



ADDITIONS TO THE KNOWLEDGE OF SHALLOW-WATER OPISTHOBRANCH MOLLUSCS (GASTROPODA: OPISTHOBRANCHIA) WITH NEW DISTRIBUTIONAL RECORDS TO ANDAMAN ISLANDS, INDIA

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ABSTRACT

Opisthobranchs are the least studied taxa of mollusks not only from Andaman and Nicobar Islands but also in entire Indian waters. The present paper reports the results obtained from different field samplings carried out on the Chidiyatapu reef of South Andaman Islands during March-May 2012. Nine species of opisthobranchs were collected, identified and deposited in the National Zoological Collections of which two are new records to Andaman Islands, while one species is a new record to Indian fauna.

KEYWORDS: Andaman & Nicobar Islands, New Record, Opisthobranch, *Goniobranchus conchyliatus*, *Flabellina bicolor*, *Thuridilla coerulea*.

INTRODUCTION

The Andaman archipelago consists of 572 islands (including islets and rocky outcrops) covering an area of 8293square kilometers on 139 islands. The sister archipelagoes of Andaman and Nicobar form an arc across the Bay of Bengal from Burma in the north and Indonesian island of Sumatra in the south with an aggregate coastline of 1962kilometers. They lie parallel to the coast of Burmese Tenasserim, the Coastal Mergul archipelago and the Thai mainland roughly 600 kilometers to the east and the Indian coast at Chennai is nearly 1100 kilometers to the west. Almost all the islands of the Andaman and Nicobar groups exhibit narrow, linear and extensively well-developed fringing reefs. Nayak *et al.*, (1994) have published lists of the coral reefs for every island and classified them as either fringing reefs or coral pinnacles. Along with the coral reefs, the islands also have other biodiverse ecosystems like mangroves and sea grass meadows much of which remains to be fully investigated thus providing a great opportunity for exploration. Eliot (1910) published the first report on nudibranch from these Islands, which dealt with the collection of nudibranchs by Annandale. The opisthobranchs are least studied taxa and have attracted the attention of a few scientists *viz.*, Apte (2009), Apte *et al.*, (2010), Raghunathan *et al.*, (2010), Ramakrishna *et al.*, (2010), Sreeraj *et al.*, (2010, 2012) and Matwal and Joshi (2011) who have studied opisthobranch fauna of India as well as Andaman and Nicobar Islands. All the previous studies on the diversity of opisthobranchs were carried out taking the whole Andaman & Nicobar archipelago into consideration. Therefore, the present work was carried out with the aim of studying the diversity of opisthobranchs in a particular reef of South Andaman Island.

MATERIALS & METHODS

The sampling site, Chidiyatapu reef is situated in the southern tip of Andaman Island nearly 30 km away from the Island capital Port Blair (11°31' N; 92°43' E). It is a bay region that connects the Andaman Sea and Bay of Bengal through Macpherson strait (Fig. 1). The fringing reef lies about 50m far from the shore. The reef crest is having a depth of 3m after which a steep slope starts going up to 10m depth. The survey and collection of specimens were carried out by snorkeling over the reef during March- May 2012. Animals were observed in the field and samples were collected in flat bottom specimen tubes before they were brought to the laboratory for identification and examination. Detailed observations of live specimens were carried out to reveal their morphological characters and measurements. The specimens were narcotized with a solution consisting of 72 g/l of Magnesium chloride and were fixed in a solution of 5% formaldehyde and seawater.

The following morphological characters were studied for taxonomical identification up to species level *viz.*, general shape and body profile, colour and pattern, morphology of notal tubercles, ridges, the mantle margin, rhinophoral colour, foot and oral tentacles. Standard taxonomic keys were used *viz.*, Gosliner *et al.* (2008), Rudman (1984), Brunckhorst (1993); and two web-based portals, the Australian Museum's Sea slug Forum (www.seaslugforum.net) and NudiPixel (www.nudipixel.net). The collected specimens were registered and submitted in the National Zoological Collections of the Zoological Survey of India, Port Blair.

