Indian Journal of Geo Marine Sciences
Vol. 54 (05), May 2025, pp. 264-268
DOI: 10.56042/ijms.v54i05.16153

Short Communication

New record of *Pterynotus alatus* (Röding, 1798) (Neogastropoda: Muricidae) from Balukhand-Konark Wildlife Sanctuary, Odisha

S Rajendra*, T Mondal, S Ghosh, C Raghunathan & D Banerjee

Zoological Survey of India, M-Block, New Alipore, Kolkata, West Bengal – 700 053, India
*[E-mail: rajenzsi1992@gmail.com]

Received 2 January 2025; revised 5 April 2025

This study documents a new distribution record of a species of marine gastropod, *i.e*., *Pterynotus alatus* (Röding, 1798), belonging to the family Muricidae from Odisha coast, India. This gastropod species was collected from the intertidal region of Balukhand-Konark Wildlife Sanctuary, Odisha. The detailed characteristics of the shell, habitat, distribution of species elsewhere, and illustrations are provided here.

[**Keywords**: Bay of Bengal, Gastropoda, Marine diversity, Pinnate murex, Range extension]

Introduction

Molluscs are diverse, soft-bodied invertebrates inhabiting marine, freshwater, and terrestrial ecosystems worldwide. Species within the marine family Muricidae are commonly referred to as murex shells or rock shells and classified under the Order Neogastropoda[1]. This family represents one of the most diverse assemblages of marine predatory snails, encompassing a total of 1,968 extant species, accounting for 12 % of the Order Neogastropoda[2]. They are distributed in all regions, inhabiting from the intertidal zone to depths of up to 7,000 meters[3]. Members of the Muricidae family are distinguished by their robust, often spiny or frilled shells; the aperture is generally elongated, and many species feature a prominent siphonal canal, indicative of their carnivorous and predatory nature. They fulfill significant ecological roles in intertidal rocky habitats and subtidal reef ecosystems, occupying terminal carnivore positions in the food web. Their diet primarily consists of various prey, including other molluscs, bivalves, polychaetes, crustaceans, and small fish, which they capture using shell drilling and wedging techniques[4-6].

The genus *Pterynotus* Swainson, established in 1833, is classified within the subfamily Muricidae *incertae sedis* and is part of the 11 genera that collectively include 85 species[2,7]. Species assigned to *Pterynotus* are distinguished by their moderately large, fusiform shell with a high spire, six to eight teleoconch whorls and a broad, ovate aperture. The body whorl bears three varices that form slender, scaly flanges, along with a knob-like axial ridge on the shoulder. The outer apertural lip is finely crenulated, the inner lip smooth, and the siphonal canal is of moderate size, adorned with spiral threads, minor cords, and a spine-like projection[8,9]. A total of 14 species have been recorded from the world oceans, including four species of *Pterynotus* namely, *Pterynotus alatus* (Röding, 1798), *P. albobrunneus* Bertsch & D'Attilio, 1980, *P. barclayanus* (H. Adams, 1873), and *P. tripterus* (Born, 1778), which are found in the Indian waters[10]. The present study reports *Pterynotus alatus* (Röding, 1798), from the coastal waters of Balukhand-Konark Wildlife Sanctuary, Odisha, for the first time, thereby expanding the known geographical distribution of the genus in this region.

Materials and Methods

Molluscan specimens were collected from the intertidal region of Balukhand-Konark Wildlife Sanctuary during August 2024 using the hand-picking method (Fig. 1). Five dead shells were collected, which were washed with tap water and air-dried. Shell photographs were taken using a Nikon Coolpix P900 camera and processed using Photoshop (version 7.0). Species identification was based on the standard literature of Subba Rao[9], Abbott & Dance[11], and Merle *et al.*[12]. Upon completion of the taxonomic study, the specimens were deposited in the National Zoological Collections, Mollusca Section, Zoological Survey of India, Kolkata.

