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First occurrence of *Beroe forskalii* (Ctenophora) in South American Atlantic coastal waters, with notes on the use of macrociliary patterns for beroid identification

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Abstract

Beroe forskalii Milne Edwards, 1841 is an oceanic ctenophore with a global distribution. The present study provides the first record of *Beroe forskalii* for the South American Atlantic coast, including a redescription of the species and a discussion on the utility of macrociliary patterns for the correct identification of at least some beroid species, exemplified by a comparison of the macrociliary patterns of *Beroe forskalii* and *Beroe ovata* (Chamisso & Eysenhardt, 1821).

Key words: Beroidae, comb jelly, ctenophore, gelatinous zooplankton, Southwest Atlantic

Introduction

Nineteen of the estimated 150 valid ctenophore species (Mills 2013) are known to occur along the South American Atlantic coast (Oliveira et al. submitted). Thirteen species have been recorded for Brazil (Oliveira *et al*. 2007), and six were already registered for the São Sebastião Channel, southeastern Brazil (Oliveira & Migotto 2006; 2007). Only two species of Beroidae [*Beroe cucumis* Fabricius, 1780 and *Beroe ovata* (Chamisso & Eysenhardt, 1821)] have been recorded for the area, taking *Beroe gilva* Eschscholtz, 1829 as a junior synonym of *B. ovata* (see Oliveira *et al*. 2007).

The identification of *Beroe* species can be very difficult as many species were only superficially described (Harbison *et al*. 1978) and the number of synonyms is likely to be very high, although determining which species names are synonomous is difficult and ideally requires study of *Beroe* collected from many localities around the world. An anatomical feature useful in discriminating among *Beroe* species is the distributional patterns of oral macrocilia (Tamm & Tamm 1993). Macrocilia are feeding organelles found exclusively inside the mouth of beroid ctenophores (Horridge 1965). Individual macrocilia present a variety of distinct forms and macrociliary fields are also arranged in species-specific patterns (Tamm & Tamm 1993).

The present study provides the first formal record of *Beroe forskalii* from the Brazilian coast, including a redescription of the species and a discussion on how macrociliary patterns can be of paramount importance for correct identification of beroid species.

Material and methods

A single *Beroe forskalii* specimen was collected in the São Sebastião Channel, southeastern Brazil (23.8° S, 45.4° W), in a horizontal plankton tow using a net with 300 μm mesh and mouth diameter of 60 cm. The specimen was then maintained in aquarium seawater at ambient temperature (20–25ºC) and photographed alive under a stereomicroscope against a dark background (Oliveira *et al*. 2007). After three days of rearing, the specimen was

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thin macrocilia (length nine times the width), with about five sharp teeth at the edge (Fig. 3), arranged in a narrow band around the inside of the lips. Comparison of macrociliary patterns in the two species, which co-occur in the São Sebastião Channel, allows them to be unequivocally distinguished (Table 2). However, definitive identification of the young specimen of *B. forskalii* from São Sebastião Channel (25 mm length *vs* 200 mm larger specimens from other areas) was possible only using the macrociliary pattern. Whereas obvious morphological differences are observed between larger specimens of *B. forskalii* and *B. mitrata* (see Wrobel & Mills, 2003), young specimens have a very similar morphology, differing chiefly in the pattern of the macrocilia. While it is true that molecular biology can be very helpful in ctenophore identification, for rapid field identification relying only on morphology, macrociliary patterns prove to be a very reliable character for the distinction of different *Beroe* species.

TABLE 2. Comparison between macrociliary patterns of *Beroe forskalii* Milne Edwards, 1841 and *Beroe ovata* (Chamisso & Eysenhardt, 1821) from southeastern Brazilian waters (after two months preserved specimens).

Structure	*B. forskalii*	*B. ovata*
Macrociliary field	Broad stripes running from the lips, tapering towards the inner stomodeum.	Narrow band (150–250 µm wide) inside lips.
Macrocilium length	40–55 µm	15–20 µm
Macrocilium diameter	7–9 µm	2–3 µm
Tooth number	18–26	4–6
Tooth size	Equal, 2–3 µm in length.	One larger, ca. 1 µm in length.

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