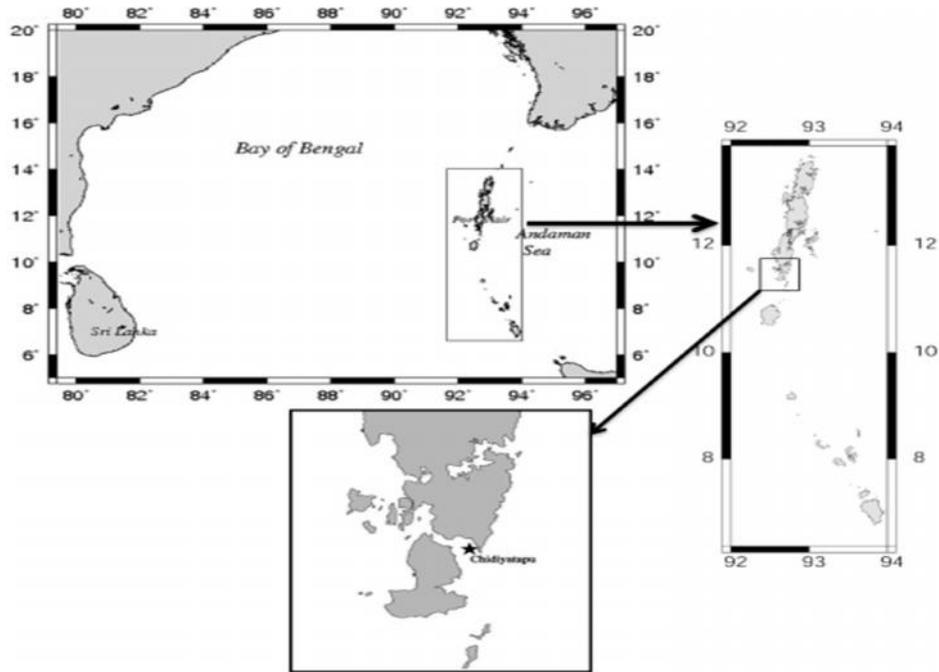


FIGURE 1. Map showing study site, Chidiyatapu

RESULTS & DISCUSSION

A total of 9 species were recorded during the study period. These belong to two orders, namely, Sacoglossa (three species of which one species is new record to Andaman Islands) and Nudibranchia (Six species out of which one species is new record to India and one species is new record to Andaman Islands).

Phylum: Mollusca

Class: Gastropoda (Cuvier, 1797)

Order: Sacoglossa (von Ihering, 1874)

Family: Plakobranchidae Gray, 1840

1. *Plakobranchus ocellatus* Van Hasselt, 1824

Materials Examined: 12.04.2012, two specimens (Figs. 2A & 2B)

Registration number: ZSI/ANRC-8129, Repository: Zoological Survey of India, Andaman & Nicobar Regional Center.

Description: The parapodia are covered with light grey dotted encircled with black rings and yellow spots which are encircled with white rings and are folded over to the backside with green patch in the mantle lining the parapodia. Rhinophores are cream in colour.

Habitat: Depth: 1m; often seen half buried in coral sand.

Distribution in India: Andaman Islands (Ramakrishna *et al.*, 2010), Tamil Nadu (Rao, 1961), Lakshadweep Islands (Apte, 2009).

Family: Elysiidae Forbes and Hanley, 1851



FIGURE 2: A. *Plakobranchus ocellatus* B. *Plakobranchus ocellatus* (Variation)



FIGURE 2: C. *Thuridilla coerulea* D. *Thuridilla gracilis*

2. *Thuridilla coerulea* (Kelaart, 1858)

Materials Examined: 29.04.2012, one specimen (Fig. 2C)
Registration number: ZSI/ANRC-8130, Repository:
Zoological Survey of India, Andaman & Nicobar Regional
Center.

Description: Oral tentacles are orange with a black edging and the upper half of the rhinophore is black with a central black band. The parapodia are blue with a broad red-orange margin and an inner thin black line.