Results

Systematics

Phylum: Mollusca
Class: Gastropoda Cuvier, 1795
Subclass: Caenogastropoda L. R. Cox, 1960
Order: Neogastropoda Wenz, 1938

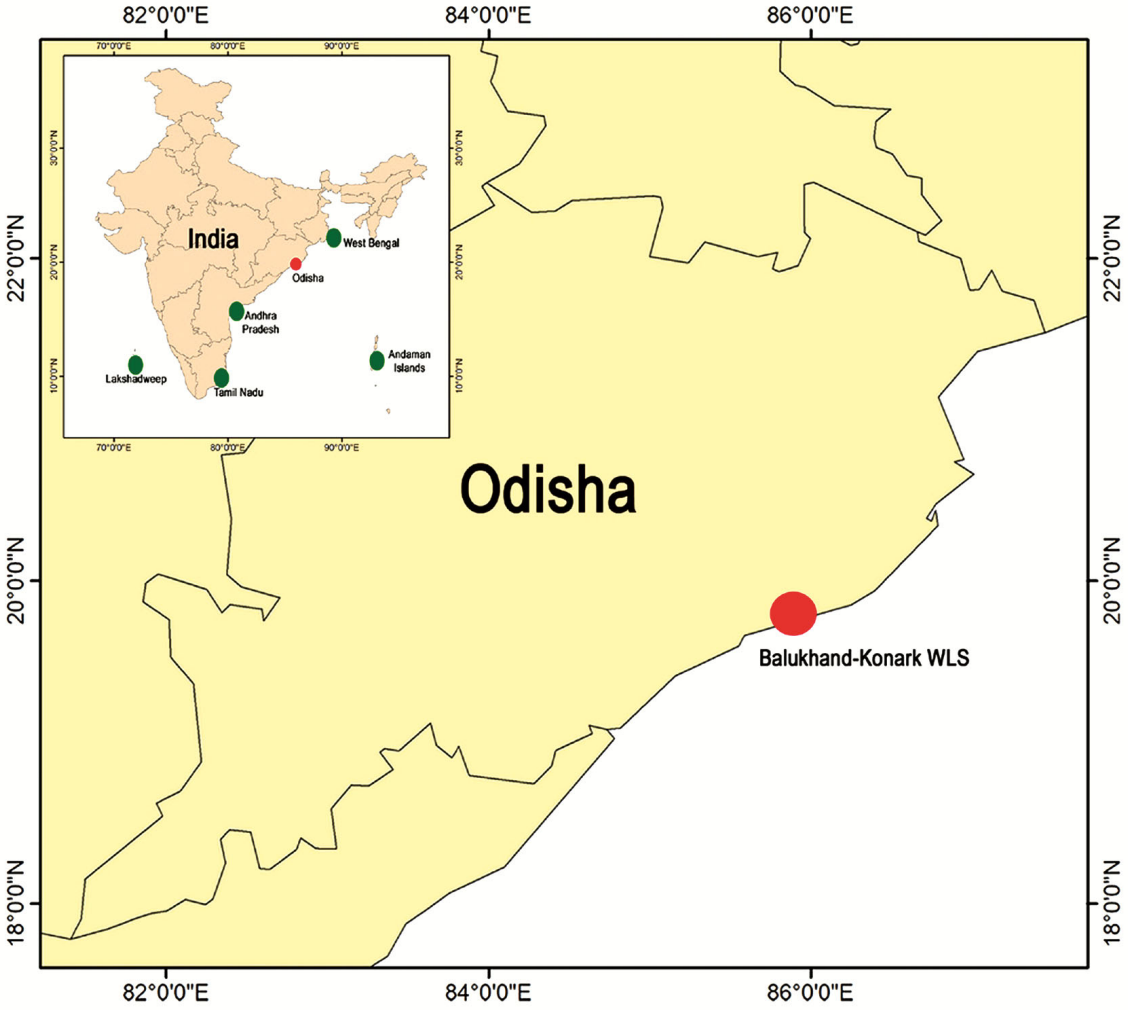

Fig. 1 — Map showing the study area of Balukhand-Konark Wildlife Sanctuary, Odisha. The red dot indicates the present study location, while the green dots indicate previous documented sites in India

