

Article

A report on the coral reef dwelling polyclads of Nicobar Islands, India

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Abstract

Although the Polycladida (Platyhelminthes) are prominent members of many reef communities, no comprehensive surveys exist for the Nicobar group of Islands, India. A total of 7 species of polyclads were collected from the reef areas of the Nancowry group of Islands in Nicobar region. The polyclads reported through this study are new to Nicobar group of Islands while, *Cycloporus venetus* Newman and Cannon, 2002; *Phrikoceros mopsus* (Marcus, 1952); *Pseudobiceros uniarborensis* Newman and Cannon, 1994 and *Pseudobiceros stellae* Newman and Cannon, 1994 are first records for the Indian waters.

Keywords Polycladida; Phrikoceros; Pseudobiceros; Cycloporus; Nancowry; India.

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1 Introduction

The phylum Platyhelminthes embraces three classes of worms. Two of these are entirely parasitic; such as Trematoda and Cestoda. The third class, the Turbellaria, is free living and is considered to be the ancestors of the two parasitic classes (Barnes, 1980). The Polycladida represents a highly diverse clade of free living, almost exclusively marine, turbellarian flatworms. The order is divided into two suborders Cotylea and Acotylea based on the character of presence or absence of a cotyl or sucker.

Polyclads are found from the littoral to the sublittoral zone and are common on coral reefs where they may act as indicator for the health of these ecosystems. They are major predators of sessile, marine invertebrates, including ascidians and commercial bivalves. Furthermore, they reveal fascinating new insights into the reproductive behavior of hermaphrodites, are important in studies of regeneration, and are of increasing interest in the search for new anti-cancer drugs from the sea.

Despite their potential contributions to so many fields, polyclads have received relatively little systematic attention. Literature survey revealed that studies on Indian polyclads are limited and for the Nicobar group of

Islands are completely unknown. Laidlaw (1903) reported 10 polyclad species belonging to 5 families and 6 genera from the Laccadive Islands, which is the first report on marine flatworms from India. Until then, no records have been available for these animals from Indian waters. The objective of the present work was a taxonomic survey of the polyclad fauna of the reef areas of the Nicobar group of Islands. This was the first such survey in Nicobar group of Islands, contributing to a general increase in biodiversity knowledge of this country, and providing a baseline data for future studies on this group in these Islands.

2 Study Area and Methods

The Nicobar Islands are situated in the South-east of the Bay of Bengal between 6 – 10° N latitude and between 92 - 94° E longitude. There are altogether 22 large and small islands, out of which only twelve have inhabitants. The most northerly island of the group is Car Nicobar, which is 143 miles from Port Blair and the ten degree channel about 75 miles separate in from Little Andaman. Chowra, Teressa, Bompoka, Katchal, Kamorta, Nancowry and Trinket form the central group of Nicobar Islands; while in the southern group are Pulo Milo, Little Nicobar, Kondul and Great Nicobar. The extreme southern point of Great Nicobar, previously known as Pygmalion Point and now Indira Point, is about 91 geographical miles from Pulo Brass of Achin Head of Sumatra. The uninhabited islands in the central and southern group are Batti Malv, Tilangchong and Meroe, Trak, Treis, Menchal and Kabra respectively. Survey sites were chosen based on the habitat features and ease of accessibility (Fig. 1). The reef areas were surveyed using SCUBA. Specimens were photographed *in-situ* and were hand collected for further taxonomic studies. *In-vitro* photographs were also taken and the animals were preserved. The morphological features and measurements of the specimen were examined using the stereo-zoom microscope (Leica, DFC 500). The taxonomical identification was based on Newman and Cannon, 2003 and 2005. All materials are deposited in the National Zoological Collections of Zoological Survey of India, Andaman and Nicobar Regional Centre.