Habitat: Depth: ~1.5m; Coral reef area with rocks covered by algae.

Distribution in India: Andhra Pradesh (Eliot, 1906).

Remark: New record to Andaman Islands

3. *Thuridilla gracilis* (Risbec, 1928)

Materials Examined: 29.03.2012, one specimen (Fig. 2D)
Registration number: ZSI/ANRC-8131, Repository:
Zoological Survey of India, Andaman & Nicobar Regional
Center.

Description: Body black with eight cream lines along the outer side of the parapodia and on the head, the tip of the rhinophores and inner margin of the parapodia are bright orange.

Habitat: Depth: ~1m; Coral reef area with rocks covered by algae.

Distribution in India: Andaman Islands (Ramakrishna *et al.*, 2010).

Order: Nudibranchia Blainville, 1814

Family: Chromodorididae Bergh, 1891

4. *Goniobranchus conchyliatus* (Yonow, 1984)

Materials Examined: 24.03.2012, one specimen (Fig. 3A)
Registration number: ZSI/ANRC-8125, Repository:
Zoological Survey of India, Andaman & Nicobar Regional
Center.

Description: The specimen is white with yellow patches and black lines in the dorsal portion. In lateral view, a longitudinal dark violet line between the foot and the mantle. Ventral surface of the mantle has orange and purple colouration. The upper half of the rhinophores and gills (both rachis and pinnae) are orange, the lower half of gills has a pale violet internal rachis and anus area with white pinnae. It has a distinctive habit of waving the anterior portion of the mantle skirt up and down as it crawls.

Habitat: Depth: ~3m; Rocky substratum covered with algae and sponge.

Remark: New record to India

5. *Goniobranchus geometricus* (Risbec, 1928)

Materials Examined: 29.04.2012, one specimen (Fig. 3B)
Registration number: ZSI/ANRC-8128, Repository:
National Zoological Collection

Description: Mantle white in colour with dark blue line running across the mantle. The upper half and tip of gills are greenish in colour, the lower half is white, large anterior mantle skirt waves up and down as the animal crawls along, and is purple on its underside.

Habitat: Depth: ~4.5m; Rock covered with algae and sponge.

Distribution in India: Andaman Islands (Sreeraj *et al.* 2012).

Family: Phyllidiidae Rafinesque, 1814

6. *Phyllidiella pustulosa* Cuvier, 1804

Materials Examined: 18.03.2012, one specimen (Fig. 3C)
Registration number: ZSI/ANRC-8127, Repository:
National Zoological Collection

Description: Body with pale green edge to the mantle with the tubercles arranged in clusters, tip of rhinophore is black. A continuous black lining is observed on the edge of mantle.

Habitat: Depth: ~1.5m; Rocky area covered by algal mat and sea weeds.

Distribution in India: Andaman Islands (Ramakrishna *et al.*, 2010), Lakshadweep Islands (Apte, 2009).

7. *Phyllidiella zeylanica* Kelaart, 1859

Materials Examined: 29.04.2012, two specimens (Fig. 3D)
Description: Three black concentric bands in the notum with an interrupted median dark band. In between the concentric bands, there are prominent elevated longitudinal ridges bearing irregular tubercles of different sizes. The ridges start anterior to the rhinophore and end behind anus, dorsal tentacles large, conical and pointed which are black coloured.

Habitat: Depth: ~3m; found among the dead stag horn corals.

Distribution in India: Lakshadweep Islands (Apte, 2009); Andaman and Nicobar Islands (Ramakrishna *et al.*, 2010; Sreeraj *et al.*, 2010); Gujarat (Matwal and Joshi, 2011).