Superfamily: Muricoidea Rafinesque, 1815
Family: Muricidae Rafinesque, 1815
Subfamily: Muricidae *incertae sedis*
Genus: *Pterynotus* Swainson, 1833

***Pterynotus alatus* (Röding, 1798)**

Type species: *Purpura alata* Röding, 1798
Common name: Pinnate murex

Synonyms

Murex martinianus L. Pfeiffer, 1840
Murex pinnatus Swainson, 1822

Type locality

Coromandel coast, Tranquebar (present Tharangambadi), India

Material examined

Five empty shells, Balukhand-Wildlife Sanctuary (Lat: 19°48'07.8" N; Long: 85°51'8.37" E), Odisha; Collection date: 21.viii.2024; Habitat: Intertidal region; Collected by: Dr. Mondal and party; registered in Mollusca Section, Zoological Survey of India, Kolkata, Reg. No. M38136/11.

Description

The shell is solid and moderately fusiform, with a high spire. The whorls are distinctly defined. The spire is high with eight whorls; the body whorl is large, and the suture is shallow. The shell is white. The teleconch consists of six convex whorls, each bearing three thin, backwardly curved, wing-like varices. These varices are accompanied by six digitations along the margin of the last whorl. Each whorl displays fine axial sculpture in the form of growth striae, which intersect with spiral cords and threads, creating a decussated (crisscrossed) pattern.

Intervarical nodes are distinctly present. The spiral sculpture is prominent, somewhat undulated, and irregularly spaced. The aperture is broad, pear-shaped, with a faint violet hue. The peristome is distinct and slightly projected upwards. The inner lip is reflected, smooth, with small undulations that correspond to longitudinal digitations, and is attached posteriorly. The outer lip is smooth, sharply bent to the right, deviating from the shell's main axis. The canal is narrowly open, with the old imbricate termination recurving to the left (Fig. 2).

Measurements

The average measurements for the specimens are as follows: total length 58.08 mm; width 24.4 mm; height of the aperture 13.9 mm.

Habitat

The specimens were found in the intertidal sandy zone near fish trash by fishermen.

Geographical distribution

India: Odisha (present study), West Bengal[13], Andhra Pradesh[14], Tamil Nadu, Andaman Islands[9], and Lakshadweep[15]; *Elsewhere*: Tropical Indo-Pacific[10], Southeastern Asia, East Indies[11], South China Sea[8], and Australia[16].

Remarks

Pterynotus alatus (Röding, 1798), originally described as *Purpura alata* by Röding in his 1798 work Museum Boltenianum. The genus *Pterynotus* was established by Swainson (1833), with *Murex pinnatus* Swainson, 1822 (= *Purpura alata* Röding, 1798) as the type species[17]. The morphological characters of *Pterynotus alatus* (Röding, 1798) are distinguished from closely related species by its slender, fusiform shell, which features three prominent wing-like varices per whorl and fine axial sculpture, with adult shells typically reaching 50 – 60 mm in length. Whereas, *P. albobrunneus* possesses a more robust, ovate shell with distinct white and brown colour bands, growing up to 70 mm in length. *Pterynotus barclayanus*, the smallest species in this group, is characterised by a compact, smoother shell. This species is commonly found in the Indian Ocean, particularly on sandy or muddy substrates. *Pterynotus tripterus*, on the other hand, is recognised for its broad, flattened varices, which form three pronounced wings, with a shell length ranging from 40 to 60 mm, and is typically found in reef environments at moderate depths.

