

ASCIDIO FAUNA FROM THE GULF OF HAMMAMET (MEDITERRANEAN SEA, TUNISIA)

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ملخص

قربيات ساحل خليج الحمامات، تونس البحر الأبيض المتوسط : طوال ثمانية حملات التي اجريت بين يناير 2005 و ديسمبر 2006 في ساحل الحمامات، تونس جمع 21 انواع من القربيات *Microcosmus squamiger* 650 فردا من بينهم واحدة لأول مرة في خليج الحمامات

كلمات مفاتيح: قربيات، اعلام جديد، انشار مكاني و زماني كلمات

RÉSUMÉ

Faune des ascidies dans le golfe de Hammamet, Tunisie : Pendant huit campagnes d'échantillonnage effectuées entre Janvier 2005 et Décembre 2006 dans la côte de Hammamet en Tunisie, nous avons récolté 21 espèces d'ascidies (650 individus) parmi eux *Microcosmus squamiger* est mentionnée pour la première fois dans le golfe de Hammamet.

Mots clés : Ascidies, affinités, biogéography, golfe de Hammamet, Tunisie.

ABSTRACT

In eight campaigns carried out between January 2005 and December 2006 on the coastline of Hammamet in Tunisia, we collected 21 ascidians species (650 individuals) among them *Microcosmus squamiger* was firstly recorded in the Gulf of Hammamet.

Key Words: Ascidians, affinities, biogeography, Gulf of Hammamet, Tunisia.

INTRODUCTION

The study of ascidians along the Tunisian coastline is still relatively rare. Indeed, only Pérès in 1954 and 1956 inventoried the ascidians in Tunisia. After that, few others studies were carried out, in the southeast of Tunisia (Ramos-Espla et al. 2000; Meliane, 2002, Chebbi et al. 2010), one in Marine Park of Zembra (Mestiri, 2005; Mestiri et al. 2005) and one in the gulfs of Tunis and Hammamet (Chebbi et al. 2009). Other non specific paper reported the occurrence of ascidians in the *Posidonia* meadows in the Gulf of Hammamet (Ben Mustafa et al. 1992; 2002). Therefore the ascidiofauna of the Gulf of Hammamet remain relatively unknown.

MATERIALS AND METHODS

Eight campaigns were carried out between January 2005 and December 2006. The ascidians species were collected in 12 stations 3 of them located in the port of Hammamet (S10, S11, S12) and the others 9 in open sea along the Northern coast of Hammamet city. In table I are reported the list of the sampling station with indication of depth, geographic coordinates and substrates on which have been found the ascidians species.

The specimens of ascidians have been manually collected during snorkeling (in shallow waters) or SCUBA (in deeper water) dives.

The samplings, in the port of Hammamet, were carried out on natural and artificial hard substrates (wall, rope, boat). The sea depth varied between 0.5 m and 18 m in the open area and between 0.5 and 5 m in the port of Hammamet.

The samplings were qualitative and the individuals collected, whether solitary or in a colony, were taken with the substratum, whenever possible, and placed in labeled pots. The specimens were anaesthetized with crystals of menthol in sea water and after fixed in 5% seawater formalin. Moreover during the sampling was recorded the sea water temperature.

RESULTS

650 individuals were collected, comprising 21 species (table II).

Substrates

In the site studied, we found four types of substrates: the photophilic algae (AP), the *Posidonia* meadows (HP), the mat of *Posidonia* (MP) and the artificial and natural hard substrate.

