

First Record of the sea turtle barnacle *Chelonibia testudinaria* (Linnaeus, 1758) in the Syrian Shore Line

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□ ABSTRACT □

During the comparative ecological study of the Biocenoses structure of the family Mytilidae (class Bivalvia) in the shore of Latakia, for the first time an individual of the species *Chelonibia testudinaria* was found during the collection of benthic samples from the Afamia area on 28/08/2021, where it was observed attached to a moulted piece of a dead loggerhead sea turtle carapace (*Caretta caretta*) on the shore of the Afamia area. This species is of Atlantic origin and has not previously been recorded anywhere on the Syrian shore.

Key words: Afamia area, *Caretta caretta*, *Chelonibia testudinaria*, sea turtle barnacle, Syrian Shore

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التسجيل الأول لبرنقيل سلحفاة البحر *Chelonibia testudinaria* في الشاطئ السوري (Linnaeus, 1758)

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□ ملخص □

تم العثور خلال الدراسة البيئية المقارنة للتركيب الأحيائي Biocenoses لفصيلة Mytilidae (صف ثنائيات المصراع Bivalvia) في شاطئ اللاذقية، ولأول مرة على فرد من نوع *Chelonibia testudinaria* أثناء جمع العينات القاعية من منطقة أفاميا بتاريخ 28 / 8 / 2021، حيث لوحظ أنه مثبت على درع سلحفاة بحرية مينة ضخمة الرأس (*Caretta caretta*) على شاطئ منطقة أفاميا. هذا النوع من أصل أطلسي وانتشاره عالمي ويرتبط وجوده بهذه السلحفاة، ويسجل وجوده للمرة الأولى في الشاطئ السوري من خلال هذا البحث.

الكلمات المفتاحية: منطقة أفاميا، *Caretta caretta*، *Chelonibia testudinaria*، برنقيل سلحفاة البحر، الشاطئ السوري

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Introduction

Chelonibia testudinaria (Linnaeus, 1758) is a cosmopolitan species of barnacle that is widespread throughout the world's oceans (Zardus and Hadfield, 2004). It is also found in warm seas and throughout the Mediterranean in the Eastern Basin of the Mediterranean (Geldiay *et al.*, 1982), in the Western Basin and Sicily (Casale *et al.*, 2004), as an epibiont on sea turtles and other marine organisms (Newman *et al.*, 1980; Koukouras and Matsa, 1998; Zardus and Hadfield 2004; Zardus *et al.*, 2014). This species has also been recorded in the following seas:

In the Aegean Sea (Koukouras and Matsa, 1998; Kitsos *et al.*, 2005), in the Ionian Sea (Rawson *et al.*, 2003; Casale *et al.*, 2004), and the Adriatic Sea (Casale *et al.*, 2004).

This species, along with other barnacles, forms part of the biofouling that attach to turtles and many of them form about 20% of the marine biofouling which is accumulation of unwanted biological matter on solid surfaces and ships, with biofilms created by microorganisms and macrofouling attach to hard substrate, in addition to other sessile marine invertebrates of isopoda, decapoda, amphipoda, gastropoda, bivalvia, polychaeta, ascidians, sponges and marine plants (Anil *et al.*, 2011; Holm, 2012).

Chelonibia testudinaria is the most frequently observed sea turtle barnacles, most commonly found on *Caretta caretta* (Linnaeus, 1758) (loggerhead) and *Chelonia* (Linnaeus, 1758) (green turtle) (Blick *et al.*, 2011). This species is rarely found on non-living bodies (Relini, 1980).

Chelonibia testudinaria preferably attaches to sea turtles as it adheres to the carapace and plastron, and is also found on the head, skin and fins (Frick and Ross, 2001).

It attaches by means of a membranous basis and an adhesive "glues" similar to that used by other barnacles (Kamino 2008, Moriarty *et al.*, 2008).

The presence or absence of epibiont barnacles that are mobile from one place to another with sea turtles provide very important data, in addition to the chemical information stored in their shells, which can be useful in obtaining information about the biology, life history and movement patterns of the sea turtles (Hayashi and Tsuji, 2008; Detjen *et al.*, 2015).

Chemical analyses of the layers of the barnacle shell can also give a complete picture of the position of turtles in time and space when these turtles move through water bodies of varying temperature and/or salinity (Killingley and Lutcavage, 1983).

The ability to age *Chelonibia testudinaria* by its size also allows assessment of the environments in which the turtles live (Newman *et al.*, 1980).

Materials and methods

Study site:

A single specimen of barnacle *Chelonibia testudinaria* was observed on the left and middle of the carapace of a dead loggerhead turtle (*Caretta caretta*) as shown in (Figure1), which was found on the rocky shore in Afamia area on the Syrian shore (35°32' 40.2"N 35°45' 23.1"E) as shown in (Figure 2) at depth 0.00 m.