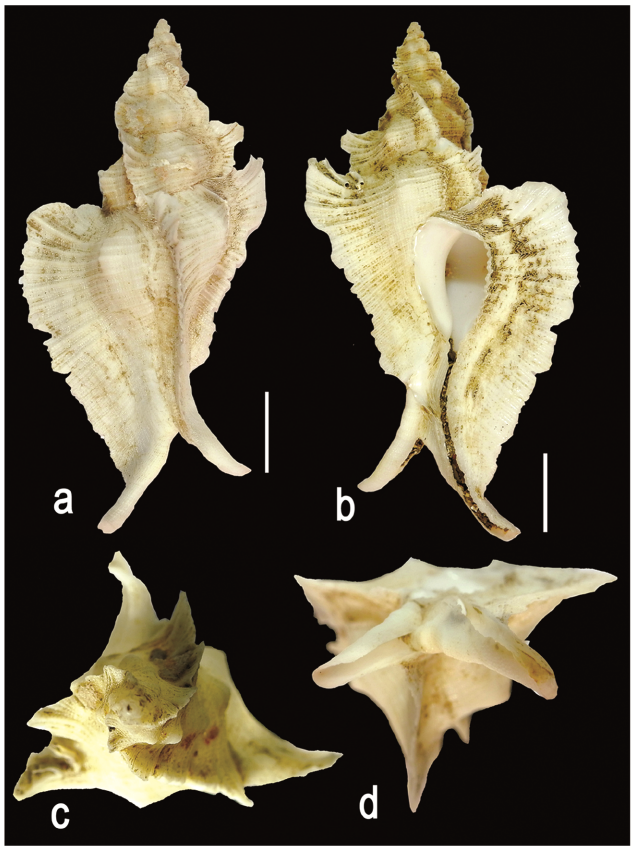

Fig. 2 — *Pterynotus alatus* (Röding, 1798): a) Dorsal view; b) Ventral view; c) Back view; and d) Front view. Scale bar = 10 mm (a–b)

Discussion

Molluscs are soft-bodied animals covered with shells, and they are the second-largest phylum after Arthropoda, with an estimated 0.2 million species[18,19]. They are most definitely a characterised group of the animal kingdom, having at least two features, the mantle and the radula, not found elsewhere[20]. They include snails, slugs, and other gastropods; clams and other bivalves; squids and other cephalopods; and other lesser-known but similarly distinctive subgroups. Among the recognised eight classes, all are represented in the marine forms, followed by freshwater with two (Gastropoda and Bivalvia), and terrestrial life has only one class (Gastropoda)[21]. The majority of species inhabit diverse habitats, including marine (intertidal to deep sea), estuarine, freshwater, terrestrial, and arboreal. These animals are highly diverse in tropical and temperate regions and can be found at all latitudes. They are highly diverse, not just in size and anatomical structure, but also in behaviour and habitat[9]. They play an important role at all levels of the food web, including herbivores, predators, detritivores, and filter feeders in the food web[22].

These species can be used as bioindicators due to their diversity and richness, which will indicate ecosystem and environmental changes over time[23]. They support the economies of coastal communities around the globe through food, ornamental items, decorative items, and the cultivation of shellfish for pearls.

Odisha plays a significant role in marine biodiversity, encompassing a coastline of 480 kms along the Bay of Bengal[24]. The state is home to 21 protected areas, which include 19 wildlife sanctuaries and two national parks, with four of these sanctuaries designated as marine protected areas[25]. The Balukhanda-Konark Wildlife Sanctuary, covering an area of 87 sq. kms in Puri District and adjacent to the Bay of Bengal, is essential for the conservation of marine and coastal species[26]. The diverse maritime environments of the state, including sandy beaches, mudflats and estuaries, provide critical ecological habitats for numerous species. India is known to host 3,070 species of marine molluscs, with 470 of these found along the Odisha coast[27]. Further, among the 107 species identified within the Muricidae family in Indian waters, 27 are found near the Odisha coastline[27,28]. Notably, the presence of *Pterynotus alatus* in Odisha is significant, as only four species of *Pterynotus* are recognised in India.

