

RELATIVE GROWTH OF THE INVASIVE CRAB *LIBINIA DUBIA* H. MILNE EDWARDS, 1834 (BRACHYURA, EPIALTIIDAE) FROM THE GULF OF GABÈS (TUNISIA)

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Abstract

Morphometric features of the Mediterranean population of *Libinia dubia* were studied by measurements of various parts of body and chelipeds. For 4276 specimens, carapace width (CW), ranged from 22.14 to 89.1 mm, with the most abundant size group of 50-52 mm, was used as a reference parameter. Allometric relationships suggested that most morphometric relations were positive ($b > 1$ or $b > 3$) and highly significant ($t_{cal} > t_{th}$, $\alpha = 5\%$). Study of such bioecological traits is essential to manage bioinvasion.

Keywords: Mediterranean Sea, NIS, Crustacea, Global change

Introduction

Libinia dubia H. Milne Edwards, 1834, native to the western Atlantic, has been observed only in Tunisia since its occurrence in the 1990s in the Mediterranean Sea [1]. This invasive crab has proliferated and invaded the Gulf of Gabès causing damages on ecosystem and threatening coastal fisheries [2]. The aim of this research is to describe the relative growth of the species by analysis of morphometric characteristics.

Materials and methods

4276 crabs divided into 2122 females and 2154 males were monthly collected and examined at different sites from the Gulf of Gabès between January 2015 and December 2016 (Figure 1). Measurements and total weights of body and chelipeds were taken using a digital vernier caliper and digital balance respectively to the nearest 0.01 mm and 0.01 g. Relative growth equation ($y=ax^b$), based on the relationship between studied character and CW, was applied for the interpretation of results and statistical analysis were done using appropriate software.

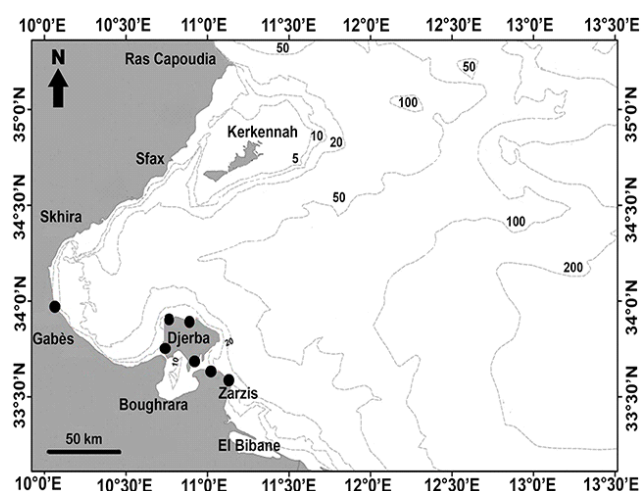


Fig. 1. Location of the study area and sampling sites in the Gulf of Gabès

Results and discussion

Most body parts of *L. dubia* showed negative allometric relations except body height (BH), abdominal length (AL) and width (AW) whereas cheliped characters were positively allometric except cheliped weight (CHWe) for combined sexes. For males, cheliped relationships were highly correlated ($0.59 < R^2 < 0.7$) compared to females ($0.44 < R^2 < 0.55$) which reveals the dimorphism of chelipeds. Values of $t_{cal} > t_{th} = 1.96$ ($\alpha = 5\%$) indicated that differences were significant for most of studied characters (Table 1).

Tab. 1. Morphometric characters of *L. dubia* from the Gulf of Gabès. Total length (TL), carapace length (CL), anterolateral border length (ABL), posterolateral border length (PBL), total weight (TW), cheliped length (CHL), cheliped width (CHW), cheliped height (CHH), M: males, F: females.

Character	Sex	$Y = ax^b$	R^2	t_{cal}	Allometry
TL	M+F	$TL = 2.852 CW^{0.8}$	0.9	58.6	-
CL	M+F	$CL = 1.898 CW^{0.858}$	0.89	33.7	-
ABL	M+F	$ABL = 1.102 CW^{0.898}$	0.69	10.3	-
PBL	M+F	$PBL = 1.172 CW^{0.89}$	0.78	15.1	-
BH	M+F	$BH = 0.535 CW^{1.040}$	0.64	2.57	+
AL	M+F	$AL = 0.063 CW^{1.574}$	0.53	11.8	+
AW	M	$AW = 0.21 CW^{1.023}$	0.68	1.22	+
	F	$AW = 0.443 CW^{1.103}$	0.8	6.18	+
	M+F	$AW = 0.039 CW^{1.586}$	0.19	3.25	+
TW	M+F	$TW = 0.002 CW^{2.582}$	0.77	6.61	-
CHL	M	$CHL = 0.054 CW^{1.684}$	0.66	12.6	+
	F	$CHL = 0.285 CW^{1.169}$	0.45	3.44	+
	M+F	$CHL = 0.185 CW^{1.322}$	0.39	5.97	+
CHW	M	$CHW = 0.002 CW^{1.986}$	0.7	14.8	+
	F	$CHW = 0.033 CW^{1.221}$	0.46	4.31	+
	M+F	$CHW = 0.011 CW^{1.534}$	0.44	8.63	+
CHH	M	$CHH = 0.005 CW^{1.891}$	0.69	14.3	+
	F	$CHH = 0.06 CW^{1.19}$	0.44	3.62	+
	M+F	$CHH = 0.027 CW^{1.44}$	0.39	6.87	+
CHWe	M	$CHWe = 6^{-05} CW^{3.105}$	0.59	0.47	+
	F	$CHWe = 1^{-05} CW^{3.228}$	0.55	0.83	+
	M+F	$CHWe = 0.001 CW^{2.602}$	0.28	1.26	-

As growth progresses, some dimensions of the animal's body may grow much more than others, resulting in the phenomenon of relative growth [3]. Our results corroborate with those obtained for *Libinia ferreirae* native to Brazil [4]. Analysis of morphometric characteristics is required for assessment of the fishery and can serve to detect changes that may occur during growth. Biometric study of *L. dubia* is essential for stocks management. Furthermore, it may be used as a primary data to evaluate the meat and shell yields for several uses (food, feed and bioactive molecules extraction) hence to convert negative impacts of the species into profits [2].

References

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