

LENGTH/WIDTH-WEIGHT RELATIONSHIPS OF THE MEDITERRANEAN GREEN CRAB *Carcinus aestuarii* NARDO, 1847 IN THE HOMA LAGOON, AEGEAN SEA TURKEY

Tahir Özcan*, Kerem Bakır, Tuncer Katağan

Department of Marine Biology, Fisheries Faculty, Ege University, Bornova-Izmir, Turkey

Abstract: In this study, the length/width-weight relationship of the *Carcinus aestuarii* Nardo, 1847 (Decapoda, Brachyura) in the Homa Lagoon were investigated during the summer period 2006. A total of 656 specimens, 555 (84.6 %) males and 101 (15.4 %) females, were collected and analyzed for the length/width-weight relationship. The carapace width (CW) ranged from 20.80 mm to 52.09 mm of male and ranged from 19.95 to 40.75 mm of females. Carapace length/width-weight relationship was found to be as $W=0.0004^{3.115}$ (r: 0.974) and $W=0.0002^{3.132}$ (r: 0.972).

Keywords: Length/width-weight relationship, *Carcinus aestuarii*, Homa Lagoon, Aegean Sea, Turkey

* **Correspondence to:** Tahir ÖZCAN, Ege University, Fisheries Faculty, Department of Marine Biology, 35100, Bornova, İzmir-TURKEY

Tel: (+90 232) 388 40 00/2822 Faks: (+90 232) 388 36 85

E-mail: tahozcan@yahoo.com and tahir.ozcan@ege.edu.tr

Introduction

The Lagoons, which has average depth of 2 m and show great seasonal changes in physico-chemical parameters, are important wetlands (Healy, 1997). The study area, Homa Lagoon (38°27' N, 26°55' E) has 23.6 -45.95‰ salinity, 5-32°C temperature, and 5.5 mg/l – 11,2 mg/l dissolved oxygen. The Homa Lagoon is a very shallow lagoon (average depth of 1 m) (Figure 1). The Mediterranean green crab *C. aestuarii* belongs to the family Portunidae, and its original habitat is the estuarine and lagoon waters in the Mediterranean (Mori et al., 1990). The species is a widely distributed in the Levantine Sea coast of Turkey, Aegean Sea, Turkish Straits System and Black Sea (Kocataş and Katağan, 2003) and reported in the Suez Canal (Holthuis & Gottlieb, 1958) also reported in the Japan coast (Sakai, 1986; Ikeda, 1989). *Carcinus* populations show a tolerance to the varying environmental changes (Abelló et al., 1997).

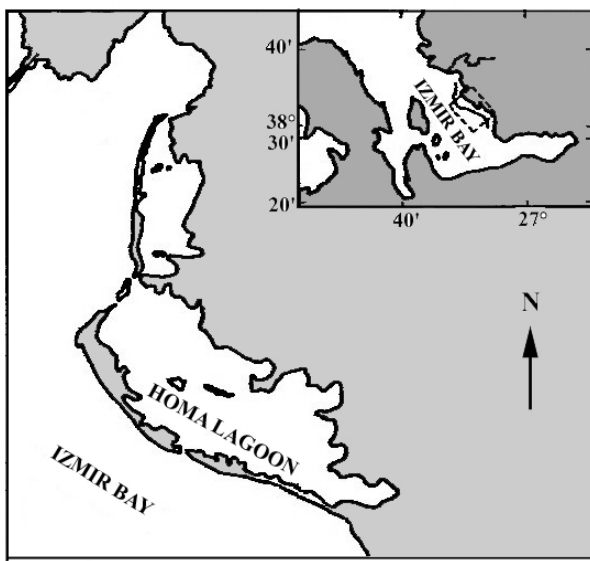


Figure 1. The map of study area.

Material and Methods

In this study, samples were collected with the net in traps of the Homa lagoon between May and August 2006. Crabs were fixed in the 4% formaldehyde and were weighed in the laboratory with a digital scale and measured the carapace length and width with a digital caliper and sexes were determined.

Sex ratio of green crab was analyzed by using Chi-square test (χ^2). The length-weight

relationships of all collected samples were determined by the expression $W=aL^b$, where W is the derived weight (g), L is the carapace length (mm) or width (mm) and a and b of the parameters of equation. The parameters a and b of the length-weight relationships were estimated by the least squares regression method. The significance of the regression was different from the predictions for isometric growth ($b=3$). Equations expressing the length/width-weight relationships of green crab were calculated for sex.

Results and Discussion

As a result of the investigation 656 specimens were collected between May and August 2006, in the Homa lagoon. 555 (84.6 %) males and 101 (15.4 %) females were determined. The overall ratio of females to males was 1:5.50 and χ^2 analysis showed this to be significant ($\chi^2=314.20 > \chi^2_{1,0.05}=3.84$). The sex-ratio is 1:5.5 in favor of males. The carapace width of the specimens ranged from 19.95 to 52.09 mm. The carapace length of the specimens ranged from 16.80 to 42.43 mm. and the weight is ranged from 2.24 to 41.32 g in males and 2.35 to 19.08 g in females (Table 1). There is no ovigerous female. All specimens are separated into 17 groups varying between 19 and 53 mm with 2 mm distance (Figure 2).