Conclusion

This finding extends the known geographical range of *Pterynotus alatus* in the Bay of Bengal, highlighting the importance of Odisha's diverse yet under-researched coastal ecosystems. The identification of this species emphasises the need for ongoing research and conservation efforts, as safeguarding this biodiversity is vital for maintaining ecological balance and supporting sustainable livelihoods in the face of growing environmental challenges.

Acknowledgements

The authors are grateful to the Director, Zoological Survey of India, Ministry of Environment, Forest and Climate Change, Government of India, for providing facilities. The authors are also thankful to the Department of Environment, Forest and Climate Change, Government of Odisha, for providing necessary permissions.

Conflict of Interest

The authors declare that there is no conflict of interest.

Author Contributions

SR & SG: Sample collection, identification and preparation of original draft; TM: Correction and revision of the manuscript; and CR & DB: Supervision, support and reviewing of the manuscript.

References

1 Houart R, Historique et classification des espèces actuelles de Muricidae (Neogastropoda, Muricoidea), *Novapex*, 19 (2) (2018) 37–66.

2 MolluscaBase (eds), MolluscaBase, Muricidae Rafinesque, 1815. Accessed through: World Register of Marine Species at: https://www.marinespecies.org/aphia.php?p=taxdetails&id=148; (Accessed on November 2024).

3 Houart R, *Living Muricidae of the world: Muricinae-Murex, Promurex, Haustellum, Bolinus, Vokesimurex and Siratus*, (Conchbooks, Hackenheim, Germany), 2014, pp. 197.

4 Connell J H, Effects of competition, predation by *Thais lapillus* and other factors on natural populations of the barnacle *Balanus balanoides*, *Ecol Monogr*, 31 (1970) 61–104. https://doi.org/10.2307/1950746

5 Taylor J D, Diets of sublittoral predatory gastropods of Hong Kong, In: *Proceedings of the First International Marine Biological workshop: The Marine Flora and Fauna of Hong Kong and Southern China*, 1980, pp. 907–920.

6 Stella C & Raghunathan C, New Record of *Muricanthus kuesterianus* (Tapparone-Canefri, 1875) Family: Muricidae, from Palk Strait, Southeast Coast of India, *Nat Environ Pollut Technol*, 8 (1) (2009) 63–68.

7 Bouchet P, Rocroi J P, Hausdorf B, Kaim A, Kano Y, *et al*., Revised classification, nomenclator and typification of gastropod and monoplacophoran families, *Malacologia*, 61 (1–2) (2017) 1–526. https://doi.org/10.4002/040.061.0201

8 Tan K S, Species checklist of Muricidae (Mollusca: Gastropoda) in the South China Sea, *Raffles Bull Zool*, 48 (2001) 495–512.

9 Subba Rao N V, Indian seashells (Part-1): Polyplacophora and Gastropoda, *Rec Zool Surv India*, 2003, pp. 416.

10 Dey A, *Catalogue of Marine Molluscs (Polyplacophora and Gastropoda)*, (Zoological Survey of India, Kolkata), 2016, pp. 687.

11 Abbott R T & Dance S P, *Compendium of seashells. A full-colour guide to more than 4,200 of the world's marine shells*, (Odyssey Publications, Hong Kong), 2000, pp. 189.

12 Merle D, Garrigues B & Pointier J P, *Fossil and Recent Muricidae of the World – Part Muricinae*, (Conchbooks, Hackenheim), 2011, pp. 652.