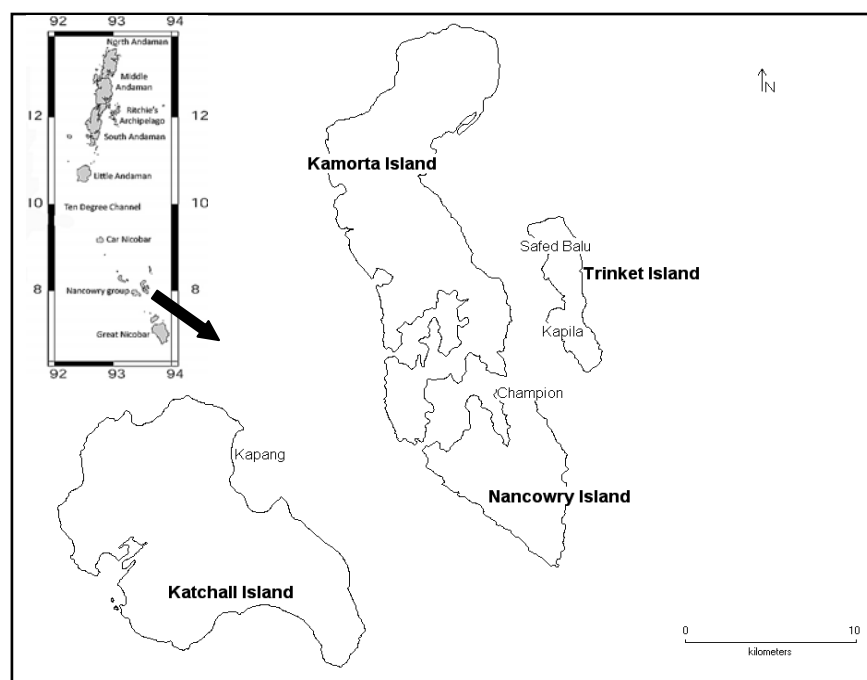


Fig. 1 Map showing the study area

3 Results and Discussion

Clade: Rhabditophora Ehlers, 1986

Order: Polycladida Lang, 1884

Sub-order: Cotylea Lang, 1884

Family: Euryleptidae Lang, 1884

Members of this family have an elongate, oval or round body of variable size with a smooth or rarely papillate dorsal surface. They usually have true tentacles that may be well developed or reduced to small bumps. The cerebral eyes are usually in two distinct, elongate clusters, which may be partially fused. The pharynx is tubular and lies anteriorly. The sucker is usually posterior to the mid-line of the body.

1. *Cycloporus venetus* Newman and Cannon, 2002

Material examined: One specimen, 5.5 cm, Safed Balu, Trinket Island (N 08°06.666', E 093°33.474'), Sreeraj C R, 6 meter, 21.02.2011.

Description: Body rounded-oval. Background body colour bright opaque blue with a narrow white median stripe. Margin wide, opaque light yellow; rim clear. Marginal tentacles are slight bumps, dark orange-red, each with a small black spot. Tentacular eyes scattered, about 15. Cerebral eyespot with two clusters of about 30 eyes each. It was seen associated with colonial ascidian *Atrium robustum*, probably its food (Plate 1A).

Distribution: Australia, Indonesia, Japan.

Remarks: New records to Indian waters

Super-family: Pseudocerotoidea Faubel 1984

Family: Pseudocerotidae Lang 1884

Body oval or oblong, surface smooth or papillate, with prominent tentacles derived from margin, sucker central. Pharynx ruffled, anterior; clearly ruffled in *Pseudoceros* and *Pseudobiceros* and not tubular as in many other families, gut anastomosing. Male copulatory complex (single or double) just behind pharynx, penis usually armed with stylet; female complex single, uterus may be greatly branched.

2. *Phrikoceros mopsus* (Marcus, 1952)

Material examined: One specimen, 6.5 cm, Kapang, Katchall Island (N 08°00.002', E 093°24.362'), J.S. Yogesh Kumar, 7 meter, 20.02.2011.

Description: Yellowish or grayish background with darkly pigmented reticulate network concentrated along the dorsal midline. Margin bordered by very thin, dark line; several white dots scattered over body surface (Plate 1B).

Distribution: Brazil, Curaçao and Antigua and Inca Inca.

Remarks: This was described previously as *Pseudoceros mopsus* Marcus, 1952, recently Quiroga et al., 2004 proposed a new combination of name for this species. Like *Pseudoceros*, members of *Phrikoceros* have a single male reproductive apparatus, but they are distinguished from that genus by deep marginal ruffling, simple pharyngeal folds and the arrangement of clustered, dorsal and ventral pseudotentacular eyes (Newman and Cannon, 1996a). Using these characteristics, this species is placed in the genus *Phrikoceros* by Quiroga et al., 2004. New record to Indian waters.

