



National Institute of Oceanography and Fisheries
Egyptian Journal of Aquatic Research

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FULL LENGTH ARTICLE

Benthic bryozoan fauna from the Northern Egyptian coast



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Received 18 June 2014; revised 8 October 2014; accepted 9 October 2014

Available online 18 November 2014

KEYWORDS

Benthos;
Bryozoa;
Taxonomy;
New record;
Northern coast;
Egypt

Abstract The present paper presents taxonomical information on a small bryozoan fauna collected from the Eastern Mediterranean coast of Egypt. Eight species of benthic bryozoans are reported from the trash crop of a trawling net in the area between Damietta and El-Manzalah. These species belong to 7 genera in 7 families of the orders Cyclostomata, Ctenostomata and Cheilostomata. Four species (*Hornera* sp., *Nolella dilatata*, *Copidozoum planum* and *Schizomavella triangularis*) are new records of the Egyptian Mediterranean waters. All species are described and photographed. © 2014 National Institute of Oceanography and Fisheries. Hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

Introduction

Bryozoa is a phylum of coelomates mostly found in the marine environment. There are approximately 6000 recent species within the phylum that have been described (Gordon et al., 2009). They are sessile species that are present in all oceans. They occupy a wide bathymetric range, and colonize almost any type of substratum (Gordon, 1999). This phylum is a diversified group; 388 species of benthic bryozoan have been described from the Mediterranean Sea, and 88 of them (23%) are endemic. However, this estimation is still incomplete because more species that have not been described yet will be added in the future (Coll et al., 2010).

Bryozoan morphology is somewhat complex. The group has not been studied well in the Egyptian waters. The species were first described in a study by Audouin and Savigny

(1826) which dealt with material from both the Egyptian Mediterranean and Red Seas. However, Dumont (1981) indicated that these authors have described 67 bryozoan species, ten species were reported from the Mediterranean and 17 from the Red Sea, but the collecting sites of the rest of the species were not mentioned. d'Hondt (2006) published a revision of the species in Savigny's plates of the bryozoans named by Audouin and Savigny (1826). He mentioned that "Audouin enumerated 64 species but, after synonymic corrections, the true number is sixty-one".

After this old study, more than a century later, O'Donoghue and De Watteville (1939) reported the distribution of 62 bryozoan species which are mostly unillustrated; they were obtained by dredging from the fishery grounds near Alexandria from 4 to 126 ftm (7–230 m). Most of them were distributed in the western and central basins of the Mediterranean. They described only two species that were new to science (*Vibracellina mediterraneae* and *Schizomavella alexandriae*). At least 50 species of them were new additions to that list recorded by Audouin and Savigny (1826).

Regarding the Egyptian Red Sea, Hastings (1927) had recorded 24 polyzoan species which were collected during the

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Peer review under responsibility of National Institute of Oceanography and Fisheries.

Cambridge Expedition from the Suez Canal, after a century of Audouin and Savigny's work in 1826. Balavoine (1959) provided descriptions of 44 species collected from 24 stations in the Northern Red Sea (Gulf of Aqaba, Gulf of Suez and Suez Canal) during the mission of Robert Ph. Dollfus in Egypt (December 1927–March 1929).

Numerous studies have been carried out on the bryozoan communities in the Mediterranean Sea, most of them were taxonomic (e.g. Calvet, 1931; Prenant and Bobin, 1956; Gautier, 1962; Harmelin, 1976; Novosel and Požar-Domec, 2001; Hayward and McKinney, 2002; d'Hondt and Chimenz, 2006), most of these works pertain to Northern Mediterranean waters. Studies dealing with bryozoans from the southern coast include those of Canu and Bassler (1930), Buge and Debourle (1977), d'Hondt and Mascarell (2004), d'Hondt and Ben Ismail (2008) and Ayari-Kliti et al. (2012). Eastern Mediterranean bryozoans have been studied by Powell (1969), Harmelin (1968, 1969), Hayward (1974), d'Hondt (1988a), Bitar and Bitar (2001), Koçak et al. (2002) and Harmelin et al. (2007, 2009), among others. Zabala (1986), Zabala and Maluquer (1988), d'Hondt (1988b), Souto et al. (2010) and Madurell et al. (2013) are authors who have studied the bryofauna of the western Mediterranean.

