COMPETITIVE DISPLACEMENT OF THE NATIVE *SQUILLA MANTIS* BY THE ALIEN INVASIVE STOMATOPOD *ERUGOSQUILLA MASSAVENSIS* IN THE GULF OF GABÈS (TUNISIA)

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Abstract
A bloom of Massawan mantis shrimp *Erugosquilla massavensis* (Kossmann, 1880) is observed in the Gulf of Gabès five years after its first occurrence in 2013 in the same area. The species is already established and regularly caught by commercial benthic trawl among fishery resources. This study focuses the spread dynamics and settlement pattern of this Erythraean species. Where both species coexist, the hourly yields of the native mantis shrimp have dramatically decreased, compared with previous studies (7.2 kg/h in 2006 *versus* 2.4 kg/h in 2018).

Keywords: Invasive species, Competition, Crustacea, Global change, Mediterranean Sea

Introduction
Despite its high economic value in the European countries, especially in the Adriatic Sea (5,000 tons/yr) [1], mantis shrimp *Squilla mantis* (Linnaeus,1758), is considered as a by-catch in Tunisia and commercial catches are usually discarded at the sea. Surveys conducted throughout the Gulf of Gabès allowed to record, for the first time in Tunisia, in 2013, the Erythraean stomatopod *Erugosquilla massavensis* (Kossmann, 1880) [2]. The biogeographical and chronological distribution of the Massawan mantis shrimp which is considered as one of the "worst invasive" in the Mediterranean sea is detailed in previous studies [2] and [3]. The species is already established in the Gulf of Gabès and compete with the native Mediterranean spot tail mantis shrimp. in the eastern basin, *E. massavensis* has an economic impact and threatens the native *Squilla mantis* throughout competition and even endangers commercially important Penaeid stocks since they often prey benthic crustaceans [4].

Materials and methods
The present study was conducted seasonally during 2 periods, 2005-2006 and 2018 before and after the appearance of the Erythraean shrimp by commercial benthic trawl. Fishing operations took place by day and by night at depths ranging from 10 to 180 m on sandy-muddy bottoms.

Results and Discussion
Yields (in kg per hour) of *S. mantis* and *E. massavensis* in the Gulf of Gabès during winter-spring trawling campaigns (2006 and 2018) are summarized in table 1.

Table1. Comparison between hourly yields of the alien and native Stomatopods caught in the Gabès Gulf.

	Yields (kg/h)			
Species	Winter 2006	Spring 2006	Winter 2018	Spring 2018
S. mantis	4,00 to 7,20	2,30 to 4,20	2,40 to 4,60	1,8 to 2,2
E. massavensis	Absent	Absent	5,40 to 5,80	6,60 to 7,80

This result confirms the status *E. massavensis* in the Gulf of Gabèsas one of the most successful migrant species in the central Mediterranean sea, due to its high fecundity and predaceous diet [5]. In Tunisia, Stomatopods are not sold on fish markets and are rarely collected by fishermen at the request of Italian restaurants (Fig.1). With the proliferation of the invasive mantis shrimp, we could expect changes in culinary traditions as it is the case with the blue swimming crab *Portunus segnis* (Forskål, 1775). Therefore, important possibilities of bioconversion and valorization may be considered for human consumption, fish meal or other protein based food.

Fig. 1. *Erugosquilla massavensis* (Kossmann, 1880) caught on April 2018 by trammel net at 10 meters depth at Ghannouch (Gabès Gulf)

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