



New record of a sea slug, *Dendrodoris fumata* (Rüppell & Leuckart, 1830) (Nudibranchia: Dendrodorididae), from Odisha, east coast of India

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Original Article

Abstract

The occurrence of a nudibranch, *Dendrodoris fumata* (Rüppell & Leuckart, 1830), in the waters of a mangrove embayment, south of Bhattarkanika in Odisha, on the east coast of India, highlights the importance of benthic monitoring of the region from a biodiversity perspective. *D. fumata*, otherwise a common species is reported for the first time from Odisha coast and confirms its range extension towards the northeastern Bay of Bengal. A brief description of the species with ecological parameters and taxonomic details are provided.

Keywords: East coast, mangroves, Hukitola Bay, nudibranch, *Dendrodoris fumata*

Introduction

Marine species documentation at local and regional scales assumes importance, given the increasing anthropogenic interferences along coastlines. Such impingements could result in species loss across space and time, thus emphasizing baseline biodiversity monitoring of poorly explored regions (Nimbs and Smith, 2018). A near-pristine mangrove embayment, the Hukitola Bay of the Jambu Kharnasi region, interposed between the Bhattarkanika mangroves in the north, and the Mahanadi estuary towards the south was explored for benthos. Amongst the diverse macrobenthic fauna obtained, a nudibranch was spotted. Typically with uncovered gills, and an undulated skirted mantle margin, the cream-hued spotted sea slug species is the first observation from the region under consideration. From the coastal waters of peninsular India, as many as 292

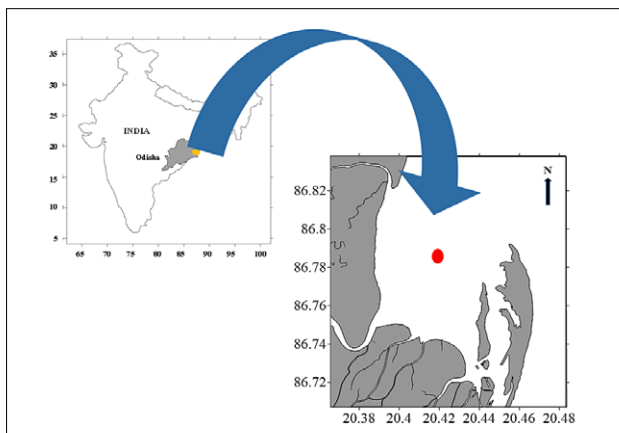
nudibranch species were documented (Sreeraj, 2020). Apte and Desai (2017) recorded an incredible nudibranch diversity (273 species) from the Andaman and Nicobar Islands. While a considerable number of species have been recorded from the west coast, there were relatively fewer records from the east coast of India. The records from Odisha are of nine species (Sreeraj, 2020) with none reported from the family Dendrodorididae. The present study assumes greater significance since the species of dendrodorid nudibranch reported is a first addition to the molluscan database of Odisha. Notably, though documented from Tamil Nadu (Satyamurti, 1952; Kumar *et al.*, 2011; Sethi *et al.*, 2015) and Andhra Pradesh (Alder and Hancock, 1864; Apte and Desai, 2017), the species is now observed farther along the northeast coast of India. Fifteen species of the genus *Dendrodoris* were reported from India. The species *D. fumata*, though recorded from the west coast, occurrence on the east coast was confined to Tamil Nadu, Andhra Pradesh, and the Andaman and Nicobar Islands (Table 1).

Material and methods

Routine benthic monitoring in March 2021 in a mangrove embayment (20°26'5.65"N and 86°47'46.52"E) (depth 2-3 m), south of Bhattarkanika in coastal Odisha, India, yielded diverse macrofaunal organisms. Amongst the fauna obtained, a single specimen of a nudibranch *D. fumata* was recorded in the dredge hauls (20 x 50 cm; mesh size ~0.6 cm²) operated from a fishing boat in Hukitola Bay (20°24'26.84"N, 86°44'1.12"E to 20°27'59.01"N, 86°46'35.17"E), Odisha, India (Fig. 1). After collection, the specimen was washed with seawater, carefully relaxed by adding small quantities of 10% Magnesium Chloride solution and photographed using a digital camera (Nikon

Table 1. Checklist of dendrodorid species recorded from India.

