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CYCLOPOIDA AND HARPACTICOIDA (CRUSTACEA: COPEPODA) OF THE GULF OF GABÈS: A REVIEW

SUMMARY

This study presents a faunal list of Cyclopoida and Harpacticoida in the Gulf of Gabès waters. A total of 30 Cyclopoida and 11 Harpacticoida species belonging to 5 and 8 families, respectively, were reported in this study area. Corycaeidae is the most diversified family with 10 species including the invasive Atlantic species, *Ditrichocorycaeus amazonicus*. The Oithonidae (mainly *Oithona nana*) were dominant in the coastal waters, whereas they declined in the offshore area, most likely due to the influence of the Atlantic Tunisian Current.

HISTORY OF STUDIES

The history of studies on Copepoda in the Gulf of Gabès started in March 1970 by BERNARD and BERNARD (1973), who reported in the coastal waters of Jerba island 2 species of Harpacticoida (*Microsetella norvegica* Boeck, 1865 and *Euterpina acutifrons* Dana, 1847) and 5 Cyclopoida (*Oithona nana* Giesbrecht, 1893, *Corycaeus brehmi* Steuer, 1910, *Oncaea* sp., *Farranula* sp., and *Cyclopina* sp.). After 22 years and from April 1992 to March 1993, DALY YAHIA and ROMDHANE (1994) reported the presence of two species of Harpacticoida (*Euterpina acutifrons* Dana, 1847 and *Clytemnestra rostrata* Brady, 1883) and one Cyclopoida (*Oithona nana* Giesbrecht, 1893). Since 2005, many studies on Cyclopoida and Harpacticoida in Gulf of Gabès ecosystems were performed (DRIRA *et al.*, 2010; 2017; REKIK *et al.*, 2012; DRIRA *et al.*, 2014; BEN LTAIEF *et al.*, 2015; 2017; BEN SALEM *et al.*, 2015; REKIK *et al.*, 2018a, b; KMIHA MEGDICHE *et al.*, 2019).

STUDY AREA

The Gulf of Gabès is approximately 90 km wide, with a 700 km coastline extending from *Ras kapoudia* to the Tunisian–Libyan border (Fig. 1). It presents some unique characteristics in the Mediterranean Sea such as a gently sloping bathymetry to a water depth of 50 m at around 130 km from the coastline and tidal amplitude, which is the highest in the Mediterranean Sea, exceeding 1.7 m (ALLOULOU *et al.*, 2012). The Gulf of Gabès plays an important role in Tunisian economy as a well-known fishing reserve and an important nursery for various fish species (DGPA, 2015; ENAJJAR *et al.*, 2015).

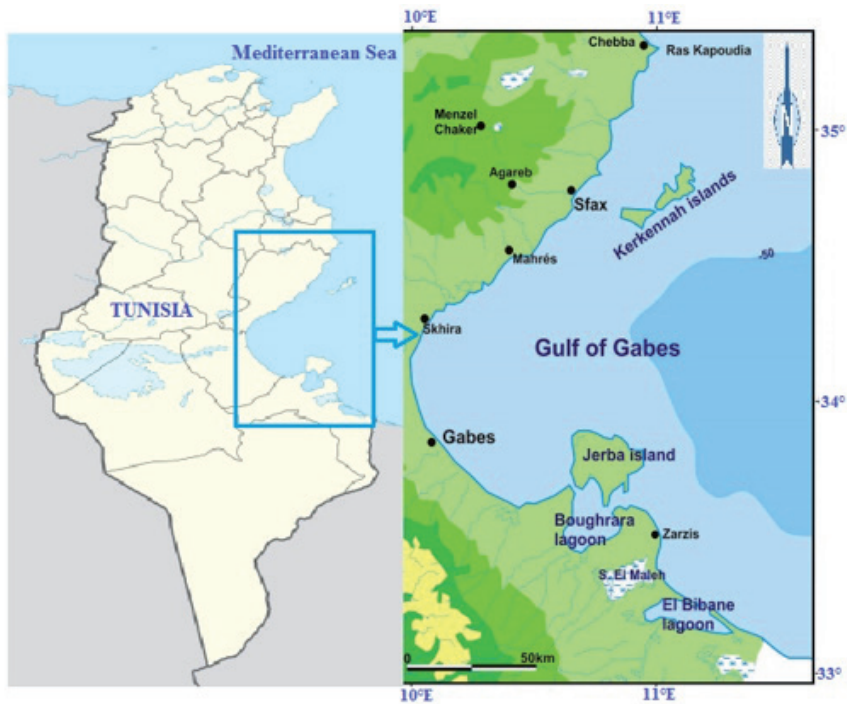


Fig. 1. Localization of the gulf of Gabès.

RESULTS AND DISCUSSION

A total of 30 Cyclopoida species belonging to 5 families, and 11 Harpacticoida species belonging to 8 families are listed in Table 1. DALY-YAHIA *et al.* (2004) observed 17 species of Cyclopoida and 5 species of Harpacticoida in the Bay of Tunis. RAZOULS *et al.* (2005-2020) reported a total of 55 Cyclopoida and Harpacticoida in the area of the Mediterranean Sea which includes the Gulf of Gabès. Along the northern coast of Africa, copepod species richness seems not to follow an eastward gradual decrease. In fact, along the Mediterranean Moroccan coast, 58 copepod species (34 Calanoida, 19 Cyclopoida and 5 Harpacticoida) were observed by BERRAHO *et al.* (2016). KHELIFI-TOUHAMI *et al.* (2007) in the Gulf of Annaba and El Kala (east coast of Algeria) showed a specific richness reaching 143 copepod species (81 Calanoida, 54 Cyclopoida, and 8 Harpacticoida).

