Study of structure dynamic *Mytilusgalloprovincialis* in the atlantic coastline rabat-sale

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ABSTRACT

The Moroccan coast has a rich environmental and ecological heritage and varied as its intrinsic value as its demographic and socio-economic interest. It has a rich and varied environmental heritage (flora and fauna, landscape and natural sites such as dunes and wetlands), which provides resources to the basis of various economic activities (forestry, fishing, grazing and forestry activities .. .). This explains the human and urban concentration, becoming more diffuse, supported and dense on these spaces. This urbanization and densification of the coast irretrievably leads to increased pressure on coastal and problems to confront: solid and liquid waste management, flow (road traffic, drinking water system, energy service ...), spatial planning (intensive industrialization, coastal development, tourism projects of great effect ...), preserving the landscape and natural resources. The use of bivalve mollusk (Mytilusgalloprovincialis) as a bio-indicator of marine ecosystem pollution provides an advantage of monitoring the coastal contamination and the evolution of the quality of coastal marine species of Rabat-Salé. The objective of this study is a comparison of the dynamic structure of the population of Mytilusgalloprovincialis on the coast of Salé-Rabat (with stations S1, S2 and S3 for Sale and R1, R2 and R3 for Rabat) in us based on the study size frequency histograms to assess the quality of the aquatic ecosystem. Following the results of this study the spatial distribution of the demographic structure of Mytilusgalloprovincialis fluctuates widely from one area to another minimum density of 624 individuals/m^2est observed in Rabat and a maximum of 4224 individuals / m^2 of Salé. It seems that it depends mainly on the physical and chemical factors, edaphic and hydrological coastline are: the nature of the substance, the tidal phenomenon, the availability of food and behavior of species. Different regression lines show that there is good correlation between the total length to the width of the shell, with significant correlation coefficients (R) of between 50% and 97% Salt and it is greater than 96% for Rabat.

Keywords: Atlantic Coast Morocco (Rabat-Sale), *Mytilusgalloprovincialis*, dynamic structure, bio-indicator.

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INTRODUCTION

The marine environment is threatened several types of pollution. Indeed the coastal area has experienced urban, industrial, tourist and agricultural unprecedented; more coastal waters were used as linker releases almost all activities related to this development. The coastline of the salty-flap wilaya is not immune to this problem. He is facing multiple environmental problems (liquid and solid waste, illegal quarrying, illegal constructions ....), Due to the demographic development and the economic importance which it relates. This destroys the quality of coastal and threatens the collection of different kinds of aquatic products for consumption, in particular mussels (*Mytilusgalloprovincialis*) collected and used throughout the year by local residents. The species *Mytilusgalloprovincialis* are mollusks well studied by several authors in biology reproduction, Its dynamic structure in some regions or as a bio-indicator of pollution [1-11].

The objective of this study is to determine the dynamic structure of this population. Benthic mollusks are considered sentinel species. They are used as biological indicators of marine ecosystem. In Rabat-salt region, mussels are good indicators of metal pollution [11].

MATERIALS AND METHODS

The choice of stations was based on their representation of the environment in relation to pollution sources and their accessibility. Six stations were chosen, on the coastal strip of Salé, the selected stations are noted S1, S2 and S3 and on the coastal strip of Rabat selected stations are balanced R1, R2 and R3 (Fig.1).

S1: opposite-SIDI MOUSSA neighborhood next to wastewater discharge
S2: as a reference station, located opposite SIDI-ADELLAH region far from any dwelling and consequently far from wastewater discharges.
S3: A BOUKNADEL located left of a wastewater discharge
R1: in front of HAY-Fath neighborhood near a wastewater discharge
R2: in front of Yacoub EL MANSOUR-area far from wastewater discharges and thus as a reference station.
R3: in front of the district OCEAN near the waste water discharge.

Figure 1 : Station location study.

For the sampling of mussels is low tide made to the Quadra used method. The principle of this method relies on the harvesting using a knife all individuals present within an area of 1/4 m^2 [12].

galoprovincialis of Mytilus shells were measured for each station. The anteroposterior length, width and thickness were measured for each individual. To make a comparison of the growth of the shell along these three dimensions in the salty coastal population flap 904 individuals of all existing sizes were used. The mold dry weight was followed over 904 individuals of different sizes for the year 2014 and 362 individuals of different sizes for the year 2015. The languor of each animal is measured using a caliper 1/20 mm. Heating the mold was carried out in an oven at 60°C until constant weight.

Figure 2: The various measured linear parameters

The measurements of linear parameters are:
• The total length (Lt) corresponding to the greatest distance; separating the front edge of the rear edge of the shell.