No.	Species	Locality	References
1.	<i>Dendrodoris albobrunnea</i> Allan, 1933	Tamil Nadu	Kumar <i>et al.</i> , 2019
2.	<i>D. areolata</i> (Alder and Hancock, 1864)	Andhra Pradesh, Tamil Nadu	Alder and Hancock, 1864; Sethi <i>et al.</i> , 2015; Sreeraj, 2020
3.	<i>D. atromaculata</i> (Alder and Hancock, 1864)	Andhra Pradesh; Tamil Nadu; Gujarat	Alder and Hancock, 1864; Sethi <i>et al.</i> , 2015; Apte and Desai, 2017; Vadher <i>et al.</i> , 2020
4.	<i>D. carbunculosa</i> (Kelaart, 1858)	Andhra Pradesh	Alder and Hancock, 1864
5.	<i>D. coronata</i> (Kay and Young, 1969)	Lakshadweep	Ravinesh <i>et al.</i> , 2013
6.	<i>D. elongata</i> (Baba, 1936)	Andaman and Nicobar	Dixit <i>et al.</i> , 2017
7.	<i>D. fumata</i> (Rüppell and Leuckart, 1830)	Andaman and Nicobar; Andhra Pradesh; Tamil Nadu; Kerala; Karnataka; Goa; Maharashtra; Gujarat	Sreeraj <i>et al.</i> , 2012; Alder and Hancock, 1864; Apte and Desai, 2017; Satyamurti, 1952; Kumar <i>et al.</i> , 2011; Sethi <i>et al.</i> , 2015; Bhawe and Apte, 2011; Apte <i>et al.</i> , 2010; Parasharya, 2012; Venkataraman <i>et al.</i> , 2015; Raghunathan <i>et al.</i> , 2016; Apte and Desai, 2017; Vadher <i>et al.</i> , 2020
8.	<i>D. fusca</i> (Alder and Hancock, 1864)	Andhra Pradesh	Alder and Hancock, 1864; Raghunathan <i>et al.</i> , 2016; Sreeraj, 2020
9.	<i>D. goani</i> (Rao and Kumary, 1973)	Goa	Rao and Kumary, 1973
10.	<i>D. grisea</i> (Kelaart, 1858)	Andhra Pradesh	Alder and Hancock, 1864; Raghunathan <i>et al.</i> , 2016; Sreeraj, 2020
11.	<i>D. guttata</i> (Odhner, 1917)	Andaman and Nicobar	Apte <i>et al.</i> , 2015; Dixit <i>et al.</i> , 2017; Kumar <i>et al.</i> , 2011
12.	<i>D. krusensternii</i> (Gray, 1850)	Andaman and Nicobar; Andhra Pradesh; Kerala; Lakshadweep; Goa	Alder and Hancock, 1864; Ramakrishna <i>et al.</i> , 2010; Dey, 2016; Raghunathan <i>et al.</i> , 2016; Apte and Desai, 2017; Chandran <i>et al.</i> , 2017
13.	<i>D. nigra</i> (Stimpson, 1855)	Andhra Pradesh; Tamil Nadu; Andaman and Nicobar; Kerala; Gujarat; Lakshadweep	Alder and Hancock, 1864; Satyamurti, 1952; Apte, 2009; Subba Rao and Satry, 2005; Ramakrishna <i>et al.</i> , 2010; Patel <i>et al.</i> , 2013; Poriya <i>et al.</i> , 2015; Venkataraman <i>et al.</i> , 2015; Raghunathan <i>et al.</i> , 2016; Apte and Desai, 2017; Chandran <i>et al.</i> , 2017
14.	<i>D. pustulosa</i> (Alder and Hancock, 1864)	Andhra Pradesh	Alder and Hancock, 1864; Dey, 2016; Sreeraj, 2020
15.	<i>D. tuberculosa</i> (Quoy and Gaimard, 1832)	Andhra Pradesh; Lakshadweep; Andaman and Nicobar	Alder and Hancock, 1864; Apte, 2009; Apte and Desai, 2017

Fig. 1. Google earth map showing the location of the sampling site of *D. fumata* (Rüppell and Leuckart, 1830)

D5600). The specimen was preserved in 10% formalin and in the laboratory after washing, it was transferred to 70% ethyl alcohol and vouchered (Voucher no. 1, Environmental Science Laboratory, Department of Zoology, Ravenshaw University, Nudibranch; abbreviated as ESLDZRUN 1). Identification was made based on the key taxonomic features (Ramakrishna *et al.*, 2010; Gosliner *et al.*, 2008) and also from related websites accessed (<http://www.seaslugforum.net>; <http://www.nudipixel.net>). A dial Caliper was used for morphometric measurements. The classification given in the World Register of Marine Species

(WoRMS) was followed. Ecological parameters, such as water samples, were analyzed according to the standard procedures given in APHA (2017); Grasshoff *et al.* (1999). Sediment texture was determined through wet sieving and pipette analysis (Krumbein and Pettijohn, 1938) and organic matter by the wet oxidation method (Gaudette *et al.*, 1974).

Results

The nudibranch specimen (Fig. 2) was identified as *D. fumata* (Rüppell and Leuckart, 1830) and the following is the taxonomic account of the species.

