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First Record of *Dendrodoris nigra* (Stimpson, 1855) from Saurashtra coast of Gujarat, India with Observation on effect of Sediment Composition on Distribution

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Abstract

Dendrodoris nigra (Stimpson, 1855) belongs to Phylum: Mollusca, Class: Gastropoda, Order Nudibranchia. This species is common in the Indian and Pacific Ocean. From India this species was recorded from Gulf of Mannar and Lakshdweep. In Gujarat this species was observed earlier in the Gulf of Kachchh. The present report describes the first record of the species from the Dwarka reef situated along the Saurashtra coast.

Keywords: *Dendrodoris nigra*, Saurashtra Coast, Dwarka, Sediment.

Introduction

Dendrodoris nigra (Stimpson, 1855) belongs to Phylum: Mollusca, Class: Gastropoda, Order Nudibranchia. *Dendrodoris nigra* has wide distribution in different parts of Indo-West Pacific[1], Zanzibar[2], South Africa and Tanzania[3], Oman, Persian Gulf and Western Pacific[4], Red Sea[5] and East Africa to eastern Australia, north to Mutsu Bay, Japan, Gilbert Islands, and New Caledonia[6, 7]. The species has also been reported from various parts of India such as Gulf of Mannar[8], Gulf of Kachchh[9;10] and Lakshadweep Islands[11]. The Dwarka reef is dominated by rocky substratum with various sized tidal pools. The exposure of intertidal zone at Dwarka is about 80-90 meters. The shore is also covered with various types of marine algae, hydroids, zooxanthellae apart from some patches of the coral (*Favitus* sp.). Inter-tidal area is rich in biodiversity.

Material and Methods

The survey was conducted at the intertidal areas of Dwarka which is the part of the Saurashtra Coast. Direct search method was used to search the opisthobranchs. The species was observed, and photographed in-situ using Canon D-10. The GPS readings were taken using Garmin e-trex model hand held navigator. Measurements of the specimens were recorded on the site. Thereafter specimens were relaxed using solution of menthol in sea water and preserved in 100% Ethyl Alcohol. The preserved specimens were then deposited to the collections of the Bombay Natural History Society for future reference. The sediment analysis was also carried out by collecting 1 kg of sample. After completely drying the sample was filter through various sieves of different mesh sizes. Then content of each mesh were weighted.

Material Examined: Total three specimens were observed. The size of observed specimens ranged between 42-60 mm (table 1).

BNHS-opistho-536 (a,b): *Dendrodoris nigra*, two specimens collected on 17/12/2010 at Dwarka, Gujarat; preserved in 95% Alcohol. One specimen was found under the rock in tidal pool where other one was crawling on the top of the small loose rock in another pool.

BNHS-opistho-539: *Dendrodoris nigra,* one specimen collected on 16/12/2010 at Dwarka, Gujarat; preserved in 95% Alcohol. This one was found under the rock.

Results and Discussion

Systematic: Dendrodorididae (Family), Dendrodoris (Genus), *Dendrodoris nigra* (Stimpson, 1855).

Relatively low and elongate body of black colour with bluish tinch; slightly erected irregular sized white pustules spread randomly on the dorsal and mental; white pustules in small cluster on the dorsal side while as big single unit on the lateral sides; smooth and undulating mental margin; mental size depends upon the animal activity; presence of red bend on the mental; transversely grooved strong foot, extending behind mental; continues red bend on the margin of foot; head is small; rhainophore were tapering with simple, thin and lofty pockets; rounded, angled slightly backwards clavus with approximately 16 slopping lamellae; first 3-4, white coloured at the front side, lamellae erected at top; finely branched gills, approximately 8-9 in numbers; gills formed a partial circle when animal at rest while form gill plume when animal on the move; gill plume directed backward when animal was on the move[12] (figure 2).

Though there are few records of Dendrodorididae and *Dendrodoris nigra* from the adjoining Gulf of Kutch and other regions of India (table 2) but as stated earlier the species is not reported from the Saurashtra coast. This is the first record of the Saurashtra coast.