3. *Pseudoceros goslineri* Newman and Cannon, 1994.

Material examined: One specimen, 7 cm, Kapila, Trinket Island (N 08°03.352', E 093°34.102'), J.S. Yogesh Kumar, 7 meter, 19.02.2011.

Description: Background cream mottled with darker brown (medially), pink and brick red dots; concentrated brick red dots medially appearing as irregular elongate blotches. Margin composed of blue and pink irregular

dots and spots. Marginal spots are numerous anteriorly across the pseudotentacles. Ventrally light violet. Pseudotentacles simple folds (Plate 1C).

Distribution: Australia-Queensland, Chagos, Indonesia, Maldives, Micronesia, Papua New Guinea, Red Sea, Somalia, Tanzania.

Remarks: New record to Nicobar group of Islands.

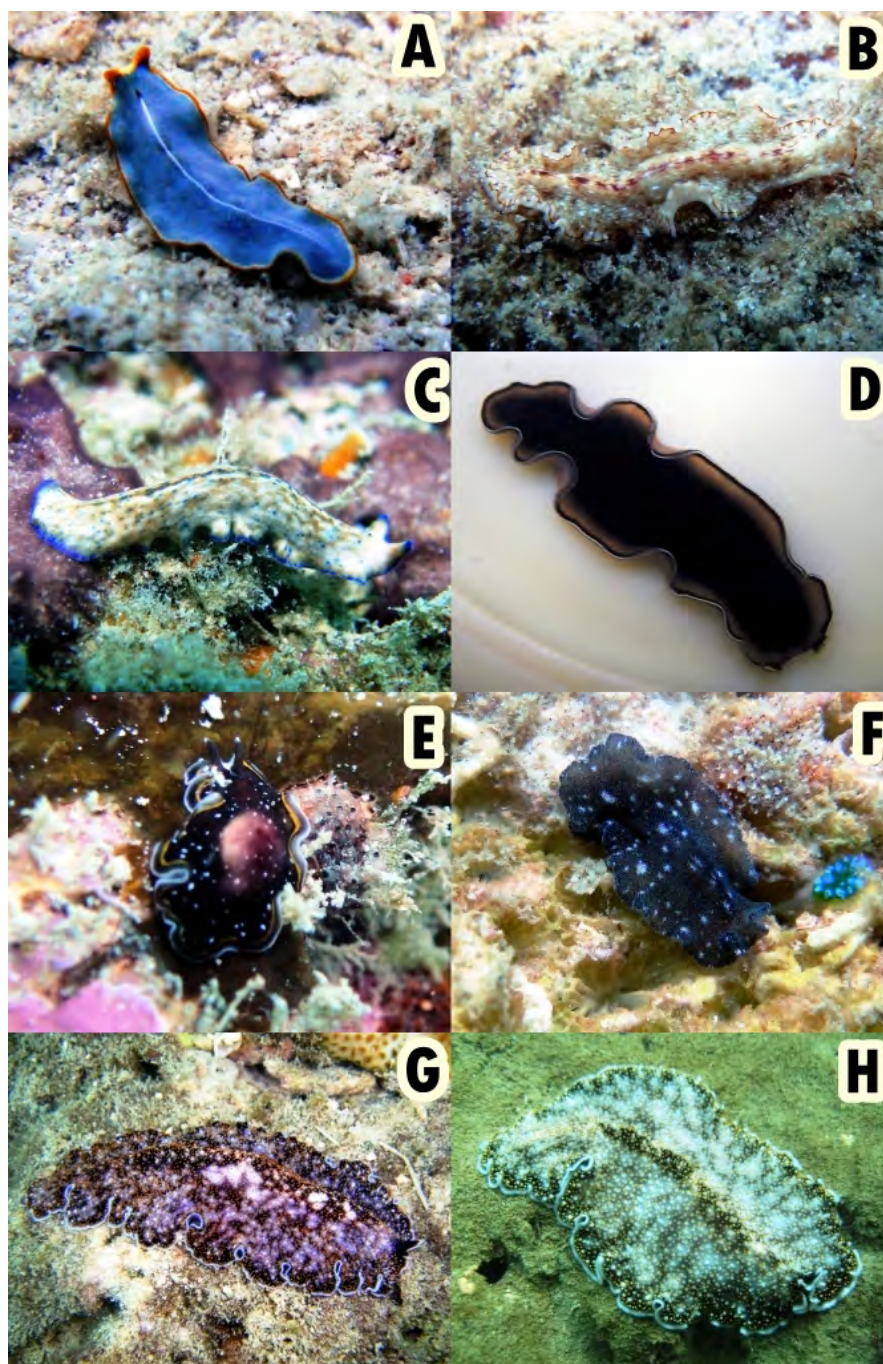


Plate 1 (A) *Cycloporus venetus* (B) *Phirkoceros mopsus* (C) *Pseudoceros goslineri* (D) *Pseudobiceros hymanae* (E) *Pseudobiceros uniarborensis* (F) *Pseudobiceros stellae* (G and H) *Acanthozoon* sp.

4. *Pseudobiceros hymanae* Newman and Cannon, 1997

Material examined: One specimen, 5.5 cm, Kapang, Katchall Island (N 08°00.002', E 093°24.362'), J.S. Yogesh Kumar, 7 meter, 20.02.2011.

Description: Background velvety black, opaque; margin with two distinct bands, rusty orange with narrow black rim. Pseudotentacles black with the same marginal bands laterally only (Plate 1D).

Distribution: Australia-Queensland, Indonesia, Maldives, Papua New Guinea, Solomon Islands, South Africa.

Remarks: New record to Nicobar group of Islands.

5. *Pseudobiceros uniarborensis* Newman and Cannon, 1994

Material examined: One specimen, 3.5 cm, Kapang, Katchall Island (N 08°00.002', E 093°24.362'), Sreeraj C R, 7 meter, 20.02.2011.

Description: Background color varies from velvety black to translucent grey or brown with three narrow marginal bands; inner band bright orange, then a wide clear or grey band and a white rim. Pseudotentacles ear-like, pointed, black with white tips; grey-white triangle between pseudotentacles (Plate 1E).

Distribution: Australia, Hawaii, Indonesia, Mauritius, Micronesia, Papua New Guinea, Red Sea.

Remarks: New record to Indian waters.

6. *Pseudobiceros stellae* Newman and Cannon, 1994

