



## First record of *Okenia pellucida* Burn, 1967 (Mollusca: Nudibranchia) from India

Vishal Bhave<sup>1</sup> & Deepak Apte<sup>2</sup>

<sup>1</sup> Scientist 'B', <sup>2</sup> Deputy Director (Conservation)  
Bombay Natural History Society, Hornbill House opp. Lion Gate,  
Shaheed Bhagat Singh Road, Mumbai 400 001, Maharashtra,  
India

Email: <sup>1</sup> vishalbhave@gmail.com (corresponding author),

<sup>2</sup> spiderconch@gmail.com

opisthobranchs was carried out by Apte (2009), Apte et al. (2010), Apte & Salahuddin (2011), Bhave & Apte (2010) and Ramakrishna et al. (2010). The present paper deals with a record of the goniodorid nudibranch *Okenia pellucida* Burn, 1967. There are very few records of goniodorids from India (Alder & Hancock 1864; Winckworth 1946; Ramakrishna et al. 2010). Table 1 provides the checklist of goniodorid species hereto recorded from the Indian coasts.

India has a large and diverse coastal area in terms of biological as well as habitat diversity. India is bracing for large coastal infrastructure development, which will impact intertidal biodiversity and the Maharashtra coast is not an exception. It is therefore essential to develop baseline information on inter-tidal marine biodiversity. As part of this effort, scientists are working on various taxa, and opisthobranchs are one such group under study. They are beautifully colored with highly diverse adaptations to compensate for the loss of shell during the course of evolution. Opisthobranchs are poorly studied from Indian coasts, and recent work on

### Materials and Methods

Direct search method was used to find the opisthobranchs by turning over rocks and boulders in the intertidal region covering various microhabitats such as rock pools and rocky areas. These specimens were collected along with the host bryozoan (*Zoobotryon verticillatum* delle Chiaje, 1828) and kept live in aquaria for a week to study their behavior. Photographs, both underwater and in the laboratory, were captured using a Canon G10 camera. The specimens were preserved directly in 95% ethyl alcohol and deposited in BNHS's opisthobranch collection. The radula was extracted by dissolving the buccal mass in sodium hypochlorite and images were captured using a Leica Microsystem Microscope (Leica EZ 4D and Leica DM 750). The series of microscopic images captured at various depths of field were then combined using the open source software package Combine ZP (<http://www.hadleyweb.pwp.blueyonder.co.uk/CZP/News.htm>).

### Descriptions

#### *Okenia pellucida* Burn, 1967

(Images 1 - On prey *Zoobotryon verticillatum*; 2 - Lateral side; 3 - Dorsal side; 4 - Whole radula, scale bar 200µm; 5 - Innermost radular teeth from new/old rows 23<sup>rd</sup>, scale bar 200µm; 6 - Egg case).

**Material:** A single specimen was used for radula preparation from each of the following collections: (a) Eight specimens collected from the rocky shore near Lighthouse, Ratnagiri on 22.ii.2010 (Catalog Id BNHS-Opistho-296 [voucher]) on *Zoobotryon verticillatum*; (b) Two specimens from Mirya, Ratnagiri 06.v.2011 (Catalog Id BNHS-Opistho-627 [voucher]) on *Zoobotryon verticillatum*.

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Image 1. On prey *Zoobotryon verticillatum*



Image 2. Lateral side



Image 3. Dorsal side



Image 4. Whole radula (light microscope photograph)

Size: 6–20 mm

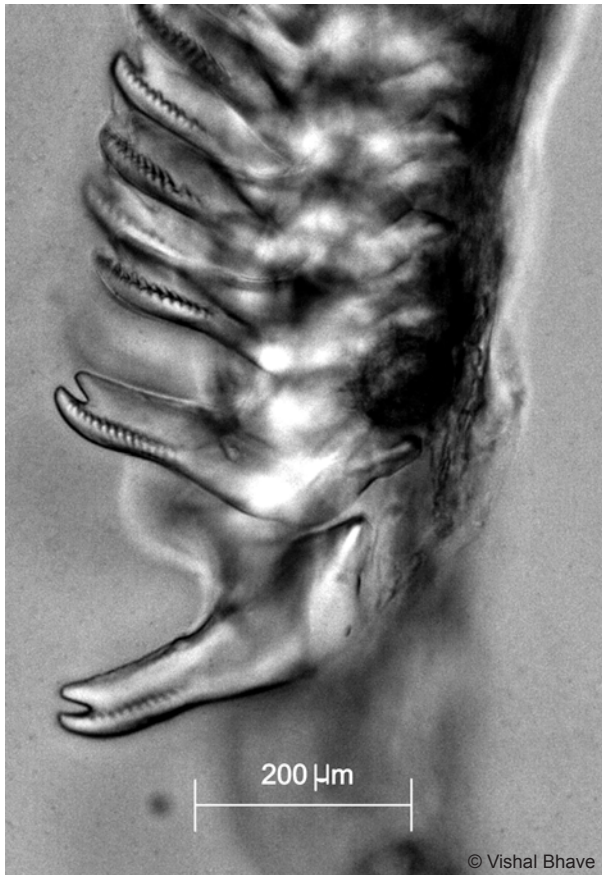
Geographic Distribution: Rudman (2004a) and Gosliner (2004) in their reviews have provided the distribution of this species. The species is known to be widely distributed in New Zealand, Australia, Hawaii, Japan, Palmyra Atoll, Oceania, Malaysia and United Arab Emirates.

