

FIRST RECORD OF THE TURTLE BARNACLE *STEPHANOLEPAS MURICATA* (FISCHER, 1886) FROM THE BAY OF MONASTIR (EASTERN COAST OF TUNISIA)

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ABSTRACT

The sessile barnacles Balanomorpha included in the family Platylepadidae are obligatory symbionts of motile marine animals, with some species occurring solely on turtles, sea snakes, and fish. Stomatolepadine barnacles like *Stephanolepas* are characterized by nearly- to fully-encapsulating the shell in host tissue. This barnacle is currently known from turtles in the Pacific, Indian and North Atlantic Oceans and in the Mediterranean Sea. In that basin *S. muricata* has been reported only in the Spanish and Italian waters and in the South of Tunisia. In this note, we document the first record of *S. muricata* in the bay of Monastir (eastern coast of Tunisia) on a loggerhead sea turtle *Caretta caretta*.

Keywords: *Stephanolepas muricata*, loggerhead sea turtle, bay of Monastir, Tunisia

INTRODUCTION

Sea turtles are characterized by a variety of migratory strategies and foraging habitats and are therefore the marine taxa with the most diverse communities of epibionts, as they provide the substratum needed for their attachment (FRAZIER *et al.* 1992; FRICK *et al.* 1998; CORRÉA *et al.* 2014). Alternatively, epibiont assemblages are useful tools to trace marine turtle movements and ecology at several spatial and temporal scales, which is particularly valuable when dealing with endangered marine species (CAINE 1986; CASALE *et al.* 2004, 2012; REICH *et al.* 2010; FRICK et PFALLER, 2013). They can also serve as good indicators of the host's health as debilitated host may offer opportunity for greater than usual levels of epibiont colonization (SLOAN *et al.* 2014). Most sea turtle and epibiont associations represent commensal relationships (FRICK *et al.* 2010). Balanomorph barnacles, the most commonly documented epibionts of sea turtles (CASALE *et al.* 2012) are obligate commensals. Many of them adhere to their hosts superficially, however, a number of species, particularly those within the family Platylepadidae, partially or fully encapsulate themselves within the host's tissues (ZARDUS et BALAZS, 2007).

Stephanolepas muricata (Fisher 1886) was reported for the first time from the skin of a hawksbill turtle (*Eretmochelys imbricata*) captured in the South China Sea, Southeastern Vietnam (Fisher 1886). Subsequent studies have detected *S. muricata* on other sea turtle species which are green turtles (*Chelonia mydas*), loggerheads (*Caretta caretta*) and olive ridleys (*Lepidochelys olivacea*) (BADILLO 2007; FRICK *et al.* 2011). It was previously believed to be restricted to the Indo-Pacific regions. However, the species was

discovered relatively recently in the Atlantic Ocean and in the Mediterranean Sea (FRICK *et al.* 2011). In the latter basin, *S. muricata* has been reported in the Spanish and Italian waters (BADILLO 2007) and in the Gulf of Gabès (South of Tunisia) (KARAA *et al.* 2012).

In this study, we describe the first record of *S. muricata* found on the skin of a loggerhead sea turtle captured in the bay of Monastir (eastern coast of Tunisia).

MATERIAL AND METHODS

As part of a project aiming to evaluate the health status of the endangered loggerhead sea turtle along the Tunisian coasts and in the framework of the sea turtle rescue center activities, a systematic study was performed to assess the presence of infective agents of the loggerhead sea turtles in the Tunisian littoral. During the summer of 2016, sea turtles admitted to the sea turtle rescue center of Tunisia were sampled for epibionts. The curved carapace length notch to tip (CCLn-t) of the turtles were measured using a flexible tape meter. The epibionts were identified, removed by gently scraping with blunt edge tool and preserved in 70% ethyl alcohol. The turtles and the epibionts were photographed.

RESULTS

The barnacle *Stephanolepa muricata* (Cirripedia: Coronuloidea: Platylepadidae) was found in an adult male loggerhead turtle (CCLn-t = 70 cm). It is the first record of this epibiont in the Bay of Monastir (fig. 1).