Recent taxonomic studies of marine bryozoan in the Egyptian waters are far fewer. Only Abdelsalam and Ramadan (2008a,b) described fouling bryozoan assemblages that developed on polystyrene test panels which were immersed 0.5 m deep in three Alexandrian harbors (Abu Qir, the Eastern and El-Dekheila). Nevertheless, many ecological studies in the Egyptian waters have at least listed the bryozoan fauna (e.g. Ghobashy, 1976; El-Komi, 1992, 1998a,b; Ghobashy et al., 1980; Ghobashy and El-Komi, 1981a,b; El-Komi and Beltagy, 1997; El-Komi et al., 1998; Emar, 2002; Emar and Belal, 2004).

Taxonomic studies are important for establishing databases concerned with the documentation and conservation of the aquatic biodiversity. In this context, the present work aims to present taxonomic information about the bryozoan fauna that was collected from the Northern Egyptian coast.

Materials and methods

Benthic bryozoan samples were collected from a trash crop of trawling net deployed by a fishing boat along the Eastern Mediterranean coast of Egypt between Damietta and El-Manzalah (Fig. 1) at depths of 20–25 m during April 2014. In this area the bottom sediment is mud mixed with sandy mud. Bottom water temperature and salinity were 18.7 °C and 39.9‰, respectively. Colonized substrata included mollusk shells, rocks, broken pieces of pottery and some bryozoan species showed association with hydroids and macroalgae. Specimens were preserved in a 10% formaldehyde solution.

Bryozoans were sorted and isolated for identification. Samples were examined by a zoom stereoscopic light microscope (Novex P-20, with total magnification up to 80×) and a monoscopic microscope (BEL Bio-1-T, with total magnification up to 400×); they were also photographed using a Nikon digital camera (model D5000) equipped with a special adaptor that was attached to the microscopes. In some cases, where illustrations were deemed appropriate, a camera lucida drawing tube was used for this purpose and descriptions were made.

Significant literature consulted for this study included d'Hondt (1983, 2006), Hayward (1985), Hayward and Ryland (1985, 1998, 1999), Zabala and Maluquer (1988) and Hayward and McKinney (2002). The systematic listing of the species employed here is that of Bock and Gordon (2013). In the text, measurements of bryozoan zooids (in micrometers) are given as mean plus or minus standard deviation, observed range, and (enclosed in parentheses) number of specimens used. Autozoid length and width are as measured at the colony surface. A cleaning agent (diluted Clorox or domestic household bleach) was used for better observation of the encrusting species.

Glossary of special terms: (<http://www.bryozoa.net/glossary.html>).

Adventitious avicularium: An avicularium derived from one or more marginal frontal septular pores and positioned on the surface of a zooid.

Areola: In ascophoran cheilostomates, a marginal opening in the frontal calcification leading to an areolar pore.

Autozoid: Feeding zooid in Bryozoa (Hayward and Ryland, 1979).

Avicularium: Specialized zooid in the Cheilostomata with reduced polypide but strong muscles which operate a modified operculum (mandible) (after Ryland and Hayward, 1977).

Basal: Underside of an encrusting or freely growing colony (Ryland and Hayward, 1977). The basal wall of a zooid is opposite to the frontal wall.

Condyle: One of a pair of oppositely placed protuberances on which the operculum pivots in some ascophoran cheilostomes (Hayward and Ryland, 1979).

Cryptocyst: In some anascan cheilostomes, more or less horizontal calcareous lamina on the basal side of the frontal membrane, developed from the vertical walls of the zooid but not completely dividing its body cavity (Hayward and Ryland, 1979).

Gymnocyst: In anascan cheilostomes, the part of the calcified frontal wall between the frontal membrane and the free edges of the vertical wall (modified after Ryland and Hayward, 1977). Frontal wall with calcified layer directly in contact with outer cuticle.

Internode: In erect articulated colonies, internodes are the sections bearing autozooids, joined by connecting tubes which are uncalcified or poorly calcified.

Mandible: Articulated part of an avicularium, moved by muscles, and homologous with the operculum of an autozoid (Hayward and Ryland, 1979).

Operculum: A generally uncalcified lamina (or flap), hinged, or pivoting on condyles, which closes the zooidal orifice in Cheilostomata (Hayward and Ryland, 1979). Calcified opercula are found in some cheilostomes, and also in the cyclostome.

Opesia: In zooids of anascan Cheilostomata, the opening below the frontal membrane remains after development of the cryptocyst (Hayward and Ryland, 1979).

Orifice: Opening in the zooid wall through which the lophophore and tentacles are exerted. In Cheilostomata, the primary orifice may be surrounded by a peristome; the opening at the upper end is then known as a secondary orifice (Hayward and Ryland, 1979).

Ovicell: The globular brood chamber in Cheilostomata (Ryland and Hayward, 1977).

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