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• The width (La) that goes from dorsal to ventral hinge;
• Maximum thickness (Ep) which is the maximum width of the convexity of the two united valves (Fig.2).

RESULTS AND DISCUSSION

1- density and size of the molds:

The average density of *Mytilusgalloprovincialis*reveals large variations: a minimum of 624 individuals per m2 in R1 and R2 and a maximum of 4224 individuals / m^2 in S1. As for the distribution and size of the mold vary from site to site, S2 and R2 sites with good environmental conditions (exempt from pollution), live in larger species. These results demonstrate that the size of the molds, varied according to the quality of the marine environment. The high density in the various stations is due to organic matter (domestic wastewater discharges) Which is a source of nutrition for mussels with the exception of station R1 or density is low, which can be explained by the collection of mussels by the riverside. The body affected by a factory polluting type of defense mechanisms to a favorable adjustment to maintain his life, part of its total energy is lost in the production of such mechanisms. This energy would have been allocated to growth and reproduction in a "clean" environment thereby increasing the size of the organization. Their size (growth parameter) may be smaller and the effectiveness of their reproduction compared to living organisms in an unpolluted environment (Fig. 3). Besides, several authors have stressed the strong correlation of the reproductive cycle and environmental conditions in particular the change in temperature [13, 14].
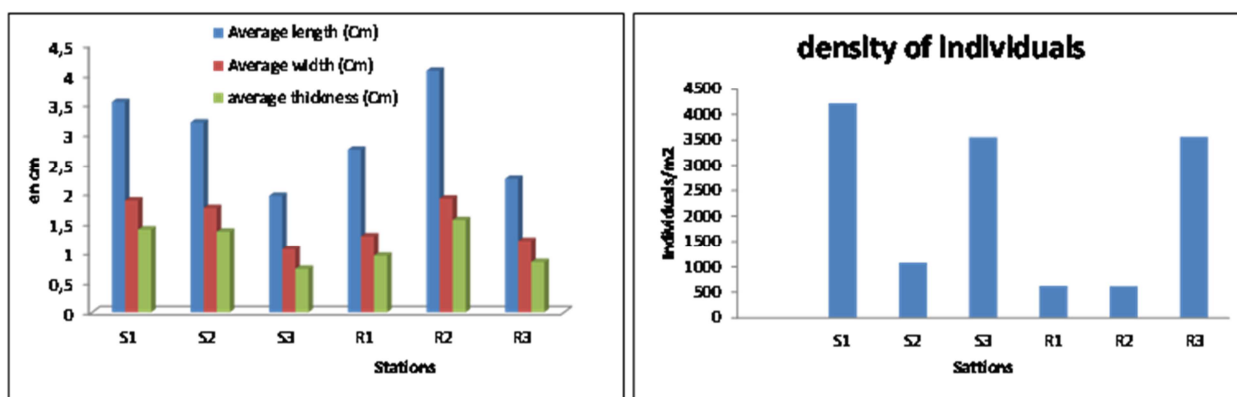

Figure 3: length variation, width, average thickness and density of *Mytilusgaloprovincialis*.
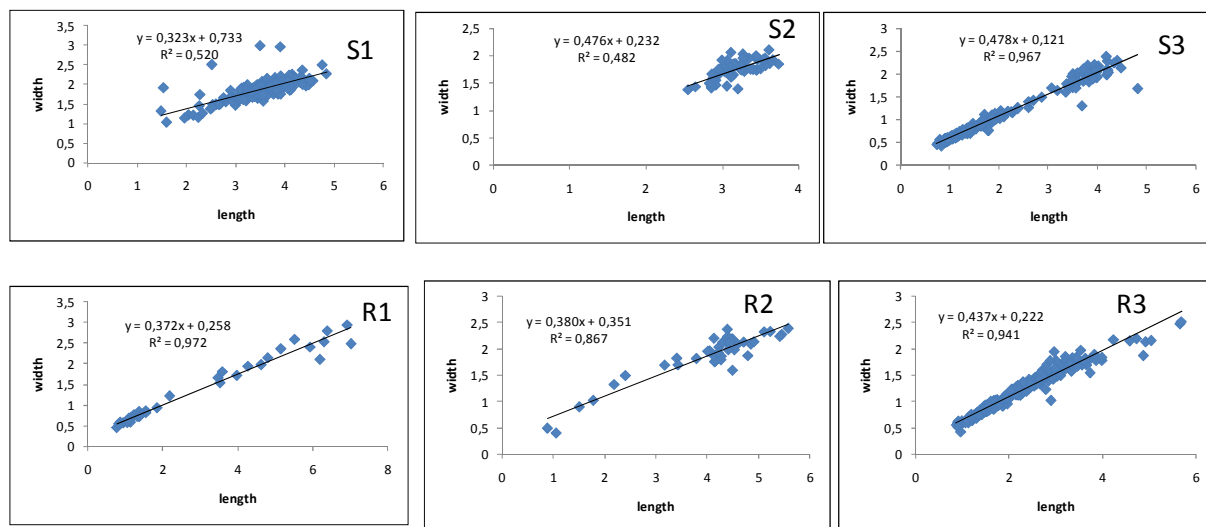