Collected specimen's leantgh were 42-60 mm. as compared to 20 mm by Satyamurti (1952) (13), 44-36 mm reported by Narayan[10], 2.5-64 mm by Brodie et al.[12] and 80 mm by Apte[11]. The collected specimens during this survey were the same in terms of body colour and patterns. Specimens were having bluish-black body colour with white coloured spots on the dorsal side. Brodie et. al.[12] has described white spots as a distinct character of this species. However, the specimens observed by Narayan[10] were greyish-blue and those by Apte[11] are plain black. In the case of marginal red ring of specimens, Apte[11] mentioned that sub marginal red colour ring on the mantle was seen only in juvenile specimens of Lakshadweep. According to Brodie et. al.[12] the clavus, bears approximately 17 sloping lamellae in observed specimens while in present specimen the lamellae numbers were 16. Other characters like branchial pocket, gills are same as observation of Brodie et. al.[12].

Dendrodoris nigra prefers coarse sand on reef. In Gujarat, we have always seen *Dendrodoris nigra* on more coarse sand of Dwarka (table 3) as compared to *Dendrodoris fumata* which prefer sand with high silt contents of Narara (table 3). Same kind of distribution pattern was observed in other studies like record of Menon et al.[9] was from Pirotan Island which is again comprised of coarse sand. Similar trend was observed at other locations such as Lakshadweep Apte[10] where *Dendrodoris nigra* is present in abundance while *Dendrodoris fumata* is absent as the substrate there is entirely of coarse sand and lack of silt. In Andaman and Gulf of Mannar, the areas dominated by silt were occupied by *Dendrodoris fumata* while as *Dendrodoris nigra* occur only on coarse sand. This could be due to structure and position of the gills. *Dendrodoris nigra* have more lamella type of gills which are usually coupled together when animal is on the move while *Dendrodoris fumata* have more open type of gills which is flatten while animal is on the move. The high silt contents in the sediments might have deposits on the *Dendrodoris nigra* gills but more behaviour study is needed on aspect of relation between sediment characterization and animal distribution of this genus.

Conclusion

Though *Dendrodoris nigra* is one of the common species of Dendrodorididae family, it is first time that anyone recorded it from the Saurashtra Coast. It has been observed that this species is found on the reef where sediment composition is more of coarse sand which is probably due to type of gills it has.

Table-1
Measurements of *Dendrodoris nigra* (Stimpson, 1855) at Dwarka Reef

No.	Specimen No.	GPS Points		Length (mm)	Breadth (mm)
		N	E		
1	S1(536a)	22°14'27.40"	68°57'23.20"	60	29
2	S2(536b)	22°14'26.80"	68°57'21.10"	42	25
3	S3(539)	22°14'25.90"	68°57'24.70"	58	21

Table-2
Records of genus *Dendrodoris* fauna from India

Sr. No	Name of Species	Recorded By	Locality
1	*Dendrodoris fumata* (Rüppell & Leuckart, 1830)	Alder and Hancock[13]	Chennai
		Apte et al.[14]	Gulf of Kutch
		Bhave et al.[15]	Ratnagiri
2	*Dendrodoris tuberculosa* (Quoy & Gaimard, 1832)	Apte [11]	Lakshadweep Island
3	*Dendrodoris guttata* (Odhner, 1917)	Apte et al. (manuscript under review)	Andaman Island
4	*Doriopsilla miniata* (Alder & Hancock, 1864)	Alder and Hancock [13]	Chennai
		Narayan[11]	Gulf of Kuchchh
		Apte et al.[14]	Gulf of Kuchchh

Table-3
Sediment analysis of Study Site

Site	Wet Wt. (Kg.)	Dry Wt (gm.)	> 2 mm (gm)	> 1 mm (gm)	> 0.500 mm (gm)	> 0.250 mm(gm)	> 0.125 mm(gm)
Dwarka	1	780	60	240	440	40	0
Narara	1	700	60	120	180	220	120

