LENGTH–WEIGHT RELATIONSHIPS OF THE ALIEN JINGA SHRIMP, *METAPENAEUS AFFINIS* (H. MILNE EDWARDS, 1837) (DECAPODA, PENAEIDAE) IN THE MEDITERRANEAN SEA

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Abstract
Seasonal length-weight relationships (LWR) of the recently introduced Jinga Shrimp, *Metapenaeus affinis*, population inthe Izmir Bay are presented. A total of 1795 specimens were collected, and LWR for females, males and combined sexes, were calculated as $W=0{,}0046L^{3{,}19}$, $W=0{,}0076L^{2{,}96}$ and $W=0{,}0041L^{3{,}23}$ respectively. Whereas females showed positive allometry, males showed negative allometry.
Keywords: Alien species, Crustacea, Aegean Sea

Introduction
Metapenaeus affinis occurs in the Indo-West Pacific Ocean, from the Persian Gulf and the Arabian Sea, to Indonesia, China, Philippines and New Guinea [1]. The species is commercially of major importance in the Persian Gulf, where it is commonly captured on shallow muddy bottoms. It is raised commercially in the Philippines. It was first noted in the Mediterranean in April 2008, when 64 specimens were caught by trammel net set on muddy bottom, at depth of 8-12 m, at the inner part of Izmir Bay, on the Aegean coast of Turkey [2]. We monitored this population ever since.

Material and Method
A total of 1795 specimens were collected at the inner part of the bay by shrimp trammel net at monthly intervals between November 2008 – October 2009. Sexually mature male and female specimens were collected between May and October. LWR measurements of the newly established population were taken and compared to data from the species native range, and to serve as baseline for possible future studies of possible adaptation to the local environment. The relationship between length and weight was established as $W=aL^b$, where W is total body weight (g), L is total length (cm), and a and b are coefficients [3]. The parameters a and b of length-weight relationships were estimated by linear regression analysis on log transformed data. The association degree between variables was calculated by the determination coefficient (R^2). The growth type was identified by Student's *t*-test.

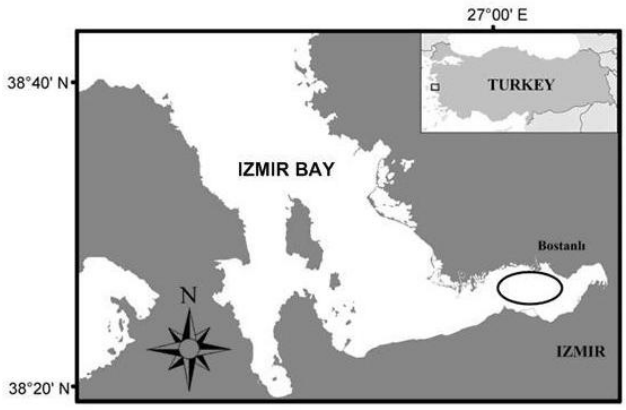

Fig. 1. Sampling area, where specimens were collected

Results and Discussion
Total length varied between 8-17,5 (±1,34) cm and weights were 3,2-38,9 (±4,87) gr. The smallest individual was a male collected in May, the largest a female collected in September. The maximum length for males was 14,6 (±1,12) cm as compared with 22.2 cm in its native range [4]. The population shows a normal distribution with sex ratio 1:1.2. Generally females are larger and heavier than males. According to calculations, growth for female and combined sex individuals showed positive allometry, but males showed negative allometry. In addition the slope (b) values revealed differences between the seasons ($p<0{,}05$). There are few LWR data for jinga shrimp. One study estimated $W=0.7079C^{2.770}$ whereas another $W=.0000495L^{2.7867}$ [4, 5]. The introduction of *M. affinis*, and the establishment of a population large enough to be commercially exploited, is a boon for Izmir Bay's artisanal fishermen, who turned from beach seining to trammel netting for prawns. During the summer of 2009, 10-12 fishing vessels were profitably engaged in this fishery, with wholesale price 4.5 euro per kg, and retail at 6.5-7 euro. The population dwindled in August, due possibly to intense illegal fishing.

Tab. 1. Length–weight relationships for, Jinga shrimp

Table. Length–weight relationships for, Jinga shrimp

Sex	*a*	*b*	n	R^2	SE(*b*)
Spring					
F	0,0059	3,09	535	0,93	0,037
M	0,0089	2,89	457	0,9	0,045
Summer					
F	0,0045	3,21	177	0,95	0,054
M	0,0082	2,93	176	0,89	0,076
Autumn					
F	0,0044	3,21	166	0,98	0,034
M	0,0117	2,8	138	0,96	0,049
Winter					
F	0,0047	3,19	108	0,93	0,082
M	0,0102	2,85	38	0,96	0,092
Total					
F	0,0046	3,19	986	0,96	0,021
M	0,0076	2,96	809	0,95	0,023
T	0,0041	3,23	1795	0,96	0,016

a, intercept; b, slope; n, number of examined specimens; R^2, correlation coefficient; SE(b), standard error of b.

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