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Current Situation of *Stramonita heamastoma* (Linnaeus 1758) (Gasteropod Mollusk) in the Western Coast of Algeria

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Abstract

Stramonita heamstoma is carnivorous gastropod mollusk who is feeding on bivalves and sessile macrofauna. The ecobiological study of this gastropod on the Algerian west coast has demonstrated the presence of significant populations in the zone Z3 with a density of 1,117 ind / mlc, as saying in the other study areas (Z1 and Z2), populations are less significant. This species shares the rock substrate with other mollusks and obeys all anthropogenic pressures that act more or less on their survival.

Keywords: *Stramonita heamstoma*; gastropod; mollusk; density; anthropogenic pressures.

1. Introduction

The analysis of the macrobenthic fauna structure is a good method in the study of environmental modifications caused both by natural and anthropologenic perturbations [1]. Different hydro climatic conditions at and above a continental shelf have significant effects on the ecology of the environment (temperature, nutrient richness and pelagic production) [2].

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The mollusks communities populations seem to be a good indicator of the intensity of this pollution. *Stramonita heamstoma* (Linnaeus, 1767) is a marine mollusk of about 4-8 cm with a bulging shell (Figure 1). It has a wide distribution in the world. This rock's gastropod is very widespread in tropical and warm waters of the western Atlantic. It is found in the Caribbean, North Carolina and Florida, Bermuda and throughout the Brazilian coast, including the islands of Fernando de Noronha e Abrolhos. It is also found in the eastern Atlantic: West Africa and tropical South West Africa, including Cape Verde and Angola, and in European waters, the islands of Macaronesia, the Mediterranean Sea and the south-west coast of Apulia [3,4]. *Stramonita haemastoma* is one of the most conspicuous spacies [5]. This carnivore snail feeding primarily bivalves is located on the soft substrate and hard substrate at a depth of 0 to 200 m [3]. *S (Thais) haemastoma* is unabl to penetrate estuaries below salinities of 15‰ [5]. Below 12° c S (Thais) haemastoma becomes torpid and inactive [6]. Algerian west coast is characterized by a very large malacological diversity. Unfortunately it seems that this wealth Malacological is subject to multiple pressures and human activities [8].

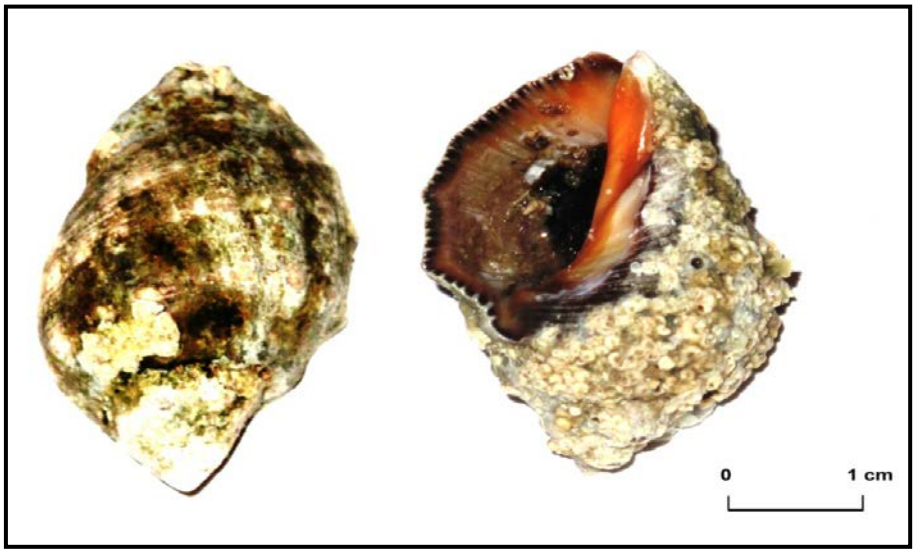

Figure 1: *Stramonita heamstoma* collected

2. Materials and methods

We undertook this study ecobiological Stramonita heamastoma at the Algerian west coast. The Algerian coast rich and diversified, where alternates rock shores, sandy beaches and wetlands, is characterized by a concentration of the population and activities due to significant industrial investments, making this area even gravitational. We have highlighted the distribution and density estimation, and the effects of human impact on its existence and undertaken relationships between this mollusc and the species with which it shares the same habitat [9].

