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TURRICULA NELLIAE SPURIA, HEDLEY, 1922 (MOLLUSCA: GASTROPOD: CLAVATULIDAE): RANGE EXTENSION AND NEW COUNTRY RECORD

Devendra A. Solanki, Jignesh R. Kanejiya and *Bharatsinh M. Gohil

Department of Life Sciences, Maharaja Krishnakumarsinhji Bhavnagar University, Bhavnagar, Gujarat, India 364 002

*Author for Correspondence

ABSTRACT

Turricula nelliae spuria reported for the first time from the Gopnath coast (21° 12' 44" N and 72° 6' 57" E) Gulf of Khambhat, Gujarat, situated on the west coast of India. Its second record for the coastline of India, firstly *T. nelliae spuria* recorded in Goa, coastal state of India. The present study was carried out from 1 April 2015 to 31 May 2016. In this study, establishing the first record of *T. nelliae spuria* to the Gujarat coastline and expanding its distribution range to the world oceans.

Keywords: Gujarat coastline, India, Mollusca, *Turricula Nelliae Spuria*, New country record

INTRODUCTION

The Indo-West Pacific oceans are famous for their richness in marine biodiversity, even known fossils from the same regions were plenty, for the reasons it being called marine hotspot for the origin of species (Renema *et al.*, 2008). *Turricula*, Schumacher, 1817 genus favors shallow-water of warm ocean and might be distributed in entire tropical Indian oceans (Powell, 1969). *T. nelliae spuria* was previously classify under family Turridae, the primitive fossil of turrids are from the mid-Cretaceous, Powell (1966); Harzhauser *et al.*, (2009) describes fossils of *T. nelliae* and *T. nelliae spuria* from the Vinjhan town, Kankawati River Gulf of Kachchh, Gujarat based on records of Powell (1969) and Dharma (2005).

T. nelliae spuria is the subspecies like *Turricula nelliae nelliae*, E.A Smith, 1877 of the parent species *Turricula nelliae*, E.A Smith, 1877. These species show considerable variation geographically according to the depth of occurrence and ecological factors (Powell, 1969). Beets (1984) described it from Mandul Island, (East Borneo) which collected by Hoist Pellekaan. *T. nelliae spuria* is the potential predator of northern seas, taking chiefly on polychaetes (Tayler,1985). Miller (1990) has described the feeding mechanism of this species from Hong Kong Sea. It recorded in mangroves habitations of China and Gulf of Thailand (UNEP, 2008). Morton (1998) worked on resistance properties of *T. nelliae spuria* from TBT. India has a huge coastline of about 8000 km along the Bay of Bengal in the east and the Arabian Sea in the west and a tremendous variety of habitats like lagoons, mangroves, estuaries, salt marshes, backwaters, rocky coasts, coral reefs and sandy stretches. Gujarat state shares around 1650 Km coastline with Gulf of Kachchh, Gulf of Khambhat and a Saurashtra coastline.

In this study, the record of *T. nelliae spuria* from Gujarat makes a significant addition to the rare fauna of the country. Although, it was well known from the southern China Sea, the current record extends the distribution of *T. nelliae spuria* up to the Indian subcontinent.

MATERIALS AND METHODS

The sampling station was the Gopnath Coast (21° 12' 35" N, 72° 6' 28" E). Gopnath is a small coastal town and well-known spiritual and tourist place located at the mouth of Gulf of Khambhat, Gujarat, Northwest coast of India (Ramnathan, 2002; Raghunathan *et al.*, 2003). An observational study has done during a period of a year (2015-16). The collection of *T. nelliae spuria* is usually during lowest low tides by the handpicking method. A live shell was preserve in 95% ethanol, while dead shell were washed by dilute acid and morphological traits were measured and compared with resemblance species. Live species weight was measured in the laboratory. Map of geographical distribution of *T. nelliae spuria* was

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prepared according to the present and past records from several checklists and official websites like World Register of Marine Species (WoRMS) Indo-Pacific Molluscan Database (Powell, 1969), Ocean Biogeographic Information System (OBIS), Encyclopedia of Life (EOL), Atlas of Living Australia (ALA) and Taiwan Biodiversity Information Facility of the same species in different marine waters.