Figure 4: Regression line connecting the length to width (mm)

2-Relationship between length and width

In the mussel *M. galloprovincialis* collected in the six stations (Figure 4), the analysis of the results after determination of the different regression lines shows that there are good correlations between the total length and width, with significant coefficients (S1 56%, S2: 50%, S3: 97%, R1: 98%, R2: 97% and R3. 96%) This result reveals that the mussels from the coast Rabat-Salé shows a correlation between changes the width and the total length of individuals. Any time this correlation is low in S1 and S2, this shows that the width believes slower than

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length. On the other hand, Le Breton [15] have shown that the comparison of the average length of the molds between sites showed significant differences in time and space of the population of the three molds of *M. galloprovincialis*of Thessaloniki bay.

3-Relations between the length and thickness
Analysis of the results obtained after the determination of different regression lines except for site S2, shows the existence of significant correlations between the total length and thickness with good coefficients of determination R (S1: 63%, S2 33%, S3: 97%, R1 98, R2: 92 and R3: 94) (Fig.5). This result shows that the growth in thickness and width is performed at the same speed with the exception of S2 site. This anomaly may be related to the removal; in fact this area is frequented by fishermen who harvest the mold during the entire year, which is about the size of the population. In addition to weight gain *Mytilus* is influenced by its growth cycle is continuous and environmental conditions as was shown in the lake of Bizerte in Tunisia [16].
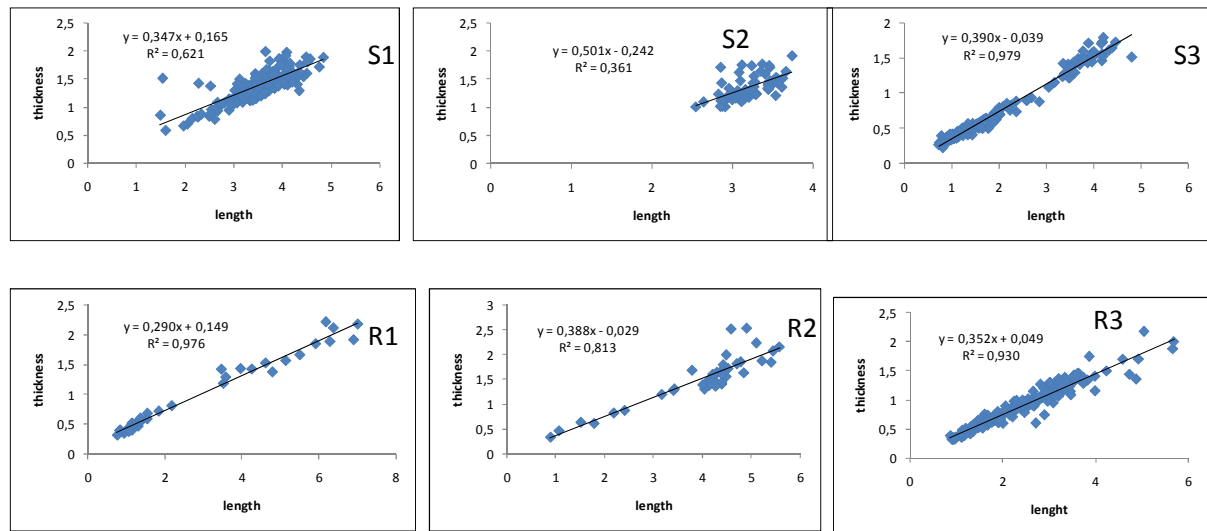

Figure 5: Regression line connecting the length-thickness

CONCLUSION

The spatial distribution of the demographic structure of *M. galloprovincialis* fluctuates widely from one area to another. It seems that it depends mainly on the physical and chemical factors, edaphic and hydrological coastline are: the nature of the substance, the tidal phenomenon, the availability of food and behavior of species. Different regression lines show that there is good correlation between the total length to the width of the shell, with significant correlation coefficients. This result demonstrates the use of this species as a bio indicator for monitoring the water quality of coastal Rabat -Sale.

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