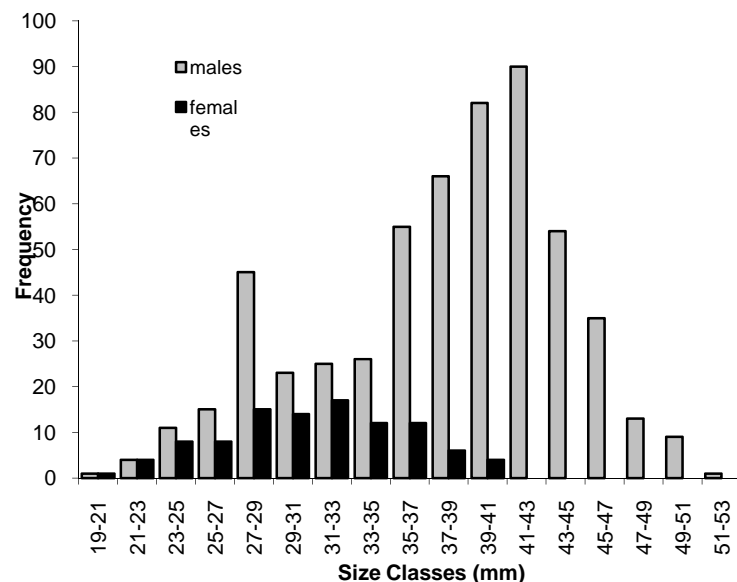


Figure 2. Carapace width-frequency distribution of males and females in *Carcinus aestuarii*

The length/width-weight relationships were calculated by using the lengths and weights and they were found as $W=0.0002CW^{3.086}$ ($r=0.971$), $W=0.0005CL^{3.053}$ ($r=0.950$) for male, $W=0.0003CW^{2.934}$ ($r=0.976$), $W=0.0007CL^{2.881}$

($r=0.944$) for female (Table 2). That the values of b for males and all samples are significantly different from 3.0, so they indicated allometric growth.

Table 1. CW, CL and W characteristic of the *Carcinus aestuarii*. Mean±SE, minimum (Min) and maximum (Max)

Sex	CW (mm)			CL (mm)			W (g)		
	Mean±SE	Min	Max	Mean±SE	Min	Max	Mean±SE	Min	Max
Male	37.97±0.27	20.80	52.09	30.67±0.22	17.1	42.43	17.67±0.34	2.24	41.32
Female	30.90±0.47	19.95	40.75	25.06±0.38	16.8	33.47	8.45±0.36	2.35	19.08
All	36.88±0.26	20.0	52.09	29.81±0.21	16.8	42.43	16.25±0.32	2.24	41.32

Table 2. Regression parameters of the relationship between W-CW, W-CL and CL-CW. A: Allometric, I: Isometric

Sex	n	W=a CW ^b			W=a CL ^b			CL=b CW+a		
		A	b	r ²	A	B	r ²	A	b	r ²
Male	555	0.0002	3.086^A	0.971	0.0005	3.053^A	0.976	0.0301	0.807	0.9844
Female	101	0.0003	2.934^I	0.950	0.0007	2.881^I	0.944	-0.1564	0.816	0.9816
All	656	0.0002	3.132^A	0.972	0.0004	3.115^A	0.974	0.0926	0.806	0.9864

The length/width-weight relationships have many benefits for indicators of the condition and can be used to calculate biomass and to estimate the recovery of edible meat from crabs of various sizes (Lagler, 1968). Also carapace width and carapace length are most frequently used dimensions in the study of crustaceans (Sukumaran and Neelakantan, 1997).

In this preliminary study to determine the length/width-weight relationship of *C. aestuarii* in Homa Lagoon observed there is a large population in the lagoon. In the study, these individuals were measured 19.95 to 52.09 mm in carapace width, 16.80 to 42.43 mm in carapace length and 2.24 to 41.32 g in weight. The sex ratio in Çakalburnu lagoon (38°24' N, 27°03' E), is an expected result of 1:1.2 in favor of males (Can et al., 2004) but in this study this ratio is 1:5.5 in favor of males and this shows different results with the sex ratio of the current study

The b value in width/length-weight of females (2.934; 2.881) was lower than of males (3.086; 3.053). The b value ranged from 2.66-2.81 (females) to 2.30-2.92 (males) for *C. aestuarii* in Çakalburnu lagoon (Can et al., 2007) and this shows different results with the b values of the present study. The b values are often 3.0 and generally between 2.5 and 3.5. The b values vary

according to species, sex, age, seasons and feeding. In addition, changes in physiological conditions, different amounts of available food, life span or growth increment can all affect the b growth exponent (Le Cren, 1951; Ricker, 1975).

Conclusion

Consequently, this study shows a close relationship between weight, carapace width (CW) and carapace length (CL) of *C. aestuarii* in Homa Lagoon. In the future when these data are supported with seasonal studies, the conduction of the population in Homa Lagoon will better be understood.

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