Identification

Identification of the species done with the help of description from a book Indo-Pacific Molluscan Database Vol-II by Tucker Abbott and confirmed by experts. Morphology of *T. nelliae spuria* is very close to one its family member *Turricula javana*, Linnaeus, 1767. However, *T. javana* well known to the Indian oceans and described by several researchers as well (Bhagirathan et al., 2014; Subba Rao, 2003). *T. nelliae spuria* differs from *Turricula nelliae nelliae* from its color pale yellowish brown from while *T. nelliae nelliae* is white, a straight anterior canal, and peripheral nodes that are 14-17 per whorl, Powell (1969).

Shell 32.0-36.7 mm. (about 1-1½ inches) in height, 12-14 mm width; 12-14 whorls, robust, with heavy rounded peripheral nodules, 14-15 per whorl; basal spirals strongly gemmated. Spire 33-35°, considerably less than the height of aperture plus canal. Fresh weight is about 2.15-2.52 g and dead shell weight is about 1.50-1.63 g. Base with about 7-9 granulated primary spirals and further 5-6 smooth spirals over the neck and anterior end, 1-2 spiral threads in each interspaced. Brownish to pale yellowish, unclearly maculated in slight reddish brown between the grannies and nodes. Sinus deep, wide with a largely rounded apex, occupying the middle of the shoulder concavity and confluent below with the broadly sharp forwardly projected outer lip "Figure 3."

RESULTS AND DISCUSSION

T. nelliae spuria recorded live from Gopnath Coast (21°12' 50" N 72°06'43" E), Gujarat, India for the first time "Figure 1", and "Figure 2". First Powell (1969) publishes distribution of this species into the world oceans. *T. nelliae spuria* reported at the junction of the lower intertidal zone subtidal zone from Gopnath coast. According to Powell (1966), this species was widely distributed extant species, which was from the Persian Gulf to New Guinea and the Chinese Sea. *T. nelliae spuria* distributed in tropical seacoasts of Persian Gulf, Gulf of Oman, Goa (India), South China Sea (Vietnam, Guangxi, Hainan, Guangdong, Fujian, Macau, Hong Kong, Taiwan coasts) East China Sea (Zhejiang and Shanghai coasts), North Sumatera coast, Indonesia (Brunei), West Papua coast, Philippine sea "Figure 2". Southeast to the Gulf of Oman it was record in Goa, India, well Gujarat is about 800 km of coastal distance to the north from Goa; therefore, it was another national record to the west coast of India. It was formerly known *Pleurotoma tuberculata*, Gray, 1839, *Pleurotoma punctata*, Reeve, 1845; *Inquisitor spurius* Hedley, 1922 and *Turricula nelliae spurius* Hedley, 1922.



Figure 1: Sampling Site, Gopnath Coast

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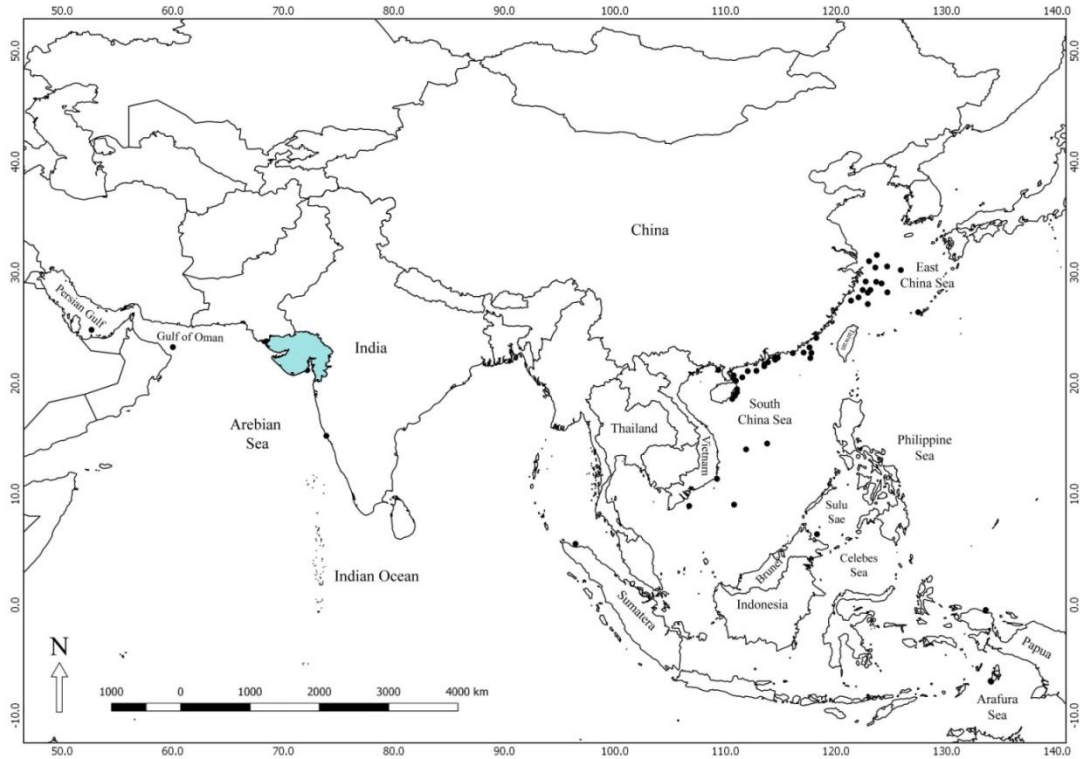


