip with a thick callus bearing a low parietal ridge and 2 oblique, tooth-like columellar ridges. Colour cream to pale brown.



**Figure 2.** *Phos gemmulifer* (ZSI/ANRC-23592), Great Nicobar Islands (11°01'38.4" N, 93°30'00.7"E) of Andaman Sea, India, in dorsal, apertural and lateral views.

**Remarks:** *Phos gemmulifer* closely resembles the Gulf of Mannar *Phos retecosus* Hinds, 1844 (Fig. 3). But this species differs from it by a strong spiral intermediary between each pair of spiral lirae, nodules that are more sharply defined (instead of smoothly rounded), and two additional denticles on the upper part of its columella.



**Figure 3.** *Phos retecosus* (DABFUK no. 1426), Gulf of Mannar, Lakshadweep Sea, India, in dorsal, apertural and lateral views.

**Table 1.** List of *Phos* spp. recorded from India.

Species	Distribution	References
<i>Phos blainvillei</i> (Deshayes, 1833)	Andaman and Nicobar Islands	Venkataraman et al. 2004, 2012
<i>Phos nodicostatus</i> A. Adams, 1851	Tamil Nadu	Standen & Leicester 1906; Hylleberg & Kilburn 2002
<i>Phos retecosus</i> (Hinds, 1844)	Tamil Nadu	Standen & Leicester 1906; Hylleberg & Kilburn 2002
<i>Phos roseatus</i> Hinds, 1844	Lakshadweep, Tamil Nadu, Andaman and Nicobar Islands	Smith 1878; Nagabhushanam & Rao 1972; Rao & Rao 1991; Venkataraman et al. 2004, 2012; Edward et al. 2022
<i>Phos rufocinctus</i> A. Adams, 1851	Andaman and Nicobar Islands	Melvill & Sykes 1897
<i>Phos senticosus</i> (Linnaeus, 1758)	Lakshadweep, Andaman and Nicobar Islands	Smith 1878; Appukuttan et al. 1989; Rao & Dey 2000; Rao 2003; Venkataraman et al. 2004, 2012; Ravinesh & Biju Kumar 2015
<i>Phos textilis</i> A. Adams, 1851	Lakshadweep	Rao & Rao 1991; Apte, 2014; Ravinesh & Biju Kumar 2015
<i>Phos textus</i> (Gmelin, 1791)	Lakshadweep, Andaman and Nicobar Islands	Smith 1878; Rao & Dey 2000; Rao 2003; Venkataraman et al. 2004, 2012

## DISCUSSION

Kilburn (2000) described *Phos gemmulifer* from southern Mozambique, East Africa, and Kilburn et al. (2010) and Fraussen et al. (2020) recorded it from the same locality. Hence, our record of the



species from India, approximately 4500 km away from the previous known locality, Quissico–Zavora area of southern Mozambique, represents a significant range extension to the Eastern Indian Ocean (Andaman Sea). Notably, the Mozambique specimens were collected from depths of 200–300 m, while the Indian specimens were collected from depths of 400–450 m.

This is the ninth record of *Phos* species from India. The diversity of the genus *Phos* recorded from different locations of India (Table 1) shows a maximum on Andaman and Nicobar Islands (5 species), followed by Lakshadweep (4 species) and Tamil Nadu (3 species). The current record is not surprising, considering that deep water molluscs are the least studied in Indian coastal waters (Biju Kumar & Ravinesh 2015). More deep-water exploratory surveys and studies are still required to obtain a fuller understanding of the molluscan taxonomy and diversity of the Indian waters.

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