Egyptian Journal of Aquatic Research (2012) **38**, 249–268

National Institute of Oceanography and Fisheries

**Egyptian Journal of Aquatic Research**

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FULL LENGTH ARTICLE

# Tintinnids (Protozoa: Ciliata) from the coast of Hurghada Red Sea, Egypt

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Available online 18 February 2013

**KEYWORDS**

Red Sea;
Egypt;
Plankton;
Taxonomy;
Protozoa;
Ciliata;
Tintinnids

**Abstract** An examination of plankton samples collected from the inshore and offshore waters in the vacancy of Hurghada area in the Egyptian Red Sea coast revealed the presence of a diverse community of planktonic tintinnids (Protozoa). Ninety two tintinnid species belonging to 13 families and 30 different genera are described and illustrated in the present paper. Most of the species recorded in the present work were previously known from tropical waters, some are cosmopolitan, while a few are cold water inhabitants. A comparison between the present data and that previously recorded in the Red Sea and/or adjacent area indicated large differences in records to the favor of the present work (60 new records).



## Introduction

Tintinnids (*Protozoa*: *Ciliata*) have been known to marine biologists since the beginnings of plankton study (Haeckel, 1873; Daday, 1887), and records for tintinnid occurrences appear from all the oceans of the world (Pierce and Turner, 1992). Pierce and Turner (1993) reviewed tintinnid distributions, yet few recent studies provide quantitative data on tintinnid diversity in coastal (Cariou et al., 1999; Dolan and Gallegos, 2001; Modigh and Castaldo, 2002) and offshore waters (Dolan and Marrasé, 1995; Thompson et al., 1999; Dolan, 2000; Pitta et al., 2001).

In contrast to other microorganisms, such as the benthic ciliates, for which local and global diversity is similar, i.e. "everything is everywhere" (Fenchel et al., 1997), most tintinnid taxa are not cosmopolitan (Pierce and Turner, 1993) and latitudinal trends in tintinnid species diversity have been described (Dolan and Gallegos, 2001).

A major barrier to defining tintinnid biogeography is poor understanding of tintinnid taxonomy. This taxonomy is based upon morphology of the lorica, or shell. Because tintinnid loricae are relatively sturdy, preserve well and are captured in fine-meshed plankton nets. There are many records of tintinnid occurrences scattered throughout the literature. In addition to studies on tintinnids or micro-zooplankton, many such records come from collection in phytoplankton samples.

Unfortunately, from a taxonomic point of view, sizes and shapes of tintinnid loricae are highly variable within species. This variability has led to a proliferation of described species, many of which are probably invalid. Recent re-examinations of several tintinnid species and genera have resulted in suggestions to reduce many species to synonyms (Burkovskii, 1973; Bakker and Phaff, 1976; Davis, 1978, 1981; Laval-Peuto,

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

ELSEVIER Production and hosting by Elsevier

1687-4285 
http://dx.doi.org/10.1016/j.ejar.2013.01.003

1981, 1983; Laval-Peuto and Brownlee, 1986; van der Spoel, 1986; Boltovskoy et al., 1990).

Considerable research has been carried out on the abundance and species composition of tintinnid protozoans in the world's oceans (Hedin, 1976; Kimor and Golandsky, 1977; Kimor and Golandsky-Baras, 1981; Capriulo and Carpenter, 1983). Recently, and with the development of staining techniques, which allows comparisons of infra ciliary patterns, a noticeable increase in the frequency for tintinnid taxonomy was noticed (Brownlee, 1977; Sniezek et al., 1991; Snyder and Brownlee, 1991; Choi et al., 1992).

Most previous plankton works done in the Red Sea area were focused on either the large-size portion of the plankton, mainly zooplankton that exceeds 200 μ (Delalo, 1966; Halim, 1969; Kimor, 1973; Echehnan and Fishelson, 1990; Almeida Prado-Por, 1990; Abd El-Rahman, 1993; Dowidar,1994; Khalil and Abd El-Rahman, 1997) or on phytoplankton (Belogorskaya, 1970; Kimor and Golandsky, 1977; Al-Najjar et al., 2003). To the author's knowledge, no work has been done on the marine planktonic tintinnids of the Red Sea except that of Komarovsky (1959) in the Gulf of Aqaba (Eylath) and most authors neglected even to mention their presence although no plankton sample collected in these waters was devoid of tintinnids. The present paper is an attempt to shed some light on the species of the order Tintinnida (Protozoa: Ciliata) collected from the inshore and offshore waters of Hurghada area at the coast of the Egyptian Red Sea during the period from winter 2009 to spring 2011.