Figure 2: Distribution Map of *T. Nelliæ Spuria* in the World Oceans

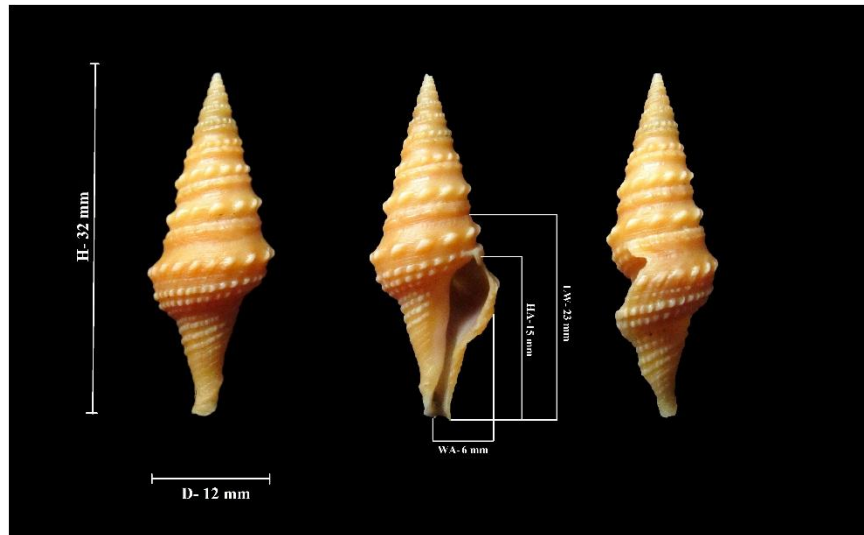


Figure 3: *T. Nelliæ Spuria* Measurements H (Height of shell)-32mm, D (Width of shell)-12mm, HA (Height of Aperture including lip) - 15mm, WA (Width of Aperture) - 6mm, LW (Height of the last whorl) – 23 mm

Taxonomic Position

Superfamily: Conoidea, Fleming, 1822
Family: Clavatulidae, Gray, 1853
Genus: Turricula, Schumacher, 1817
Species: *Turricula nelliæ* E. A. Smith, 1877
Subspecies: *Turricula nelliæ spuria* Hedley, 1922

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Habitat

The unique intertidal zone of Gopnath opens about 700 m to a kilometer during lowest tides. The whole coast was thoroughly rocky except some interruption of sandy, muddy and mangrove patches. The surface of rocks was sharp edged with plenteous pools and puddles "Figure 1." The middle littoral zones and lower merely share equal features of substratum and existing macro invertebrate at sampling area. The live species always encountered submerged about a foot in rocky pools and puddles at the junction of the lower intertidal zone and subtidal zone along with the thin layer of mud and algal cover at Gopnath coast "Figure 3." The presence of *Diogenes avarus*, Heller, 1865 in the dead shells of *T. nelliae spuria* frequently noticed, with large congregation under rocks "Figure 4."



Figure 4: *T. Nelliae spuria* in Natural Condition



Figure 5: *T. Nelliae spuria* Shells and Shell with *Diogenes Avarus*, Heller, 1865

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