

# SPATIAL DISTRIBUTION AND MORPHOMETRIC CHARACTERIZATION OF THE INVASIVE SPECIES *CERITHIUM SCABRIDUM* PHILIPPE (1848) IN THE TUNISIAN COASTS

Nadia Ben Akkez <sup>1</sup>, Wafa Boulajfene <sup>2</sup>, Lotfi Rabaoui <sup>3</sup> and Sabiha Tlig Zouari <sup>1\*</sup>

<sup>1</sup> Unité de Biologie intégrative et d'écologie évolutive et fonctionnelle des milieux aquatiques - s.zouaritlig@gmail.com

<sup>2</sup> Université Tunis El Manar Faculté des Sciences de Tunis, Unité de Biologie intégrative et écologie évolutive et fonctionnelle des milieux aquatiques

<sup>3</sup> Université Tunis El Manar Faculté des Sciences de Tunis, Unité de Biologie intégrative et écologie évolutive et fonctionnelle des milieux aquatiques

## Abstract

This work is a contribution to the study of the spatial distribution and the morphology of the invasive species *Cerithium scabridum* along the coasts of Tunisia. Among the surveyed stations (18), only four situated in the Gulf of Gabes, revealed the presence of this Cerithe with a relatively large density values. The application of the Factorial Discriminant analysis (FDA) to the metric variables measured on specimens sampled from the Gulf of Gabes and the Persian Gulf, divided the stations into two groups significantly different. The isolation of the stations of Jerba seems to be related to environmental conditions favorable to the development of this species.

**Keywords:** *Gastropods, Lessepsian migration, Invasive species, Tunisian Plateau*

## Introduction

The invasive species *Cerithium scabridum* Philippi, 1848 is a prosobranch gastropod subservient to the infralittoral. It is among the first indo-pacific molluscan species recorded in the Suez Canal and then in the Mediterranean Sea. It was recently reported on the Tunisian coasts ([1]). The deficiency of researchs on the eco-biology of this Cerithe led us to study its current distribution along the Tunisian coasts and to compare the shell morphology of the introduced specimens with that of individuals from their original environment (Persian Gulf).

## Materials and methods

A total of 18 stations were surveyed along the coasts of Tunisia, in spring 2015. At each station containing *C. scabridum*, the density was evaluated using a quadrat of 0.25m<sup>2</sup> of surface at the rate of 5 replicates at each station and a sample of 30 individuals was collected. In addition, a sample of 30 individuals was brought from the Manifah station (Arabian Gulf). On each shell, metric variables were measured using an electronic caliper (1/100 mm) : Shell length (L), shell width (l), shell thickness (E), last whorl length (LDS), siphonal canal length (Ls), siphonal canal width (ls), aperture length (Lo), aperture width (lo). A factorial discriminant analysis (FDA) has been performed and Wilks test was applied to verify the significance of the difference between the groups obtained by FDA. In addition, the estimated percentages PCS was used to assign individuals into their original samples.

## Results and Discussion

The study of the spatial distribution showed that the species was encountered alive only at four stations in the Gulf of Gabes namely: Zarzis a, Zarzis b, Jerba El Borj and Jerba Sidi Jmour. The density values were relatively important varying between 7 and 11 ind / m<sup>2</sup>. The application of Kruskal-Wallis test on the measured variables revealed a highly significant difference between them at the limit of 1% reflecting a clear morphological variability between the studied samples. The results of the FDA performed on the metric variables showed that the two first axes explain 93% of the total variation (Fig. 1).

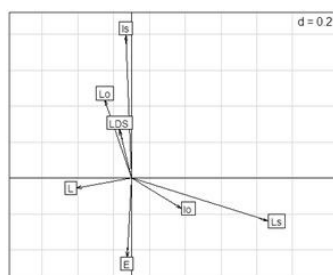


Fig. 1. Contribution of the variables in the formation of the two first discriminant functions

The barycentric representation of the factorial plan FDA (Fig 2) suggested the presence of two main groups: the first is the two stations of Jerba (Jerba El Borj, Jerba Sidi Jmour). The second includes the Zarzis stations and that of Manifah (Arabian Gulf). The Wilks test confirmed the significance of this difference (Wilks lambda = 0.036109, F = 27,143, p <0.05). The calculated percentages of PCS are varying between 95% in Arabian Gulf and 98% in Jerba El Borj reflecting an intra-sample similarity.

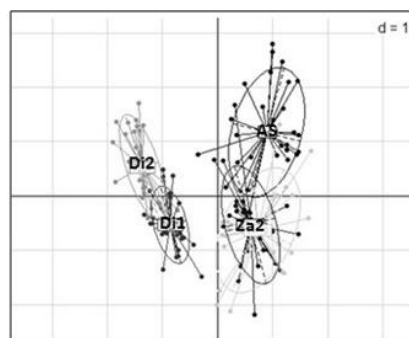


Fig. 2. Factorial Discriminant Analysis (FDA) of studied populations

The absence of *C. scabridum* in the Gulf of Tunis despite its signalisation in previous works, seems revealing that the species wasn't installed in abundance at this level and didn't yet constitute stable populations ([2]). Furthermore, the segregation of Jerba stations may be related to environmental conditions such as the availability of foods and space that appears to be suitable to the prosperity of this invasive species.

## References

- 1 - 1- Enzenross L., Enzenross R. 2001. Untersuchungen uber das Vorkommen mariner Mollusken in tunesischen Gewasser. *Shriften sur malakozoologie*, 17: 45-62.
- 2 - 2- Antit M., Daoulati A., Rueda J.L and Salas C. 2013. Temporal variation of the algae associated molluscan assemblage of artificial substrata in the Bay of Tunis (Tunisia). *Medeterranean Marine Science*, 14 (2):390-402.