A total of 18 stations of rocky and sandy coastline of western Algeria were prospected during the period from June 2013 to August 2016 (Figure 2). These stations are divided into 3 zones whose position is reporoted in Table 1.

Table 1: positioning of sampled stations

Zone	Stations	Position	Lacation
Zone 1 (Z1)	Station 1	35° 54’57.74’’ N 0°03’21.15’’ E	Salamandre beach
	Station 2	35° 49’52.90’’ N 0°01’03.01’’ O	Stidia beach
	Station 3	35° 47’56.50’’ N 0° 09’45.23’’ O	Mers El Hadjaj beach
	Station 4	35° 51’39.80’’ N 0° 17’43.07’’ O	Arzew beach (next to tho port)
			Kristel beach
Zone 2 (Z2)	Station 5	35° 49’25.87’’ N 0° 29’17.11’’ O	
			Ain Turk beach
	Station 6	35° 44’34.88’’ N 0° 45’16.39’’ O	
			Bousfer beach
	Station 7	35° 44’31.88’’ N 0° 50’12.54’’ O	
			Cap falcon beach
	Station 8	35° 46’07.65’’ N 0° 47’74.48’’ O	
			Bomo beach
	Station 9	35° 45’13.04’’ N 0° 49’45.16’’ O	
			Les andalouses beach
	Station 10	35° 42’39.44’’ N 0° 54’28.34’’ O	
			Madegh beach
	Station 11	35° 38’01.97’’ N 1° 04’00.37’’ O	
			Bouzedjar
Zone 3 (Z3)	Station 12	35° 34’25.52’’ N 1° 09’24.87’’ O	
			Sbiaat beach
	Station 13	35° 33’21.56’’ N 1° 11’40.96’’ O	
			Terga beach
	Station 14	35° 26’10.45’’ N 1° 14’20.98’’ O	
			Chatt el Hilel
	Station 15	35° 22’00.89’’ N 1° 16’29.91’’ O	
			Sidi Djelloul beach
	Station 16	35° 21’21.44’’ N 1° 17’13.59’’ O	
			Plage du puits
	Station 17	35° 18’04.58’’ N 1°24’09.29’’ O	
			Rechgoune beach
	Station 18	35° 17’58.00’’ N 1° 28’08.16’’ O	

Zone 1 (Z1): Gulf of Arzew (St 1: Salamandre, St 2: Stidia, St 3: Mers El Hadjaj, St 4: Arzew beach)

Zone 2 (Z2): Gulf of Oran (St 5: Kristel, St 6: Ain El-Turck, St 7: Bousfer, St 8: Cape Falcon, St 9: Bomo, St 10: les andalouses, St 11: Madegh)

Zone 3 (Z3): The Bay of Beni Saf (St 12: Bouzedjar St. 13: Sbiaat, St 14: Terga, St 15: Chatt el Hillel, ST16: Sidi Djelloul, St 17: plage du puits St 18: Rechgoun)