Systematics

Class: Gastropoda
 Subclass: Heterobranchia
 Subterclass: Ringipleura
 Superorder: Nudipleura
 Order: Nudibranchia Cuvier, 1817
 Suborder: Doridina
 Infraorder: Dorodoidei
 Superfamily: Phyllidioidea Rafinesque, 1814
 Family: Dendrodorididae O'Donoghue, 1924 (1864)
 Genus: *Dendrodoris* Ehrenberg, 1831
Dendrodoris fumata (Rüppell and Leuckart, 1830)

Synonymy

Dendrodoris rubra (Kelaart, 1858); *Doridopsis rubra* (Kelaart, 1858); *Doris atrata* Kelaart, 1858; *Doriopsis rosea* Vayssière, 1912; *Doridopsis communis* Risbec, 1928; *Doridopsis communis* var. *nigra* Risbec, 1928; *Doridopsis communis* var. *rosea* Risbec, 1928; *Doris fumata* Rüppell and Leuckart, 1830, Original combination.

Material examined

Single live adult specimen (Fig. 2), Voucher no. ESLDZRUN 1 from Hukitola Bay (Latitude 20°25' 43.52"N; Longitude 86°45' 55.97"E) south of Bhattarkanika, Odisha; dated 31.03.2021, depth 1.21m.

Description

The specimen is 45 mm long, 25 mm in width, thick and solid, slightly arched dorsum, oval, elongated in shape; creamy white with an orange-yellow hue in fresh condition. The skin of the mantle is smooth, soft; speckled with slightly raised papillae appearing dark bluish-purple, almost like black spots. The outer mantle margin is rugose, ruffled and crenulated; a faded reddish hue around the mantle margin in the freshly preserved specimen.

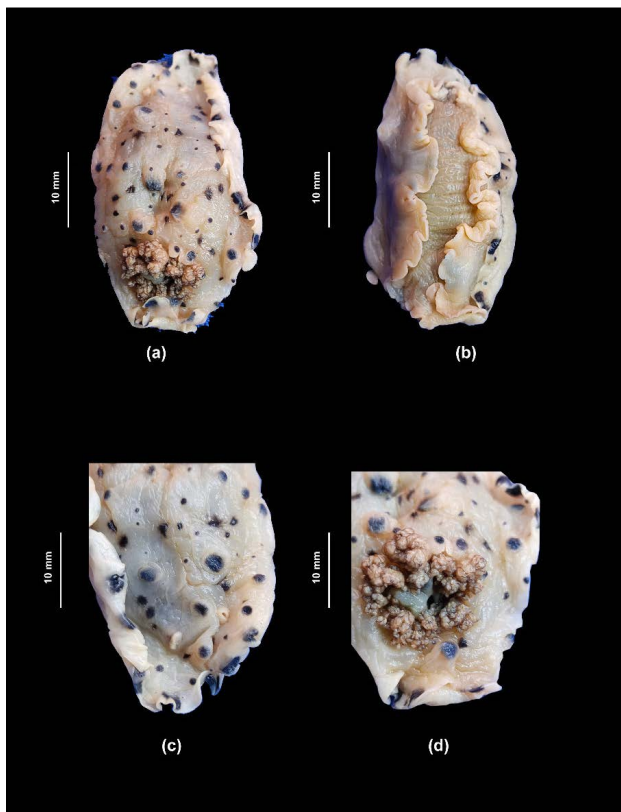


Fig. 2. *D. fumata* (Rüppell and Leuckart, 1830), a. Dorsal view, b. Ventral view, c. Rhinophores, d. Gill plumes

Head small; the mouth is seen as a minute aperture. The radula is not seen. Rhinophores are bulbous, lamellated distinctly stalked. Rhinophoral pockets with simple, thin, distinguished with marginally raised edges; orange-brown coloured prominent gills, clustered, tripinnately branched, 5 in number, encircled around the anal papilla on posterior dorsum; Foot depicts strong transverse grooves towards its anterior part.

Distribution

The global distribution is tropical Indo Pacific. Reported from the Red Sea, Israel, Africa, Seychelles, Reunion, Vietnam, Singapore, Korea, Japan, Western Australia, and New Caledonia. In India, it is distributed to the Andaman and Nicobar Islands (Sreeraj *et al.*, 2012); Andhra Pradesh (Alder and Hancock, 1864; Apte and Desai, 2017); Tamil Nadu (Satyamurti, 1952; Kumar *et al.*, 2011; Sethi *et al.*, 2015); Kerala (Apte and Desai, 2017); Karnataka (Apte and Desai, 2017); Goa (Apte and Desai, 2017); Maharashtra (Bhave and Apte, 2011); Gujarat (Apte *et al.*, 2010; Parasharya, 2012; Venkataraman *et al.*, 2015; Raghunathan *et al.*, 2016; Apte and Desai, 2017; Vadher *et al.*, 2020).

Ecology

The specimen was recorded from the muddy textured substrate (sand 13.72%, silt, and clay 86.28%) with high organic matter (2.19%), at a salinity of 23.55 PSU and dissolved oxygen 6.8 mg/l. The cohabitant species noticed were the gastropod muricid *Indothais lacera* (Born, 1778) and olivid *Agaronia gibbosa* (Born, 1778) from the same location.

The present finding of *D. fumata* from the bay waters of Hukitola assumes significance, as it is the first record from Odisha and its documentation indicates its northeastward range extension into the waters of the Bay of Bengal.

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