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## First Record and COI Gene Sequencing of *Naxioides robillardi* (Decapoda: Epialtidae) from the Southern Coast of Oman

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### Abstract

This study documents the first occurrence of the deep-sea spider crab *Naxioides robillardi* (Miers, 1882) along the southern coast of Oman in the Arabian Sea. Three specimens were collected off the Dhofar region near Mirbat and identified as *N. robillardi* form *mammillata* through morphological and molecular analyses. DNA barcoding of the COI gene confirmed the identification with 100% similarity to known sequences. This finding expands the known geographic range of this species to include the Arabian Sea coastline of Oman. This discovery highlights the importance of exploring marine biodiversity in the Arabian Sea and contributes to our understanding of deep-sea species geographic distribution.

**Keywords:** Arabian sea, Oman, spider crab, *Naxioides robillardi*

### Introduction

The family Epialtidae MacLeay, 1838, represents a diverse group within the deep-sea spider crab superfamily, Majoidea Samouelle, 1819 (Lee *et al.*, 2020), comprising 452 species across 89 genera (Davie *et al.*, 2015). One deep-water epialtid crab, *Naxioides robillardi* (Miers, 1882), is widely distributed in the Indo-West Pacific region, ranging from eastern Africa to Australia and Japan, at depths of 30–260 m (Poupin, 1995; Devi *et al.*, 2019; Lee *et al.*, 2020). This crab species was grouped into two forms (i.e., *N. robillardi* form typical and *N. robillardi* form *mammillata* according to their morphological characteristics (Poupin, 1995). One specimen of *N. robillardi* was first reported in the Omani waters in the Gulf of Oman (Now Sea of Oman) near Muscat area in 1963 during the International Indian Ocean Expedition the RV *Anton Bruun* and identified as *N. robillardi* form typical (Griffin, 1974). This paper reports, for the first time, the presence of *N. robillardi* (form *mammillata*) along the southern coastline of Oman in the Arabian Sea. The COI gene sequences of the specimens were analyzed and compared with the GenBank database.

### Materials and Methods

#### Specimen Collection

On 24 February 2023, three specimens of *N. robillardi* were collected using a fish cage trap at a depth of 230 m, approximately 700 m off Ain, Mirbat, in Dhofar region on the Arabian Sea (16°57'37.6"N, 54°52'46.3"E). The specimens were transported to the Mirbat Aquaculture Station for identification and analysis.

#### Morphological Identification

Measurements of carapace length (CL) and width (CW) were recorded to nearest 0.1 mm for each specimen. The morphology was analyzed following the descriptions provided by Poupin (1995) <sup>[7]</sup> and Lee *et al.* (2020) <sup>[6]</sup>. Key diagnostic features included a pyriform carapace, elongate dorsal spines, and distinctive regional spination patterns were examined under a stereomicroscope (Zeiss Stemi 2000-c, Germany). Photos of the specimen were taken using a digital camera (Sony RX100 VII, Japan).

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All specimens were kept and preserved in Mirbat Aquaculture Station, Mirbat, Sultanate of Oman.

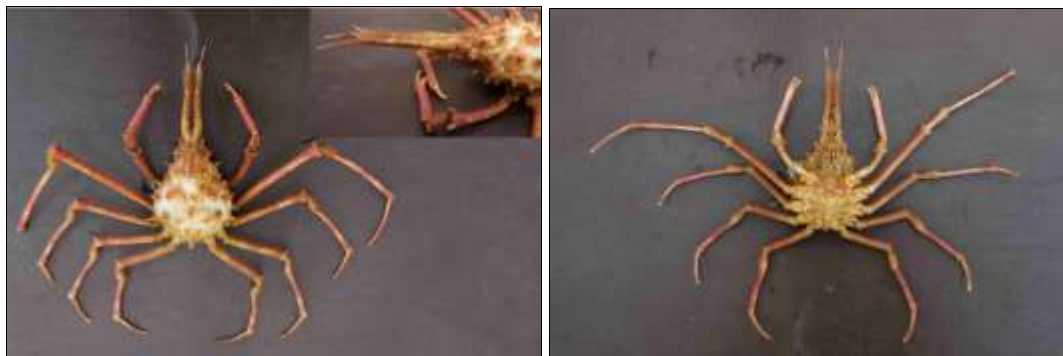
### Molecular Analysis

Genomic DNA (gDNA) was extracted from the leg muscle tissue of *N. robillardii* specimens using the Qiagen DNeasy Blood & Tissue Kit (Qiagen, Germany). To enhance cell lysis and DNA yield, phenol: chloroform alcohol (25:24:1 v/v) was added to the lysis buffer. The extracted gDNA was assessed for purity and quantified using a Nanodrop spectrophotometer (Thermo Fisher Scientific, USA), diluted to 50 ng/μL in AE buffer, and visualized on a 1% agarose gel stained with ethidium bromide. The cytochrome oxidase I (COI) gene was PCR-amplified using universal primers LCO1490 and HCO2198 (Folmer *et al.*, 1994) [3] in a 25 μL reaction containing 3 μL of diluted gDNA, 1 μL each of 100 μM primers, and PuReTaq Ready-To-Go PCR beads (GE Healthcare). The amplification protocol included initial denaturation at 94 °C for 4 minutes, followed by 30 cycles of denaturation (94 °C for 1 minute), annealing (52 °C for 1 minute), and elongation (72 °C for 1 minute), with a final elongation at 72 °C for 10 minutes. PCR products were visualized on a 2% agarose gel, purified using the Exo-SAP cleanup kit (Jena Bioscience, Germany), and labeled for sequencing using the BigDye Terminator v3.1 Cycle Sequencing Kit (Applied Biosystems, USA). Sequencing was

performed on an ABI 3130 Genetic Analyzer (Applied Biosystems, USA) after purification with the BigDye X-Terminator kit. The resulting sequences, approximately 800 base pairs, were trimmed, aligned using ClustalW in BioEdit (Hall, 1999) [5], and compared against the NCBI GenBank database using the BLASTn algorithm to confirm species identity.