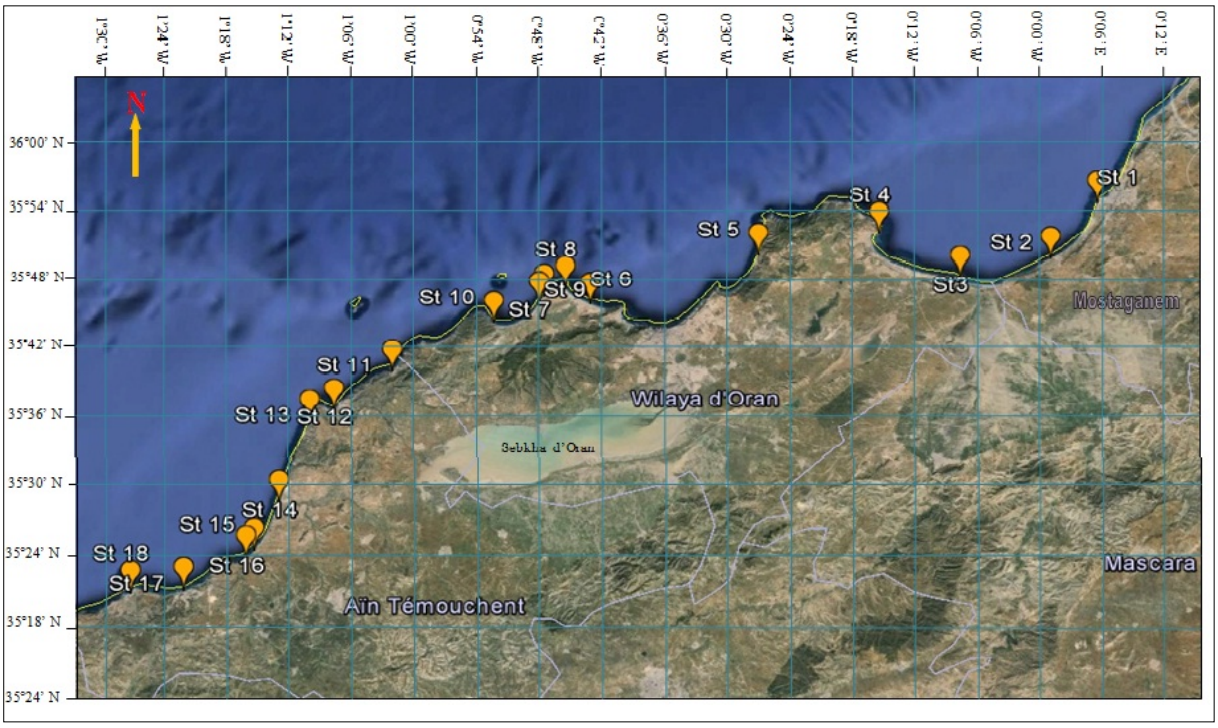

Figure 2: Study area

The density Estimation of *Stramonita haemastoma* was performed using a horizontal transect parallel to the shoreline, with 20 m long. Thus the individuals of this counted species and the density was determined by linear meter of coast (ind / lmc). In parallel, we proceeded to the identification of other molluscs associated with S. heamastoma and flora and other wildlife noticed at the station where the abundance of this snail is high, with a quadra of 1m of coast.

3. Results and discussion

The field observations allowed us to highlight the individualization of stations 5, 8, 15 and 16, characterized by a marked abundance of *S. haemastoma*, this species is ubiquitous in areas where nutrients are abundant especially on bivalves mytilids. The abundance of this species could correspond to a movement towards the lower shore, to better preserve Starmonita larvae from the wave actions [7]. In quiet websites species are bigger. *S. haemastoma* is less abundant and markedly reduced in the port sites and stations where human activity is pronounced. The size of individuals is less significant in disturbed sites. The lowest densities are noticed at station 3 (0.03 ind / lmc), 4 (0.05 ind / lmc), 6 (0,175 ind / lmc), 9 (0.15 ind / lmc) 12 (0,125 ind/lmc), 14 (0.1

ind / lmc). These stations are characterized by the presence of industrial and fishing ports, where the activity is clearly intense (St: 3, 4, and 14). Antifouling paints used on boats and ship hulls to avoid bioincrustation are frequently toxic to non-target organisms [8]. A sea water desalination plant is located in Shatt el Hillel (St 12) whose discharges flow directly into the beach and brines are deposited in an approximate area. Human activity, especially in summer, urban discharges should be at the origin of the low density of *S. haemastoma* in stations 6 and 9.