Figure 1: A dead loggerhead turtle (*Caretta caretta*) on Latakia Shore



Figure 2: Location of the specimen on Latakia Shore

Study specimen:

The specimen was collected during August 2021. The barnacle was identified and classified according to (Gorringe and Nicholls, 1982), and based on WoRMS taxon details (2021).

The weight, length, width and height measurements of the barnacle where it was taken (Figure 3). Then it was well preserved in a container in the Laboratory of Graduate Studies at the Faculty of Science, Tishreen University.

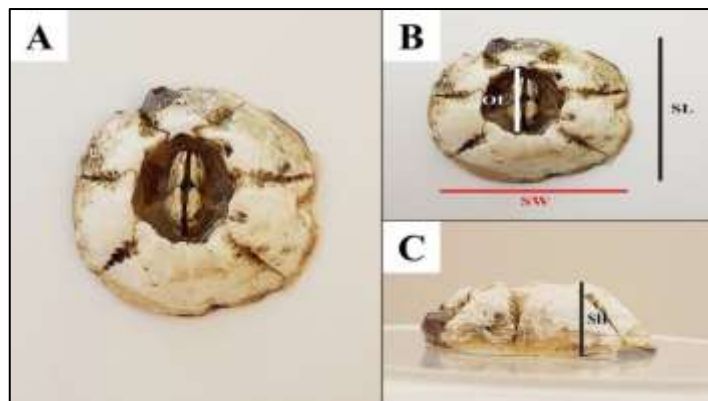


Figure 3: A. General form of the species *Chelonibia testudinaria*. B. Shell Parameters measured for morphological analysis. SL – shell length, OL – orifice length, ST – shell thickness. C. A profile of *Chelonibia testudinaria* where SH – shell height.

Results

The taxonomic status of the species according to WoRMS:

Kingdom:	Animalia
Phylum:	Arthropoda
Class:	Thecostraca
Order:	Balanomorpha
Family:	Chelonibiidae
Genus:	Chelonibia
Species:	<i>Chelonibia testudinaria</i> (Linnaeus,1758).

General characteristics of the species:

The external shell of *Chelonibia testudinaria* is oval, polished, with a smooth surface, composed of 6 white, smooth and firm pieces. The shell is low in profile, and has oval depressions along the radius, which are connections between the shell plates. Most often found on a small dwarf male located in these oval depressions (Gruvel, 1965).

The growth rate of *Chelonibia testudinaria* is not constant (non-linear) as the rate of increase in height decreases with age. And the largest length that this barnacle can reach on sea turtles is about 70 mm. This species can live for 21 months or more (Doell, Sophie, *et al.*, 2017).

It is known that the individuals of this species are hermaphroditic, and it is noted that individuals of a small sized male are attached on her as described by (Zardus & Hadfield, 2004), as is the case in the studied sample as shown in (Figure 4), indicating the presence of a small male individual associated with the studied specimen.



Figure 4: *Chelonibia testudinaria* side view, hermaphrodite with a small male attached

External morphological characteristics and measurements of the studied specimen:

Among the most prominent of these characteristics, we mention them as shown in (Figure 3):

- Color:** White to beige.
- Shape:** Regular circular, smooth polished.
- Surface:** Smooth and polished.
- Basal margin:** Soft, not sharp.
- Shell length (SL):** 38 mm.
- Shell width (SW):** 35.50 mm.
- Shell height (SH):** Low height about 10.55 mm.

•Orifice length (OL): 16.40 mm.

•Weight: 8.685 Gr.

The registration of this species for the first time in Syrian shore is a new addition to the sites of its existence, according to (Current Study 2021), which documents the presence of barnacles on the eastern shore of the Mediterranean Sea.

It is reported that this species has been recorded in specimens of dead turtles on the Turkish beaches of the eastern shore of the Mediterranean Sea (Geldiay *et al.*, 1982), and the Aegean Sea (Koukouras and Matsa,1998), where it was found on two dead loggerhead turtles *Caretta caretta* (northern Aegean Sea) (Gönülal, 2016).

Discussion

Chelonibia testudinaria has been found on a dead loggerhead sea turtles (*Caretta caretta*) carrying only one individual as the majority of epibiont communities tend to stick to the carapace (Frick and Pfaller, 2013; Gönülal, 2016).

When comparing the studied specimen with the Turkish specimens recorded in the Aegean Sea, it is noted that the length of the studied specimen is (38 mm), while the lengths of the Turkish specimens ranged from 2.8 mm to 44.5 mm (Gönülal, 2016).

Thus, the studied specimen is considered to be of medium size compared to the Turkish specimens.

On the other hand, the water temperature in the Afamea area, in which the studied specimen was found reached 32.2 C°, the oxygen concentration in the water was 6.7 mg/l, and the salinity degree was 37.6, and this can be considered a suitable Abiotic factors for the presence of this species of barnacle on the Syrian shores of the eastern basin for the Mediterranean sea.

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