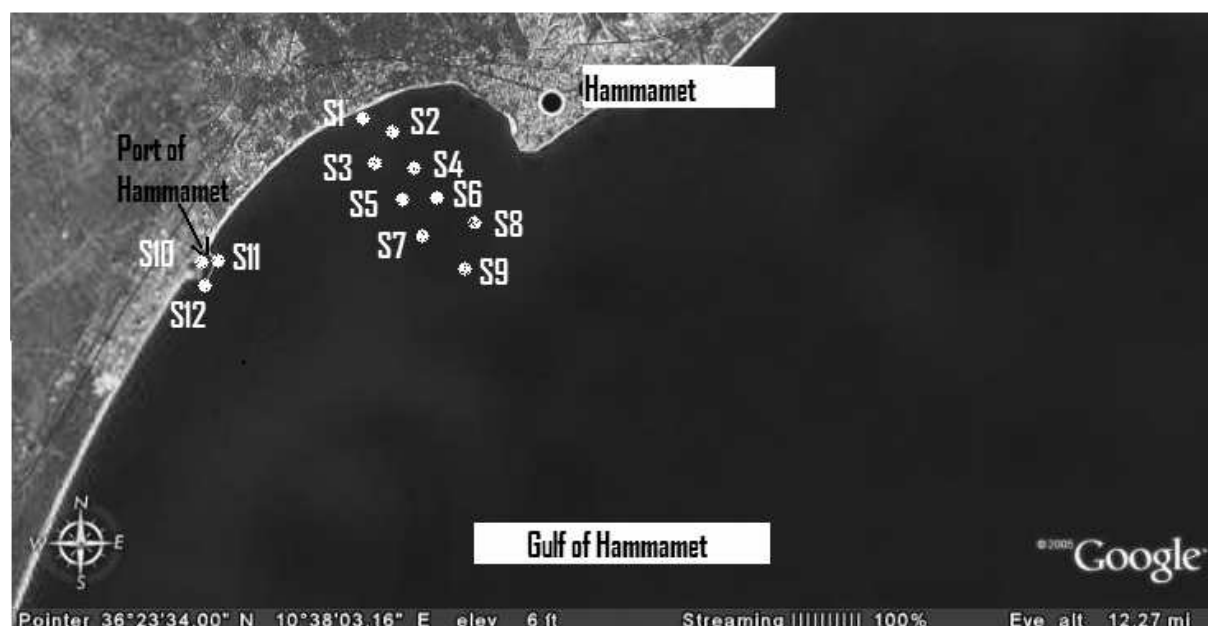


Fig. 1: Map of the Hammamet coast with the position of stations

The stations 1, 2, 3, 4 and 6 have a photophilic algae substrate, the station 5, 7, 8 and 9 have *Posidonia* meadows and matte of *Posidonia* substrate and the stations 10, 11 and 12 have a natural and artificial hard substrate (table I). Two seem to be similar in the number of species: the *Posidonia* meadows (16 species) and the matte of *Posidonia* (13 species). For the other two, photophilic algae and the artificial and natural hard substrate, the number of species remain relatively low. We note the high richness in ascidofauna into *Posidonia* meadows (HP and MP) (table III).

Ascidofauna

In the port of Hammamet were found only 3 species: the Styelidae *Styela plicata* and *Botryllus* sp. and the Clavelinidae *Clavelina lepadiformis*. *S. plicata* was recorded in all three station carried with high density (personal observation of the first author) on the contrary *B. sp.* was occasionally found only in st 12 at 3-5 m depth (table II).

On the other hand, along the northern Hammamet coast were recoded 19 species distributed among the following 8 families **Clavelinidae** (*Clavelina lepadiformis*), **Polycitoridae** (*Cystodytes dellechiaiei*, *Polycitor adriaticum*, *Eudistoma planum*) **Polyclinidae** (*Synoicum lacazei*, *Pseudodistoma cynusense*, *Aplidium mediterraneum*, *Aplidium* sp., *Aplidium conicum*, *Morchellium argus*, *Aplidium nordmanni*) **Didemnidae** (*Didemnum* sp., *Polysyncraton lacazei*), **Cionidae** (*Ciona intestinalis*), **Ascididae** (*Ascidia* sp.), **Styelidae** (*Styela canopus*) and

Pyuridae (*Halocynthia papillosa*, *Microcosmus savignyi* and *Microcosmus squamiger*) (table II).

In detail in shallow water (< 4 m) were found only two species *C. lepadiformis* and *Didemnum* sp., in the *Cystoseira* sp. meadow, from 4 to 12 m, were found 15 species while in *Posidonia oceanica* meadows were found 11 species.

Biogeographic affinities

In accord with Pérès (1958) and Koukouras et al. (1995), we noted a majority the endemic Mediterranean species (24%) and they are: *Aplidium conicum*, *Aplidium mediterraneum*, *Pseudodistoma cynusense*, *Polycitor adriaticum* and *Microcosmus savignyi*. The cosmopolitan species represent only 19% like: *Microcosmus squamiger*, *Styela plicata*, *Styela canopus*, and *Ciona intestinalis*. The atlanto-mediterranean species account for 19% of the total species: *Clavelina lepadiformis*, *Morchellium argus*, *Aplidium nordmanni*, *Polysyncraton lacazei*, and the pantropicale species represent only 4% like *Cystodytes dellechiaiei* (table III).

