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Distribution extension to India of *Nassarius punctatus* (A. Adams, 1852) (Mollusca: Gastropoda: Nassariidae)

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Short communication

Abstract

The known distribution of *Nassarius punctatus* (A. Adams, 1852), was limited to Mauritius, Reunion, Sri Lanka, Vietnam, Indonesia, Philippines, China, Australia, New Caledonia to French Polynesia. This communication reports its extended range of distribution to Maharashtra, Diu and Daman, the west coast of India. A comprehensive taxonomic description of the species is provided along with additional morphological and ecological information.

Keywords: *Intertidal, Nassariinae, new record, Maharashtra, Diu and Daman, India*

Introduction

This paper reports the occurrence of live specimens of *Nassarius punctatus* (A. Adams, 1852) from the intertidal sandy shore of Mirya (17° 01′ 25.2″ N 73° 16′ 17.7″ E), Ratnagiri, Maharashtra and Diu and Daman, in India. A complete taxonomic description for the species is provided along with information on morphological characters which were previously unknown (radula and operculum). *N. punctatus* was earlier reported from Mauritius, Sri Lanka, Vietnam, Indonesia, Philippines, China, Australia, New Caledonia to French Polynesia.

Material and methods

Taxon sampling

Five specimens of the species were handpicked at low tide, intertidally, up to 1 m depth, at Mirya, Ratnagiri, Maharashtra, India. Live animals were photographed in the field (Fig. 1). Animals were preserved in 96-98% ethanol and voucher specimens are housed in the Museum of Bombay Natural History Society (BNHS). Live specimens were recorded in Diu and Daman, in India by Dr Hugo Kool (pers. comm. in 2013).

Identification

A stereomicroscope (Carl Zeiss ZEISS Stemi 2000C, Germany) was used to examine the shell and operculum morphology for each specimen included in the study. A digital vernier calliper (accurate to 0.1 mm) was used for shell measurements. Shells were photographed using the SX520 HS Canon digital point and shoot camera. For SEM imaging, radulae were mounted on carbon conducting tape and sputter-coated with Au-Pd. The scanning electron microscope (SEM) images of radulae were obtained by a JEOL JSM 6360A (JEOL, Japan) operating at 10 kV. Primary morphological identifications were confirmed by accessing the taxonomical information from Cernohorsky (1984), MolluscaBase (2023) and Gili (2017).

Results

Systematics

Family : Nassariidae Iredale, 1916 (1835)
Subfamily : Nassariinae Iredale, 1916 (1835)
Genus : *Nassarius* Duméril, 1805

Type species: *Buccinum arcularia* Linnaeus, 1758 (by subsequent monotypy; Froriep, 1806).

Nassarius punctatus (A. Adams, 1852). (Fig. 1, 2 A-I)

Fig. 1. *N. punctatus* in its natural habitat- fine silty sand, within the intertidal area at Mirya, Ratnagiri, Maharashtra

Synonymy

1852. *Nassa punctata* (A. Adams), 20: p. 105.

1984. *Nassarius (Telasco) reeveanus* (Dunker, 1847)-Cernohorsky, 14: p. 115, pl. 20, fig. 4.

1984. *Nassarius (Telasco) gaudiosus* (Hinds, 1844) forma *marrati* [sic] (E. A. Smith, 1870)-Drivas & Jay, p. 10, fig. 7b (not of Smith, 1870).

1986. *Nassarius gaudiosus* (Hinds, 1844)-Abbott & Dance, 3th ed.: p. 180 (not of Hinds, 1844).

1994. *Nassarius reeveanus* (Dunker, 1847)-Wilson, p. 85, pl. 14, figs. 14a-b (not of Dunker, 1847).

1994. *Nassarius pictus* (Dunker, 1847)-Coulombell, p. 80.

2004. *Nassarius velatus* (Gould, 1850)-Qi, p. 99, pl. 59, fig. M (not of Gould, 1850).

2005. *Nassarius (Telasco) reeveanus* (Dunker, 1847)-Dharma, p. 106, figs. 10d-e (not of Dunker, 1847).

2007. *Nassarius punctatus* (Adams, 1851)-Thach, p. 106, pl. 27, figs. 487a-b.

2008. *Nassarius reeveanus f. marrati* (Smith, 1876) [sic]-Robin, p. 237, fig. 3 (not of A. Adams, 1852).

2008. *Nassarius reeveanus* (Dunker, 1847)-Lozouet & Plaziat, p. 62, pl. 29, figs 1-3 (not of Dunker, 1847).

2017. *Nassarius gaudiosus* (Hinds, 1844)-Coulombell, p. 80 (non Hinds, 1844)-Gili, p. 43 (error) (not *N. gaudiosus*).