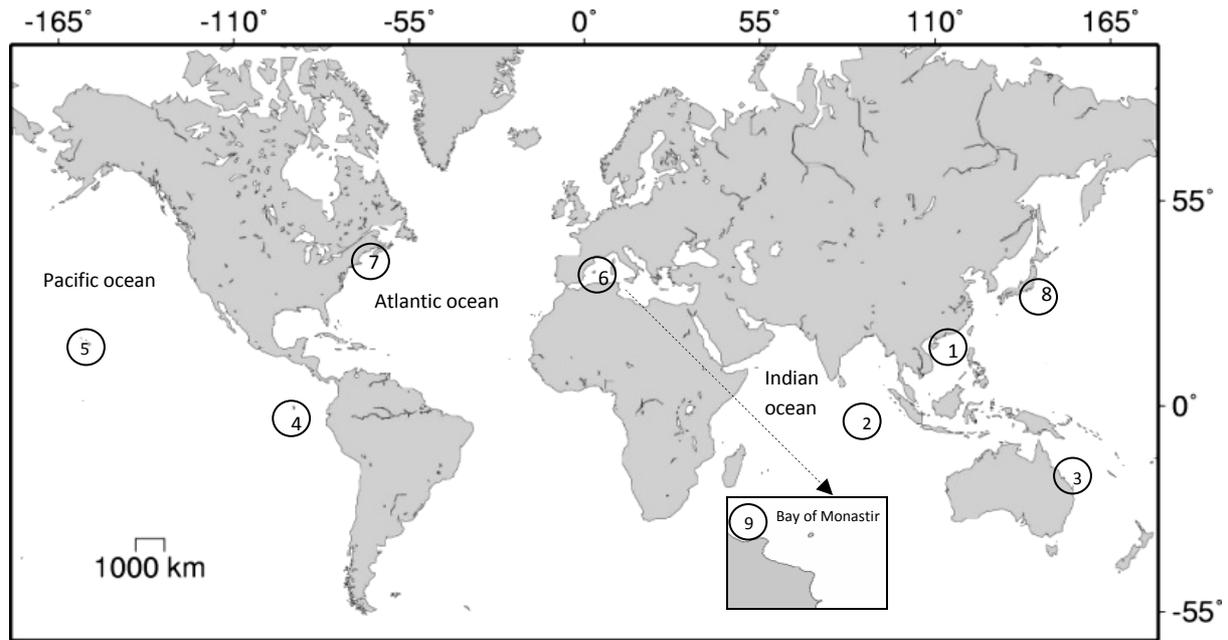


Figure 1: Geographic occurrence of the turtle barnacle *Stephanolepas muricata* in the world and the study area. Sites are listed in a chronological order according to the earliest date of the barnacle discovery
 1: South of Vietnam; 2: Sri Lanka; 3: Australia; 4: Galapagos + Costa Rica; 5: Hawaii; 6: Mediterranean Sea; 7: North Atlantic; 8: Japan; 9: the study area, bay of Monastir

The weakened turtle was admitted to the rescue center on June, the 7th, 2016. It was incidentally captured in a gillnet. Numerous *S. muricata* barnacles, of different sizes, were attached to the leading edges of the fore flippers of the animal situated in the gaps between scales (fig. 2). The shell of *S. muricata* is fragile and has a series of sutural elaborations that radiate outwards so as to cross-anchor the animal deep within the dermis of the

host tissue (fig.3). Additionally, other epibionts were collected from the carapace of the turtle including the cirripedia *Chelonibia testudinaria*, the green algae *Enteromorpha sp* and the red algae *Polysiphonia sp*. After full recovery, the turtle was released after 2 months of hospitalization, on August the 18th, 2016.



Fig.2: *Stephanolepas muricata* in the fore flipper of the turtle

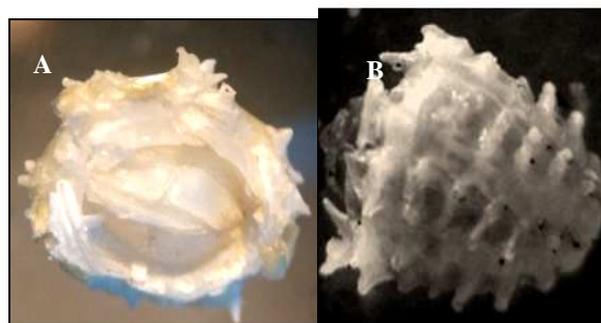


Fig.3: A: apical view; B: lateral view

DISCUSSION

In this study we recorded the first incidence of the sessile barnacle *S.muricata* in the bay of Monastir, Tunisia. This species was observed to penetrate nearly 1 cm into the turtle’s integument, colonizing in important numbers the anterior edge of its flippers.

The turtle reacts by encysting them in fibrous connective tissue where the barnacle is not only held in place by the host but can continue to grow, which explains the finding of different sizes of the specimen. In other regions of the world, *S.muricata* was commonly collected from the outer edge of the carpal region of the forelimbs of *C. caretta*. It is

hypothesized that this restricted and specialized distribution over the host body could be due to feeding needs, since this area is the "leading edge" of the limb during swimming and, therefore, one of the areas of the turtle most exposed to the current of water, which could represent an advantage for a filtering body (FRICK *et al.* 2011).

The turtle barnacle *S.muricata* was recently detected in the Western and Central Mediterranean but never in the Eastern region of that basin. Given the continuous variation of the marine environment conditions caused by a variety of factors including the climate change, acidification, pollution...etc, one would think about the dispersal behaviour of *S. muricata*, and hypothesize whether it is a newfound species in the Mediterranean resulting from a recent invasion phenomenon or there could be simply a lack of historical documentation.

Genetic analyses would be interesting in order to determine possible routes of invasion into the Mediterranean Sea and to better understand the transmission and potential gene flow in these barnacles between populations and pathways of infection between turtle species. Comparison of specimens found in Tunisia with their conspecifics from other seas would be determinant to identify the origin of the new found turtle epibiont in the bay of Monastir.

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