## Materials and methods

### *Samples collection*

The study area included the inshore and the off-shore areas around Hurghada city as indicated in Fig. 1. The plankton samples were collected seasonally during the period January 2009 till March 2011 using a 55 μm net. Offshore samples were collected from areas around the islands. Samples were examined under a research compound microscope; photos were taken using digital camera (3 mega pixels) mounted on the microscope. Measurements were done using calibrated images of slide micrometer using Image-Pro image analysis software.

### *Systematic: identification of samples*

The identification of samples collected in the present paper follow the literature based entirely on the shape of the lorica and its dimensions such as Meunier (1919), kofoid and Campbell (1929), Hada (1938), Komarovsky (1959), Marshall (1969), Balech (1975) and Sharaf (1995). However, for certain species a special publications were used including Fernandes (2004), Agatha and Riedel (2006) and Agatha and TSAI (2008). For confirmation of the identified species several data basis on the World Wide Web was consulted.

### *Classification criteria applied*

Classification criteria applied in the present study depends mainly on the overall structure of the Lorica (Fig. 2) which considered being the primary classification criterion used for the classification of the modern Tintinnids. These criteria included: (A) shape of the Lorica (corolla). (B) Surface ornamentation. (C) Presence or absence of Collar. (D) Shape of the calyx. (E) Presence and number of stems. (F) Type of stems. (G) Collar ornamentation. (H) The thickness of the wall is not used as a classification criterion here because loricae walls increase in thickness during life.

## A typical ideal tintinnid

The shape of the animal in the swimming state is usually companulate or conical. below mostly more or less abruptly

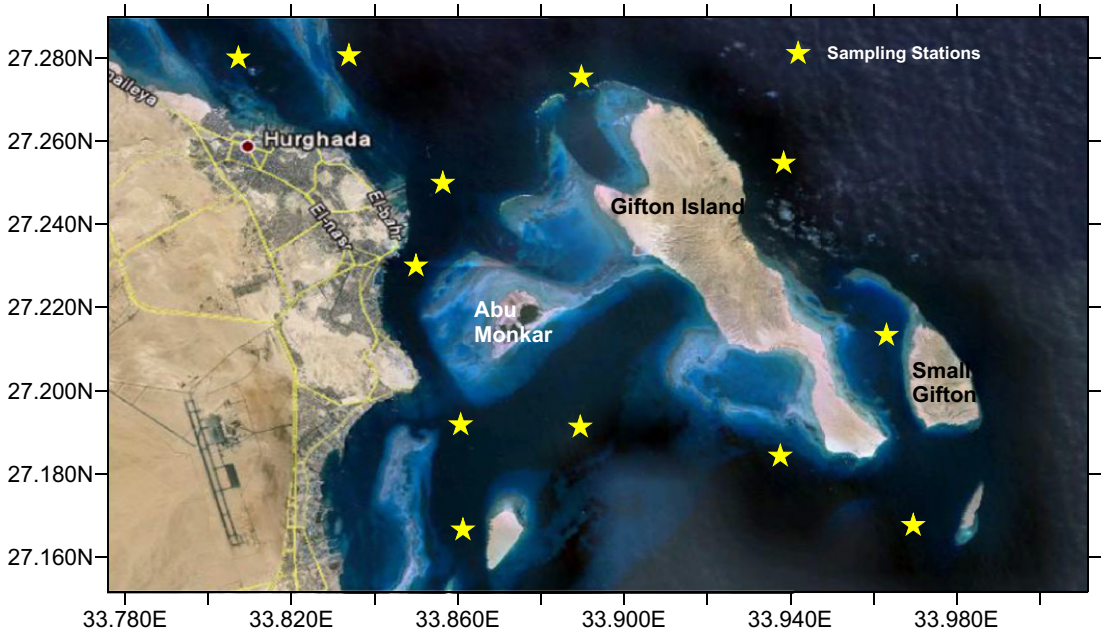


**Figure 1** Map indicating the study area and the collecting stations.