Morphology (Images 1–3): The animal is somewhat elongated with a long tail which was observed to be

helpful to cling onto the bryozoan host while feeding. There are 10–12 lateral papillae on each side of the mantle and 5–6 papillae on the dorsal side of the notum. The eight gills are large, bi-pinnate and form a thick rosette. The head can be distinguished easily and the oral tentacles are triangular. The rhinophores are long, approximate 2.5–3 mm, almost 1.5 times the length of the head when alive. Two small papillae

Table 1. Goniodorid fauna recorded from India

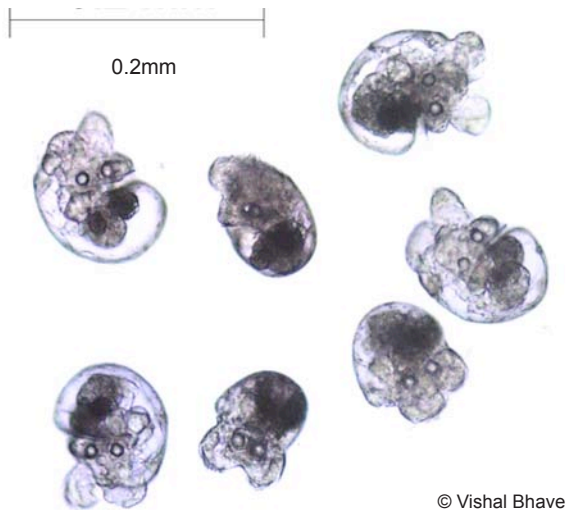
SNo	Name of the species	Recorded by	Locality
1	<i>Goniodoridella savignyi</i> Pruvot-Fol, 1933	Ramakrishna et al. 2010	Andaman Island
2	<i>Goniodoris aspersa</i> Alder & Hancock, 1864	Alder & Hancock 1864	Vishakhapattanam
3	<i>Goniodoris citrina</i> Alder & Hancock, 1864	Alder & Hancock 1864	Vishakhapattanam
4	<i>Goniodoris modesta</i> Alder & Hancock, 1864	Alder & Hancock 1864	Vishakhapattanam
5	<i>Goniodoris kolabana</i> Winckworth, 1946	Winckworth 1946	Mumbai, Maharashtra



**Image 5. Lateral view of innermost radular teeth from rows 23- light micrograph processed with Combine ZP**



**Image 6. Egg case**



**Image 7. Free swimming veligers (with eye spots and larval shells)**

are present on the posterior side of each rhinophore extending up to half its height. There are two papillae in front of each rhinophore.

**Color:** The overall color of the mantle is creamy

white and randomly marked with brown wavy lines. The rhinophores are creamy white; a subapical band of brownish-orange is present on rhinophore and is 1/4<sup>th</sup> of rhinophore height. In some specimens, the base of the rhinophores shows an aggregation of brown wavy lines. Rhinophore tips are pale followed by pale brownish band which is one-fourth in size than that of the rhinophore. Gills are whitish and in some specimens with brownish pigmentation at the base. Oral veil is triangular with oral tentacles short with rounded corners.

**Radular morphology (Images 4–5):** The radular formula of an 18mm animal was 23x1.1.0.1.1. The first lateral tooth is an elongated bicuspid blade and inner margin of inner cusp is denticulate with approximately 10–12 denticles. The size of teeth at its longest edge is 89.37μm. Breadth at blade portion is around 15.20μm.

**Egg case and Larvae (Images 6–7):** The egg cases are randomly laid in the form of white tubular strings. These are loosely attached to the host bryozoans and

thus can be easily detached. It is due to the network structure of the *Zoobotryon verticillatum* colony that the egg cases become entangled and protected. Eggs are large and can be seen by the naked eye in freshly laid egg cases. The length of the string varies between 16–20 mm and the width is around 1–1.5 mm (Image 6).

Free swimming larvae were observed in the egg cases collected from the field. However, these eggs were not freshly laid. The larvae were moving in the egg capsules. The larvae measured around 0.1mm in diameter, when these were free. Large eyespots and clear larval veil with cilia and transparent large shell were easy to spot (Image 7).

### Discussion

This is the first record of *Okenia pellucida* from the Indian subcontinental waters. This species is known to be an oblique associate of the fouling bryozoans *Zoobotryon verticillatum* (Atkinson & Atkinson 2000; Rudman 2004a,b). During the present study, we also observed *O. pellucida* associated with *Zoobotryon verticillatum*.

There are a few records of *Zoobotryon verticillatum* along the coastal shores of India (Swami & Udhayakumar 2010; BioSearch 2011) confined mostly to the east coast of India. This species was recorded from the Mumbai coast recently (Swami & Udhayakumar 2010) and it is the only known record of it on the west coast of India. However, this species is possibly widespread along other parts of India, thus the distribution of *O. pellucida* could be widespread along the coastline. More intensive surveys can throw light on its distribution along the Indian coast.

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