Material examined: specimen, 2 cm, Champion, Nancowry Island (N 08°01.718', E 093°32.728'), J.S. Yogesh Kumar, 3 meter, 16.02.2011.

Description: Body varies from translucent grey to opaque black to brown, with raised white microdots in irregular clusters and scattered evenly. Pseudotentacles square, highly ruffled laterally (Plate 1F).

Distribution: Australia, Galapagos Island, Hawaii, Indonesia, Marshall Islands, Papua New Guinea, Red Sea.

Remarks: New record to Indian waters.

7. *Acanthozoon* sp.

Material examined: One specimen, 9 cm, Champion, Nancowry Island (N 08°01.718', E 093°32.728'), S. Kumaralingam, 4 meter, 16.02.2011. One specimen, 8 cm, Safed Balu, Trinket Island (N 08°06.666', E 093°33.474'), S. Kumaralingam, 6 meter, 21.02.2011.

Description: Large species. Background body colour mottled black and white-grey. Dorsal surface covered with yellow or orange short papillae. Margin white. Ventral body colour white with black marginal band white rim. Pseudo-tentacles black with black tips (Plate 1 G and H).

Distribution: Indonesia, Japan, Maldives, Marshall Islands, Papua New Guinea, Philippines, Thailand.

Remarks: Common reef associated polyclad found in Andaman and Nicobar Islands. This species is reported from various parts of the world and is mentioned to be a common encounter (Newman and Cannon, 2005). In spite this still remain to be an undescribed species. New record to Nicobar group of Islands.

These findings suggest that the Andaman and Nicobar Islands is indeed a region of high polyclad diversity, although to date it remains understudied as established besides the present study. New methods of fixation (Newman and Cannon, 1995) and the addition of photographic records are important and necessary improvements to the study of these animals. Cotyleans are of importance in the study of aposematic coloration in marine invertebrates (Ang and Newman, 1998). Recently, polyclads are of increasing interest in the search for new drugs from the sea (Carté, 1996), in fact, it has been shown that some species contain chemicals that can kill human cancer cells (Kubanek et al., 1995). In-depth studies are required for understanding of polyclad systematics, including their distributions and abundances.

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