Among them, 85% of species were founded previously by Pérès (1954 and 1956), Méliane (2002) and Mestiri (2005). In fact, *Clavelina lepadiformis* was founded by Pérès (1956), *Cystodytes dellechiaiei* was founded by Pérès (1954, 1956) and Méliane (2002), *Polycitor adriaticus* was founded by Pérès (1956), Méliane (2002) and Mésirti (2005), *Eudistoma planum* was founded by Pérès (1954, 1956) and Méliane (2002), *Pseudodistoma cynusense* was founded by Pérès (1956) and Mestiri (2005), *Aplidium mediterraneum* was founded by Pérès (1956) and Méliane, (2002), *Aplidium conicum* was founded by Pérès (1954, 1956), Méliane (2002) and Mésiri (2005), *Polysyncraton lacazei* was founded by Pérès (1954, 1956) and Méliane (2002), *Ciona intestinalis* was founded by Pérès (1956),

Tab. I - List of the sampling stations carried out along the northern coasts of Hammamet (S1-S9) and in the Port of Hammamet (S10-S12).

AP: Biocenosis of photophilic algae, HP: Biocenosis of the *Posidonia oceanica* meadowsMP: Biocenosis of *mattes* of *P. oceanica*

St	Depth (m)	Coordinates	Substrates
S1	0.5 - 2	36°22'30.31"N 10° 31'34.90"E	AP (facies <i>Padina pavonica</i>)
S2	2-4	36°22'28.72" N 10°32'13.78" E	AP (facies <i>Padina pavonica</i>)
S3	4 – 6	36°22'26.55" N 10°32'56.98" E	AP (facies <i>Cystoseira zosteroides</i>)
S4	6 – 8	36°22'24.44" N 10°33'15.24" E	AP (facies <i>Cystoseira zosteroides</i>)
S5	8 – 10	36°22'22.38 " N 10°33'22. 98" E	HP et MP
S6	10-12	36°22'20.16" N 10°33'34.80" E	AP (facies <i>Cystoseira zosteroides</i>)
S7	12 – 14	36°22'18.17" N 10° 34' 54.80"	HP and MP
S8	14 – 16	36° 20'16.78" N 10° 35'14.61" E	HP and MP
S9	16 - 18	36° 19' 14.80" N 10°36' 08.23" E	HP and MP
S10	0.5 - 2	36°22'30.77" N 10°32'43.78"E	Natural and artificial hard substrates
S11	2 – 3	36° 22'29.67" N 10°32'53.80" E	Natural and artificial hard substrates
S12	3-5	36°22'30.07"N 10°32'50.97" E	Natural and artificial hard substrates

Tab. II- List of the ascidian species collected along the Hammamet coasts (January 2005, December 2006)

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
Order : Aplousobranchia Lahille, 1890												
Family Clavelinidae												
<i>Clavelina lepadiformis</i> (O.F. Muller, 1773)	x	x			x					x	x	x
Family : Polycitoridae												
<i>Cystodytes dellechiaiae</i> (Della Valle, 1877)					x		x	x				
<i>Polycitor adriaticus</i> (Drasche, 1883)					x		x	x				
<i>Eudistoma planum</i> Pérès, 1948			x	x								
Family: Polyclinidae												
<i>Synoicum lacazei</i> (Pérès, 1957)				x	x							
<i>Pseudodystoma cyrnusense</i> Pérès, 1952				x	x	x	x					
<i>Aplidium mediterraneum</i> (Hartmeyer, 1909)					x		x					
<i>Aplidium</i> sp.					x							
<i>Aplidium conicum</i> (Olivi, 1792)			x	x		x						
<i>Morchellium argus</i> (Milne-Edwards, 1841)					x		x					
<i>Aplidium nordmanni</i> (Milne Edwards 1841)					x		x					
Family: Didemnidae												
<i>Didemnum</i> sp.		x	x									
<i>Polysyncraton lacazei</i> (Giard, 1872)			x	x	x							