2017. *Nassarius punctatus* (A. Adams, 1852)-Gili, p. 47, figs. 10-18.

Vernacular name : Punctate/ dotted Nassa.

Type locality : Puerto Galera, Mindanao, Philippines.

Examined specimens

Lectotype of *Nassa punctata* A. Adams, 1852 (designated by Cernohorsky, 1984) (British Museum of Natural History, London; Specimen number 1973136) (images examined from Cernohorsky, 1984: P. 116; Pl. 20, Fig. 4). In addition to the lectotype, following material also compared with our specimens: 1 specimen (CG 580-N/1) from Batu Layar, Pangandaran, Java, Indonesia [images examined from Gili (2017): P. 47, Fig. 10 to 12]; 1 specimen (CG 749-N/4) from Bali, Indonesia [images examined from Gili (2017): P. 47, Fig. 13 to 15] and 1 specimen (CG 871-N/2) from Tahiti, French Polynesia [images examined from Gili (2017): P. 47, Fig. 16 to 18].

Five specimens of *N. punctatus* (A. Adams, 1852) were collected on 5, December 2014; within fine sand in the intertidal area

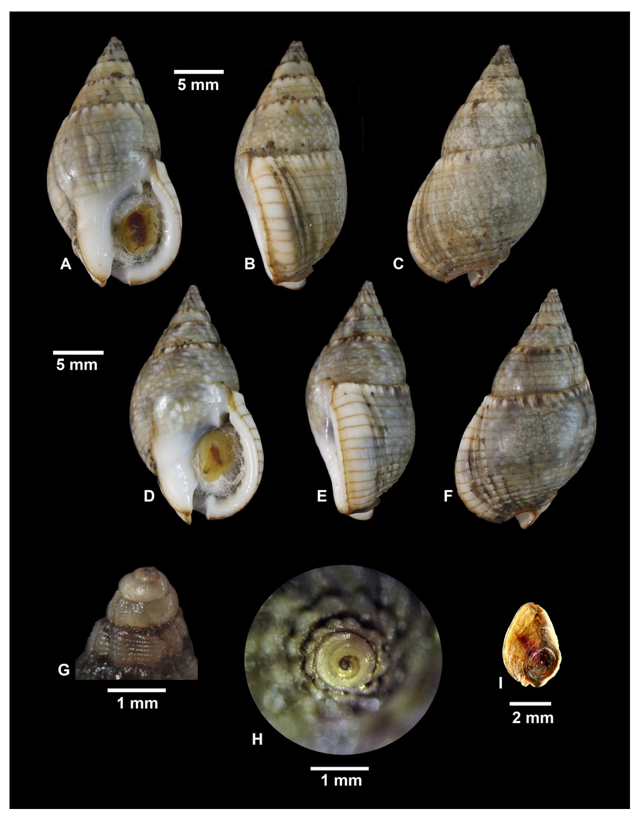

Fig. 2. *N. punctatus*, BNHS NASSA 318 [A to C: Shell (height 23.4 mm, width 13.1 mm)]; BNHS NASSA 462 [D-F, Shell, height 23.6 mm, width 13.0 mm]; G: apex of BNHS NASSA 462; H: protoconch of BNHS NASSA 462; I: operculum of BNHS NASSA 318

at Mirya, Ratnagiri district, Maharashtra, India (17° 01′ 25.2″ N 73° 16′ 17.7″ E); intertidal, up to 1 m depth) with accession numbers BNHS NASSA 316 (height 22.1 mm, width 12.9 mm; Fig. 2, A-C); BNHS NASSA 317 (height 23.6 mm, width 13.2 mm; Fig. 2, D-F); BNHS NASSA 318 (height 23.4 mm, width 13.1 mm); BNHS NASSA 462 (height 23.6 mm, width 13.0 mm); and BNHS NASSA 463 (height 22.6 mm, width 12.8 mm). The specimens with accession numbers BNHS NASSA 318 and BNHS NASSA 462 were used for dissecting radula and studying different morphological characters.

Description

Animal (Fig. 1): Head-foot of animal whitish cream with numerous black speckles present on the whole body. Eyes conspicuous, black. Penis moderately large, elongate, dorso-ventrally flattened, gradually tapering to pointed tip, uniformly cream in colour. Siphon is pigmented, slender and characteristically long while extended.