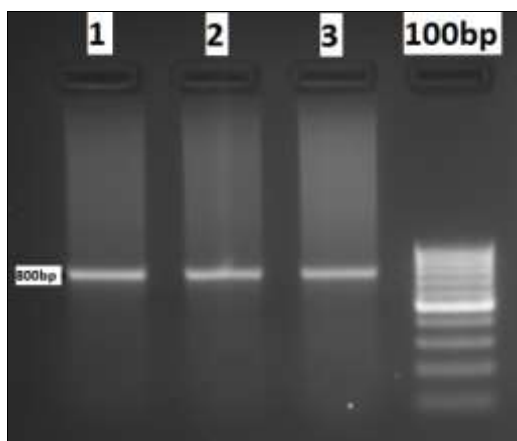
### Results

The carapace length (CL) and width (CW) of the specimens were measured as follows: one female (CL: 47.2 mm, CW: 35.6 mm) and two males (CL: 44.3 mm, CW: 32.7 mm; CL: 58.8 mm, CW: 47.6 mm). Carapace pyriform (Fig. 1); elongate dorsal surface covered with various spines and a number of tomentum and with well-defined regions. Gastric region with three or four prominent spines longitudinally. Cardiac region with a defined median spine. Three spines within intestinal region and branchial region is slightly rounded and margin covered with numerous spines, while posterior is with one large spine. Supraorbital eave diagonally slim with a distinct vertical preorbital spine aligned anteriorly. One long spine is located at hepatic margin. Narrow basal antennal article, anterior margin with a blunt tooth at anterolateral angle. Legs slender, covered with tomentum. Body flesh colored, with reddish legs stripped faintly striped.



**Fig 1:** *N. robillardii*, male (form *mammillata*), from the Arabian Sea, southern coast of Oman.

The PCR amplification of the COI gene resulted in sequences approximately 800 base pairs in length for each specimen. The sequences exhibited 100% similarity to a *N. robillardii* voucher specimen (MT469872) from Korean waters, confirming their identity as *N. robillardii* form *mammillata*.



**Fig 2:** Agarose gel (2%) electrophoresis of PCR products obtained from three *N. robillardii* samples of 800 base pair and (DNA ladder, 100bp).

### Discussion

This study represents the first documented occurrence of *N. robillardii* in the Arabian Sea, specifically along Oman's southern coast. Previous records from Muscat identified the species as *N. robillardii* form typical (Griffin, 1974) [4]. The identification of the *mammillata* form in Oman is consistent with reports from southern India and the Philippines, indicating a potentially broader distribution across the Indo-West Pacific. Devi *et al.* (2019) [2] suggested that specimen collected from southern India appear to be form *mammillata*. DNA barcoding played a crucial role in confirming species identity, emphasizing the importance of molecular tools for resolving taxonomic ambiguities. This finding underscores the need for continued exploration of marine biodiversity in the Arabian Sea, as its deep-sea fauna remains poorly characterized.

### Acknowledgments

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## References

1. Davie PJF, Guinot D, Ng PKL. Systematics and classification of Brachyura. In: Treatise on Zoology, Anatomy, Taxonomy, Biology, Decapoda: Brachyura. 2015;2:1049–1130. DOI: 10.1163/9789004190832\_021.
2. Devi SS, Kumar AB, Ng PKL. New records of two brachyuran crabs (*Naxioides robillardi* and *Lupocyclus tugelae*) from India. *Thalassas*. 2019;35:399–404. DOI: 10.1007/s41208-019-00138-2.
3. Folmer O, Black M, Hoeh W, Lutz R, Vrijenhoek R. DNA primers for mitochondrial cytochrome c oxidase subunit I. *Mol Mar Biol Biotechnol*. 1994;3(5):294–299.
4. Griffin DJG. Spider crabs (Majidae) from the International Indian Ocean Expedition. *Smithson Contrib Zool*. 1974;182:1–35. DOI: 10.5479/si.00810282.182.
5. Hall TA. BioEdit: A user-friendly biological sequence alignment editor and analysis program for Windows 95/98/NT. *Nucleic Acids Symp Ser*. 1999;41:95–98.
6. Lee SH, Jung J, Park T. First record of Indo-West Pacific spider crab, *Naxioides robillardi* (Decapoda, Epialtidae) from Korean waters. *Anim Syst Evol Divers*. 2020;36(4):400–407. DOI: 10.5635/ASED.2020.36.4.077.
7. Poupin J. Study of *Naxioides* group *robillardi* (Majidae: Pisinae). *J Nat Hist*. 1995;29(1):85–109. DOI: 10.1080/00222939500770051.