Corycaeidae is the most diversified family among Cyclopoida, with 10 species. Among the described taxa, only the cyclopoid *Pachos tuberosum* Giesbrecht, 1891 was classified as endemic species in the Mediterranean Sea (RAZOULS *et al.*, 2005-2020). The invasive Atlantic species, *Ditrichocorycaeus amazonicus* Dahl, 1894, was recorded mainly in the offshore region of the Gulf of Gabès. This could depend by transport in ballast waters (RAZOULS *et al.*, 2005-20) being the species typical of America and only present in gulf of Gabes out of its native geographic distribution.

Small copepods, particularly Oithonidae (mainly *Oithona nana*), were observed to largely dominate copepod communities in the Gulf of Gabès (REKIK *et al.*, 2012; DRIRA *et al.*, 2014). The adoption of a successful reproductive strategy combined with an omnivorous diet, lower metabolic needs and tolerance to pollution are certainly behind the prominence of small planktonic copepods in the inshore region of the Gulf of Gabès (BEN LTAIEF *et al.*, 2015). However, in the open sea region of the Gulf of Gabès, where exchange of water masses is active and under the influence of the Atlantic, Oithonidae density declined significantly, providing place to offshore copepod species such as the calanoid *Nannocalanus minor* CLAUS, 1863 (BEN LTAIEF *et al.*, 2015).

Table 1. List of the Cyclopoida and Harpacticoida species in the Gulf of Gabès observed by the following literature: 1 : DRIRA *et al.*, 2010, 2 : REKIK *et al.*, 2012, 3 : DRIRA *et al.*, 2014, 4 : BEN LTAIEF *et al.*, 2015, 5 : BEN SALEM *et al.*, 2015, 6 : BEN LTAIEF *et al.*, 2017, 7 : DRIRA *et al.*, 2017, 8 : REKIK *et al.*, 2018a, 9 : REKIK *et al.*, 2018b, 10 : KMIHA MEGDICHE *et al.*, 2019.

Order	Family	Species	Authors
Cyclopoida	Oithonidae	<i>Oithona nana</i> GIESBRECHT, 1893	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
		<i>Oithona similis</i> CLAUS, 1866	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
		<i>Oithona plumifera</i> BAIRD, 1843	1, 3, 4, 6, 7, 9, 10
		<i>Oithona robusta</i> GIESBRECHT, 1891	3
		<i>Oithona linearis</i> GIESBRECHT, 1891	6, 9
		<i>Oithona attenuata</i> FARRAN, 1913	6
		<i>Oithona brevicornis</i> GIESBRECHT, 1891	7
		<i>Oithona setigera</i> DANA, 1849	10
	Corycaeidae	<i>Agetus limbatus</i> BRADY, 1883	1, 3
		<i>Corycaeus clausi</i> DAHL, 1894	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
		<i>Corycaeus giesbrechti</i> DAHL, 1894	6
		<i>Corycaeus speciosus</i> DANA, 1849	1, 2, 3, 6, 7, 9, 10
		<i>Corycaeus latus</i> DANA, 1849	3, 4, 6, 7
		<i>Farranula carinata</i> GIESBRECHT, 1891	1, 3
		<i>Farranula gracilis</i> DANA, 1849	6
		<i>Farranula rostrata</i> CLAUS, 1863	1, 3, 4, 6, 8
		<i>Onychocorycaeus ovalis</i> CLAUS, 1863	4, 6
		<i>Ditrichocorycaeus amazonicus</i> DAHL F, 1894	6
		Oncaeidae	<i>Triconia conifera</i> GIESBRECHT, 1891
	<i>Triconia minuta</i> GIESBRECHT, 1893		7, 10
	<i>Oncaea mediterranea</i> CLAUS, 1863		1, 2, 3, 4, 6, 7, 8, 9, 10
	<i>Oncaea notopus</i> GIESBRECHT, 1891		1, 3
	<i>Oncaea venusta</i> PHILIPPI, 1843		4, 6
	<i>Oncaea clevei</i> FRÜCHTL, 1923		4, 6
	<i>Oncaea media</i> GIESBRECHT, 1891		6
	<i>Conaea rapax</i> GIESBRECHT, 1891		3, 9
	Incertae sedis	<i>Pachos tuberosum</i> GIESBRECHT, 1891	4
	Sapphirinidae	<i>Sapphirina darwinii</i> HAECKEL, 1864	6
		<i>Sapphirina intestinata</i> GIESBRECHT, 1891	6
		<i>Sapphirina nigromaculata</i> CLAUS, 1863	6

Harpacticoida	Tachidiidae	<i>Euterpina acutifrons</i> DANA, 1847	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
	Ectinosomatidae	<i>Microsetella rosea</i> DANA, 1847	1, 2, 3, 4, 6, 8, 9
		<i>Microsetella norvegica</i> BOECK, 1865	1, 2, 3, 4, 5, 6, 8, 9
	Miraciidae	<i>Macrosetella gracilis</i> DANA, 1846	6
	Peltidiidae	<i>Clytemnestra scutellata</i> DANA, 1847	1, 2, 3, 5, 7, 8, 9, 10
	Tisbidae	<i>Tisbe battagliai</i> VOLKMANN-ROCCO, 1972	2, 5, 6, 7, 8
		<i>Tisbe furcata furcata</i> BAIRD, 1837	10
	Harpacticidae	<i>Harpacticus littoralis</i> SARS G.O., 1910	7, 10
		<i>Tigriopus</i> sp. NORMAN, 1869	10
	Aegisthidae	<i>Aegisthus aculeatus</i> GIESBRECHT, 1891	3
Metidae	<i>Metis ignea</i> PHILIPPI, 1843	8	

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