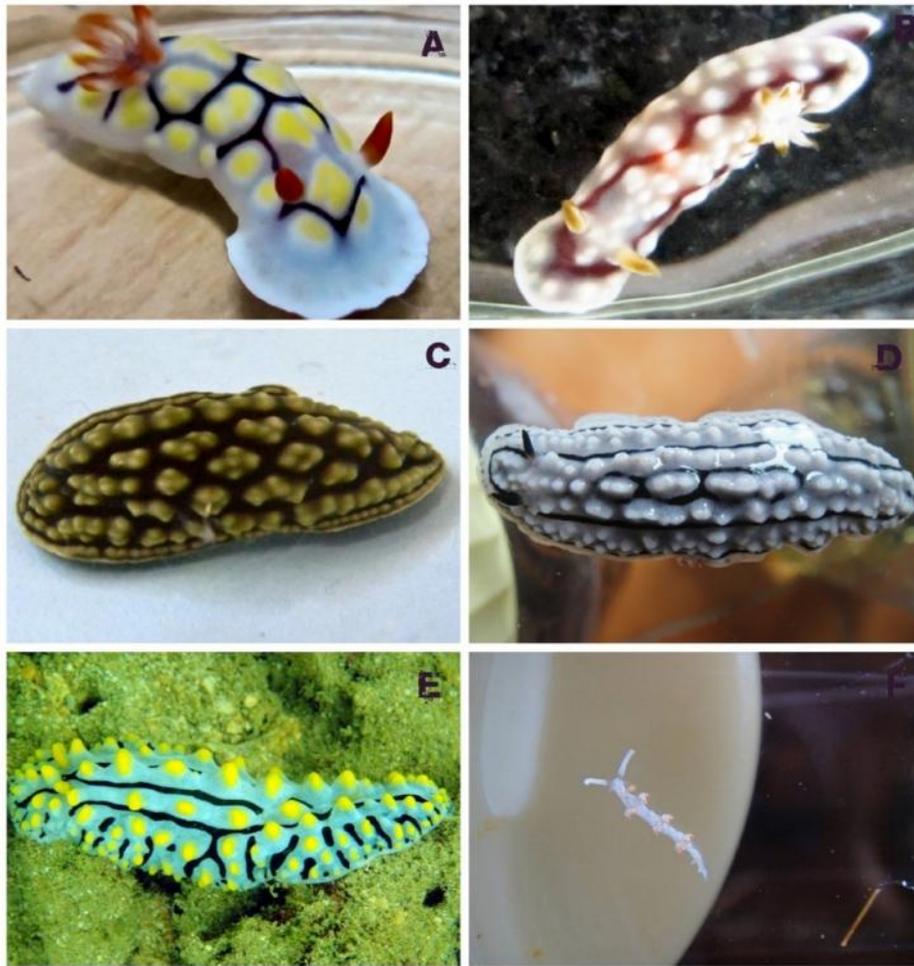


FIGURE 3: A. *Goniobranchus conchylitatus* B. *Goniobranchus geometricus* C. *Phyllidiella pustulosa* D. *Phyllidiella zeylanica* E. *Phyllidia varicosa* F. *Flabellina bicolor*

8. *Phyllidia varicosa* Lamarck, 1801

Materials Examined: 04.04.2012, three specimens (Fig. 3E)

Description: Body blue with yellow tubercles and rhinophores, a black coloured ridge starting anterior to the rhinophores and ends at anus and black bands arising from the ridges and ends on foot sole.

Habitat: Depth: 1m; between the crevices of coral reefs.

Distribution in India: Andaman Islands (Ramakrishna *et al.*, 2010), Lakshadweep Islands (Apte, 2009), Karnataka (Zacharia *et al.*, 2008).

Family: Flabellinidae Bergh, 1881

9. *Flabellina bicolor* (Kelaart, 1858)

Materials Examined: 04.04.2012, one specimen (Fig. 3F)

Registration number: ZSI/ANRC-8126, Repository: National Zoological Collection

Description: White body with lamellate rhinophores and subterminal golden band on each cerata, oral tentacles with a flattened terminal lobe.

Habitat: Depth: 1m; Coral reef area with rocks covered by algae, found along with *Thuridilla coerulea*.

Distribution in India: Lakshadweep Islands (Apte, 2009), Andhra Pradesh (Eliot, 1906) and Gujarat (Apte *et al.*, 2010).

Remark: New Record to Andaman Islands

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