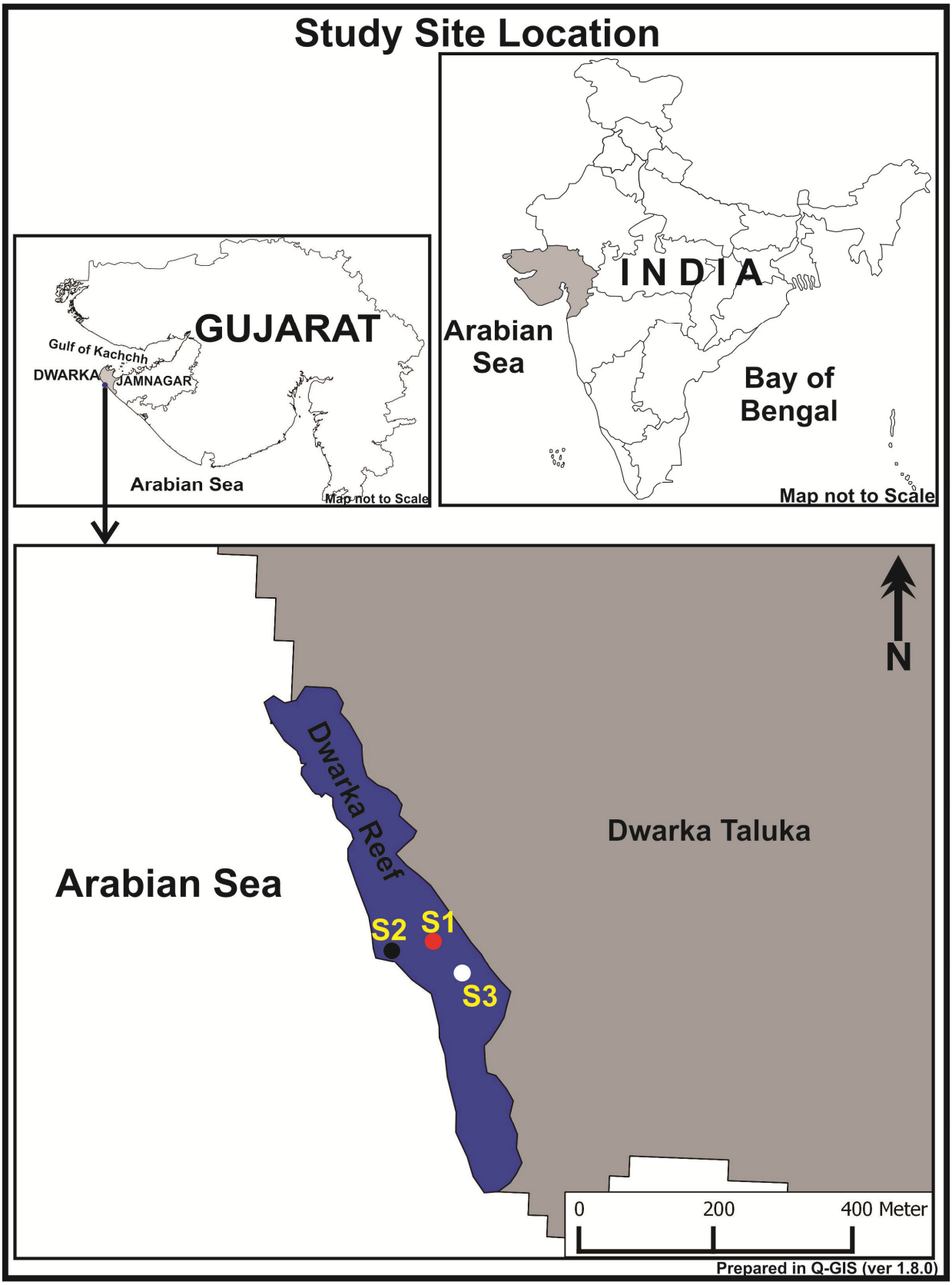
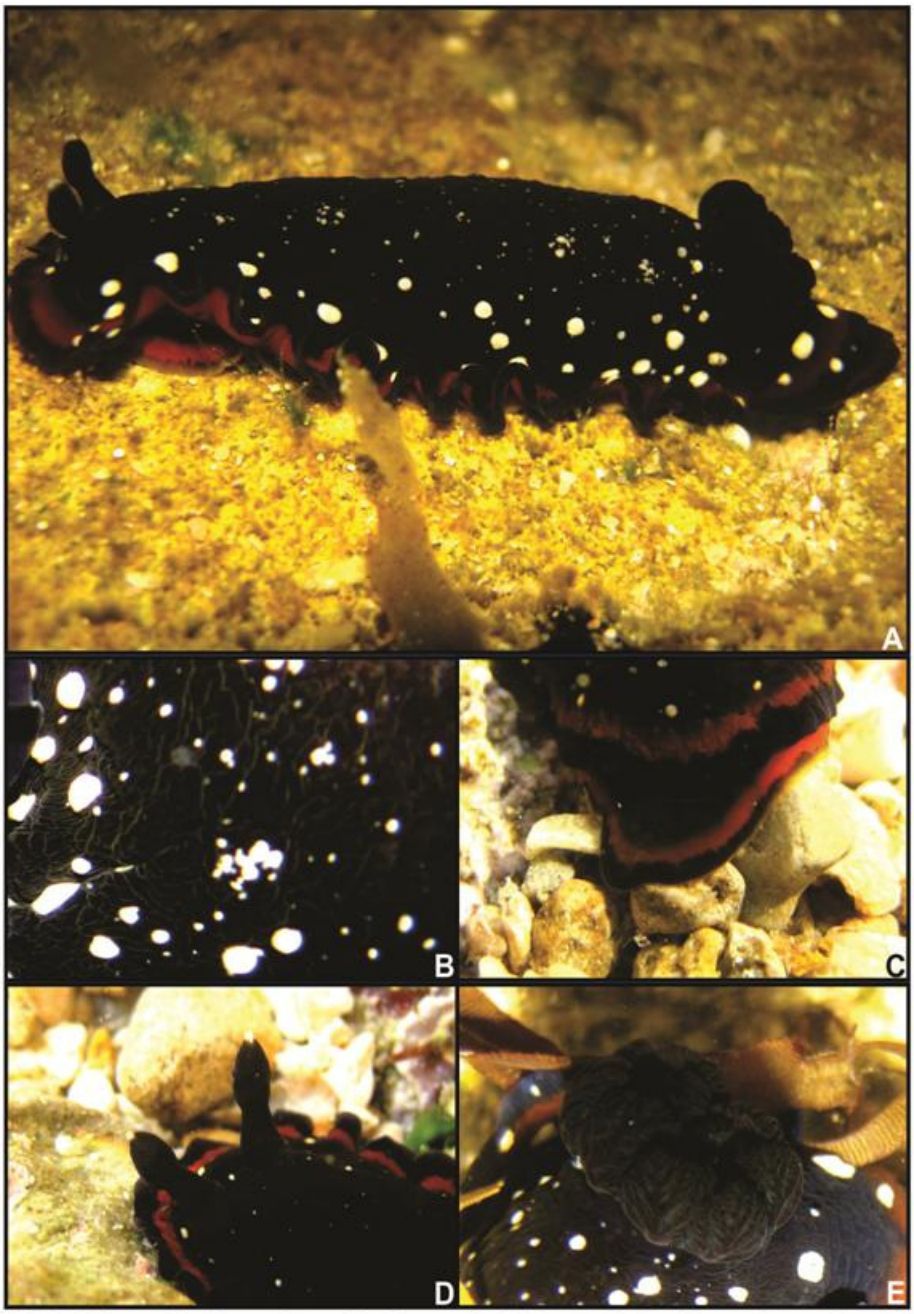


Figure-1
Study site location



A- Side View, B- Pustules, C- Extended Foot, D- Rahinophors, E- Gills

Figure-1
***Dendrodoris nigra* (Stimpson, 1855)**

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