Shell (Fig. 2. A-H): Shell up to 23 mm in length that may exceed slightly, elongate-ovate, conical, solid, teloconch up to 6.75, weakly convex whorls. Multispiral protoconch about 3.25 glassy yellowish brown (ochre) convex embryonic finely carinated whorls, transition to teleoconch marked by an opisthocyrt rib. Teleoconch up to 6.75 whorls, first 3 with quite wide and close ribs, somewhat prosocline, frequently arcuate that gradually disappear becoming obsolete and remaining only a series of small prominent and close subsutural nodules. The spiral cords of the first three whorls are very narrow and about 7 to 10 in number, separated by very fine grooves; only the first subsutural cord is slightly larger, and they progressively disappear from the third whorl, being the subsutural cord that remains most. Axial ridges followed by a strong varix reappear and become more crowded behind the outer lip, rest of the conch is smooth. The suture is channelled. Shell colour is greyish brown in the background or slightly greenish with numerous whitish or yellowish patterned spots and numerous transverse dark brown fine spiral lines. Subsutural nodules are whitish or yellowish and the external part of the outer lip is more uniformly white. Dark brownish inside, yellowish to brownish denticles and columellar callosity. Protoconch usually glossy brown, sometimes ochre. Aperture whitish, ovate, moderately wide, heavily convex, outer lip thickened with varix, the interior of with about 10 to 12 regularly arranged, prominent, lirate 7-8 denticles. Columella concave, plicate with two or three fine folds. The columellar callus is thick, smooth, white, and more or less transparent, spreading to some extent on the body whorl and extending outwards at the siphonal canal forming an anterior ridge. Anterior or siphonal canal short, distinct, wide and marked with five or six very close spiral grooves or basal cords. The posterior or anal canal is distinct, deep, narrow and marked by a posterior columellar ridge and a strong parietal denticle on the top of the columella.

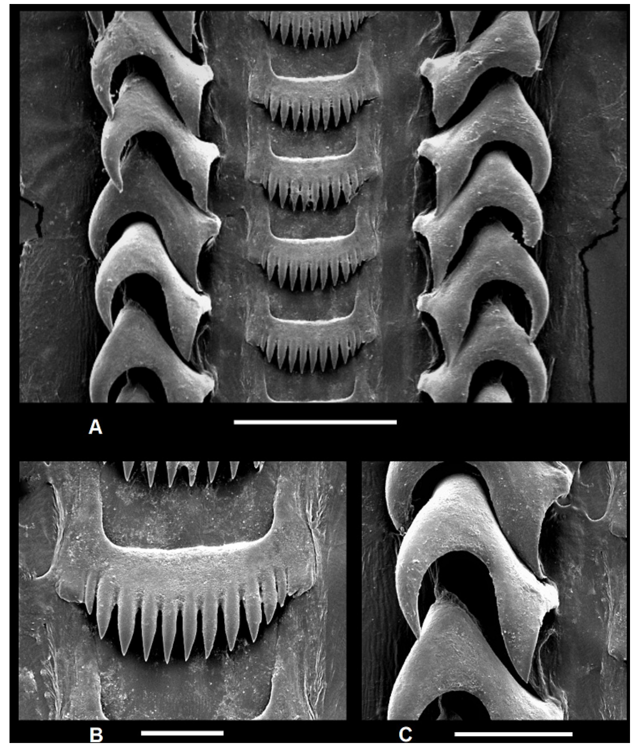

Fig. 3. Radula of *N. punctatus,* NASSA 318. A: part of radular ribbon showing three transverse rows of teeth (accessory lateral plates absent); B: rachidian tooth; C: lateral plate. Scale bars: A= 200 μm, B= 50 μm & C= 100 μm

Some variabilities observed in the specimens are the extension of the subsutural cord in some shells perceived until the penultimate whorl, although faintly defined (Gili, 2017); thickness of columellar callus, and its spread on the body whorl, *ie.* the region of the callosity on the whorl is also variable; the colour of the protoconch, which is ochre in some cases (Gili, 2017).

Operculum (Fig. 2I): Operculum of BNHS NASSA 318 is corneous, yellowish brown and usually with a dark red streak through the centre, trapezoidal, ovate-elongate, simple, flattened with smooth margin, crenate outer margin and terminal nucleus. Information on the operculum of lectotype is not available.

Radula (Fig. 3): Radula of BNHS NASSA 318 consists of 62-65 rows of teeth; rachidian teeth with a square base and cutting edge fringed with 11 sharp, pointed, conical denticles in symmetrical arrangement; corners wide and smooth. Accessory lateral plates are absent. Lateral teeth with two arched, narrow, elongated and pointed hook-like cusps, the basal cusp being shorter than the upper cusp.