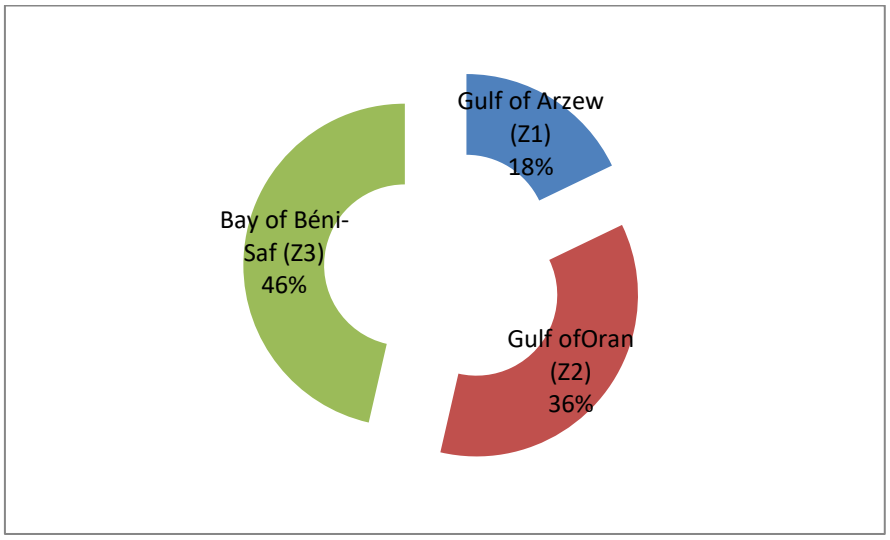

Figure 3: Variation of density of *Stramonita haemastoma* in three zones surveyed

The obtained results suggest that the distribution of *S. haemastoma* in the different zones studied is not homogeneous (Figure 3). High densities are recorded in the zone Z3 corresponding to the Bay of Beni Saf with an average of 1.06 ind / lmc. In this area biotopes are characterized by a relative preservation of port and industrial pollutants or pollutant inputs agglomerations. These communities are more or less protected from violent waves and currents on the infralittoral zone. This seems to support the installation of algal mats on or in which settles faunal diversity that serves as food for *S. haemastoma*.

In addition, the low densities recorded at the port of Arzew (St 3) at Bétioua (St 4) and the beach of the puit of Beni Saf (St 14) may be related to the high activity of these industrial clusters, to naval activities and the presence of shipbuilding workshops. The turbidity of the water is not excluded saw various discharges that flow directly in the beaches. This only confirms what has been reported by the autors [12,13] on the sterility of *S. haemastoma* due to antifouling products, disinfectants, mollucides and biocides used in ships, and the results obtained by [14] concerning the affecting factors of the distribution on this Muricidae.

These results confirm what was obtained by [9,15] concerning the presence and absence of *Stramonita (Thais) haemastoma* in the Algerian west coast and the factors that influence its spatial distribution.

The quadra we installed in the station 16, where the density is more important, gave us an idea about the species that share the sandy and rocky shoreline, in the area of balancing waves: mention the patellidae in supralittoral floor with a density of 29 ind / m^2 the chitonidae with 23 ind / m^2 on the mediolittoral. We noted the presence of

very small Mytilidae fixed on the algae, buccinidae with a density of 78 individuals / m^2. In the zones Z1 and Z2 vertical distribution is the same, but the densities are lower than those of the zone Z3.

4. Conclusion

Biotic and abiotic conditions can separately and synergistically influence the abundance and distribution of species and create vertical zonation patterns in marine systems [16].

The wide distribution of *Stramonita haemastoma* in the Algerian west coast does not necessarily committed tolerance to disturbance. In the 18 stations we surveyed *S. haemastoma* is omnipresent, the density of this muricids varies from one station to another and this variability is related to environmental conditions. High densities observed in the station 13 (Sbiaat) are relative to the preservation thereof. Biodiversity on this almost-island is remarkable and disturbances are reduced. By cons, in the stations where industrial and / or human activity are accentuated, densities of *S. haemastoma* are minimal. *Stramonita haemastoma* is a mollusc gastropods muricide whose density and survives depends on the degree of affection of their living environment and intensity of anthropogenic actions exerted on each link in the chain to which it belongs.

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