Order: Phlebobranchia Lahille, 1890													
Family: Cionidae													
<i>Ciona intestinalis</i> (Linnaeus, 1767)								x	x				
Family: Ascididae													
<i>Ascidia</i> sp.					x								
Order: Stolidobranchia Lahille, 1890													
Family: Styelidae													
<i>Styela plicata</i> (Lesueur, 1823)										x	x	x	
<i>Styela canopus</i> (Savigny, 1816)			x	x	x	x							
<i>Botryllus schlosseri</i> (Pallas, 1766)													x
Family: Pyuridae													
<i>Halocynthia papillosa</i> (Linnaeus, 1767)								x	x				
<i>Microcosmus savignyi</i> C. Monniot, 1962					x				x				
<i>Microcosmus squamiger</i> Michaelsen, 1928					x			x	x				

Tab. III - Ecological distribution of the species: percentage of individuals or colonies sampled in the different biocoenoses

Symbols: AP = photophilic algae, Art and Nat hard substrates = artificial and natural hard substrates, HP= herbaria of *Posidonia*, MP = the matte of *Posidonia*

Biocoenoses	AP	Art and Nat hard substrates	HP	MP
<i>Clavelina lepadiformis</i>	25%	50%	25%	
<i>Cystodytes dellechiaiei</i>			25%	75%
<i>Polycitor adriaticum</i>			25%	75%
<i>Eudistoma planum</i>			100%	
<i>Polysyncraton lacazei</i>			50%	50%
<i>Didemnum</i> sp.			75%	25%
<i>Synoicum lacazei</i>			100%	
<i>Pseudodistoma cyrnusense</i>	50%		50%	
<i>Aplidium mediterraneum</i>			100%	
<i>Aplidium</i> sp.			50%	50%
<i>Aplidium conicum</i>			75%	25%
<i>Morchellium argus</i>			50%	50%
<i>Aplidium nordmanni</i>				100%
<i>Ciona intestinalis</i>				100%
<i>Ascidia</i> sp.			100%	
<i>Styela plicata</i>		100%		
<i>Styela canopus</i>			75%	25%
<i>Botryllus</i> sp.		100%		
<i>Halocynthia papillosa</i>				100%
<i>Microcosmus savignyi</i>			50%	50%
<i>Microcosmus squamiger</i>			25%	75%
Number of presents species	2	3	16	13
Total number of species (n = 21)	9.5%	14.2%	76%	62%

Styela plicata was founded by Pérès (1954 ; 1956), *Styela canopus* was founded by Pérès (1956) and Méliane (2002), *Botryllus schlosseri* was founded by Pérès, (1954,1956) and Méliane (2002), *Halocynthia papillosa* was founded by Mestiri (2005), and *Microcosmus savignyi* was founded by Méliane (2002).

Three species was found for the first time in the Gulf of Hammamet: *Morchellium argus* and *Aplidium nordmanni* were cited previously (Chebbi et al., 2009) and *Microcosmus squamiger* was cited for the first time.

The extent of introduction of invertebrate species may be important and deserves further attention and

in terms of conservation, not only is the important arrival of non-indigenous species, but so too are the invasion of new genetic variants but for confirming this it need a genetic study like the study of the introduction of *Clavelina lepadiformis* into Mediterranean harbour (Turon and al. 2003).

CONCLUSION

In two years between January 2005 and December 2006, eight campaigns were launched in the coastline of Hammamet during which 21 species of ascidians were collected with an autonomous scuba diving for important depths and by snorkeling for shallow waters. Among the 21 species of ascidians, we collected for the first time in the Gulf of Hammamet: *Microcosmus squamiger*. This species is non-indigenous, of Australian origin (Monniot C., 1981; Costello et al., 2001 and Mastrototaro and Doppiano, 2005). We noted the presence of species that have preferences for relatively polluted waters in the marina of Hammamet such as *Styela plicata* and *Clavelina lepadiformis*. These species were found on wet ropes and growing on the hulls of some boats and the walls in the port. Up to 5 m, these species were found in large numbers.

We can conclude that the ascidians fauna from the coast north of Hammamet varies interspecifically. The Polyclinidae families are the most diversified, followed by the Polycitoridae. A very clear difference is noted between the number of species according different substrates. The high richness is found in the *Posidonia* meadows (HP and MP).

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