13 Ghosh A, Barua S, Dey A & Mukherjee A, Report of *Pterynotus pinnatus* Swainson (Mollusca: Gastropoda: Muricidae) from Shankarpur Mohona, Digha, West Bengal, *Rec Zool Surv India*, 2006, pp. 99–100. https://doi.org/10.26515/rzsi/v106/i2/2006/159183

14 Ramakrishna, Dey A, Barua S & Mukhopadhya A, *Marine molluscs: Polyplacophora and Gastropoda. Fauna of Andhra Pradesh, State Fauna' Series, 5 (Part-7)-Marine Mollusca*, (Zoological Survey of India, Kolkata), 2007, pp. 148.

15 Raghunathan C & Rajendra S, Mollusca, In: *Current Status of Faunal Diversity in Lakshadweep*, edited by A N Rizvi, C Raghunathan & D Banerjee, (Zoological Survey of India, Kolkata) 2024, pp. 453–496.

16 Ponder W F, Notes on some Australian Genera and Species of the Family Muricidae (Neogastropoda), *J Malacol Soc Aust*, 2

(3) (1972) 215–248. https://doi.org/10/1080/00852988.1972.10673856

17 MolluscaBase (eds), MolluscaBase, *Pterynotus* Swainson, 1833. Accessed through: World Register of Marine Species at: https://www.marinespecies.org/aphia.php?p=taxdetails&id=138204.

18 Boominathan M, Ravikumar G, Chandran M S & Ramachandra T V, Mangrove associated molluscs of India, In: *LAKE 2012: National Conference on Conservation and Management of Wetland Ecosystems*, 06th - 09th November 2012, School of Environmental Sciences Mahatma Gandhi University, Kottayam, Kerala, 2012, pp. 1–11.

19 Pandian T J, *Reproduction and development in mollusca*, (CRC Press, Taylor & Francis Group), 2018, pp. 320.

20 Göttng K J, Origin and relationships of the Mollusca, *J Zool Syst Evol Res*, 18 (1) (1980) 24–27. https://doi.org/10.1111/j.1439-0469.1980.tb00725.x

21 Thomas R, *Marine biology: An ecological approach*, (Scientific e-Resources, Edtech), 2019, pp. 304.

22 Cannicci S, Burrows D, Fratini S, Smith T J, Offenberg J, *et al.*, Faunal impact on vegetation structure and ecosystem function in mangrove forests: A review, *Aquat Botany*, 89 (2008) 186–200. http://dx.doi.org/10.1016/j.aquabot.2008.01.009

23 Dumitrache C, Abaza V, Mihnea R, Varga L & Gheorghe L, Establishing the ecological quality status using benthic invertebrates as bio-indicators in marine monitoring, *Cercet Mar*, 38 (2008) 119–135.

24 Pati S K, Swain D, Sahu K C, Sharma R M, Mohapatra A, *et al*., Marine fauna of Odisha, east coast of India: an annotated checklist of historical data of 135 years, *J Aquat Biol Fish*, 6 (2018) 1–115.

25 Mohanty P & Garada R, Forest rights act & community conservation initiatives in Odisha: Exploring an alternative regime of forest governance, *J Politics Governance*, 5 (3) (2016) 35–47.

26 Rajendra S, Mondal T & Raghunathan C, New Record of a Marine Heterobranch, *Dendrodoris krusensternii* (J. E. Gray, 1850), from the Odisha Coast, India, *Rec Zool Surv India*, 124 (iS) (2024) 161–168. https://doi.org/10.26515/rzsi/v124/i1S/2024/172728

27 Tripathy B, Tudu P C, Mukhopadhyay A, Sajan S K, Sreeraj C R, *et al*., C*hecklist of Fauna of India: Mollusca. Version 1.0.*, (Zoological Survey India, Kolkata), 2024, pp. 1-120. https://doi.org/10.26515/Fauna/1/2023/Mollusca

28 Rajendra S & Raghunathan C, Mollusca, In: *Faunal Diversity of Biogeographic Zones: Coasts of India*, Edited by Chandra K, Raghunathan C & Mondal T, (Zoological Survey of India, Kolkata), 2020, pp. 497–574.