Fig. 4. Global distribution of *N. punctatus*. Red star is the type locality (Puerto Galera, Mindanao, Philippines); Black circles are its previously known localities; Red circles are its new localities from India

The inner cutting edge of the lateral teeth (between the two cusps) is smooth. The outer edge of the basal cusp (below the basal spur) is also smooth. The basal spur is prominent. Information on the radula of lectotype is not available. Radula of *N. punctatus* is similar to all other published radulae of *Nassarius* species in basic characters. The only striking difference is its rachidian teeth with a square base. Radulae of all other *Nassarius* species have rachidian teeth with concave crescentic bases.

Global distribution (Fig. 4): INDIAN OCEAN: MAURITIUS: no particular locality mentioned; SRI LANKA: Kankesanturai (N. of Jaffna) https://www.gbif.org/occurrence/215813291; Djibouti; Réunion; VIETNAM: no particular locality mentioned; INDONESIA: Ceram I., Moluccas; Ambon anchorage, Moluccas; PHILIPPINES: Alona Beach, Panglao I.; Balicasag I., Bohol; Lubang I., Balakias Bay, Mindoro; Calapan, Mindoro; Cuyo, Palawan; Luzon I.; CHINA: no particular locality mentioned; AUSTRALIA: no particular locality mentioned; NEW CALEDONIA: between Touho Bay and Ilot; FRENCH POLYNESIA: no particular locality mentioned (GBIF occurrences https://www.gbif.org/species/9408808, Cernohorsky, 1984; Gili, 2017).

Localities within India (Fig. 4): Maharashtra: Mirya, Ratnagiri present study; Diu and Daman: Diu (Dr. Hugo Kool *pers. comm.* in 2013).

Habitat: Intertidal, fine silty sand, benthic.

Discussion

N. punctatus has not been reported from India earlier (Nerurkar *et al*., 2020) and thus, the present record extends

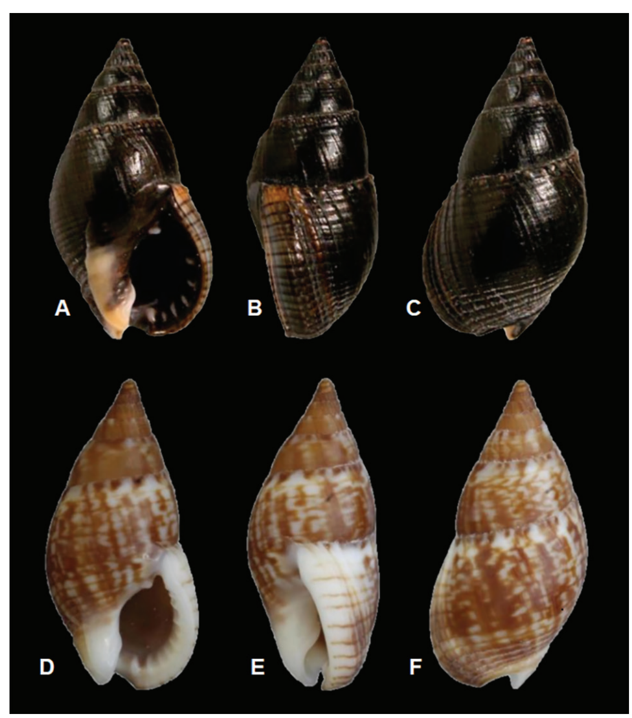

Fig. 5. *N. luctuosus*, CG 1046-N. A to C: Shell [height 18.87 mm (Gili, 2017: P. 46, Fig. 1to 3); *N, marratii*, HK 988.07. D to F, Shell [height 15.6 mm (Kool, 2013: P. 43, Fig. 14 to16)

the known range of the species to Indian waters. The species shows morphological similarities and can be confused with *N. luctuosus* (Fig 5, A-C) and *N. marratii* (E. A. Smith, 1876) (Fig 5, D-F). Compared to *N. luctuosus*, *N. punctatus* has a larger protoconch and a longer carina. The shell of *N. punctatus* is less slender and the outer lip denticles are finer and more numerous than *N. luctuosus*. The colouring of both the shells is different. In addition, the longitudinal cords remain until the last whorl in *N. luctuosus*. Compared to *N. marratii*, *N. punctatus* has a high spire. *N. punctatus* differs from *N. marratii* in having columellar tubercules and a larger parietal denticle. The colouring of both the shells is different and *N. punctatus* is always dotted. *N. luctuosus* is distributed in the Pacific Ocean from Japan and China to the Philippines (Gili, 2017), India, while *N. marratii* is distributed from Sri Lanka to Thailand including Andaman and Nicobar Islands, India; from Malaysia (Sabah), Indonesia and the Philippines to New Guinea, Vanuatu and the Solomon Islands (Kool, 2013).

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