

MORPHOMETRIC ANALYSIS OF THE DEEP FISH *CHLOROPHTHALMUS AGASSIZI* IN THE IONIAN SEA(GREECE)

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Abstract

Morphometric relationships of *C. agassizi* (B.1848) from the Ionian Sea are presented for the first time and may be a useful reference for future studies. Analysis of Variance indicates significant relationships for several parameters ($p < 0.01$).

Keywords : *Eastern Mediterranean, Deep Sea Ecology, Fisheries.*

C. agassizi is the dominant species in the uppermost layer of Ionian Sea. Although it undoubtedly plays an important role in the eastern Mediterranean deep-fish assemblages [1, 2], information is still scarce regarding its population status, biology and habitat needs. In the Ionian Sea it has been studied monthly over the course of a year recording biometry, growth, reproduction and dietary requirements [3]. Morphologic variation between populations is used in stock identification. Community structure, stock identification, and productivity are important factors in the development of management strategies as well as for experimental design of sampling programs [4]. The objective of this paper is to present morphometric relationships of the species from the Ionian Sea. Specimens were collected monthly from December 1996 to November 1997 by a commercial bottom trawler using a net with a cod end mesh size of 14 mm from knot to knot. Sampling was carried out at 92 stations between 300 and 800 m depths, covering an area of about 1500 km². As the species is synchronously hermaphroditic, data collection did not record gender. In all, 2309 specimens were measured. All morphometric relationships between parameters were calculated using linear regression. To test for isometry, the allometric index values obtained were compared with the expected values using a student t-test. Morphometric ranges for various parameters were: TL (total length): 48-201 mm (SD= ±30.6); the FL (fork length): 45-181 mm (SD= ±27.3); SL (standard length): 41-169 mm (SD= ±25.4); HL (head length): 11-52 mm (SD= ±7.7); BH (body height): 4-35 mm (SD= ±4.9); DFL (length of dorsal fin): 3-19 mm (SD= ±3.9); D_AL (distance from the end of the dorsal fin till the origin of the adipose fin): 13-144 mm (SD= ±8.2). All morphometric relationships are summarized in Table 1.

Tab. 1. Relationships and allometry of *C. agassizi* measured characters. N=number of individuals, SD=standard deviation of the slope b, t=values of the student's t-test for the type of allometry (Ho:b=1 for all the occasions). In each relationship $P < 0.01$.

Relationship	Equation	N	Allometry	r ²	SD(b)	t
TL-SL	SL= -0,6785 + 0,9989 * TL	2304	Isometry	0,998	0,046	-1,15
TL-FL	FL= -0,2002 + 0,8942 * TL	2283	Isometry	0,998	0,045	0,21
FL-SL	FL= 0,0312 + 1,0002 * SL	2282	Isometry	0,998	0,038	0,27
HL-TL	HL= -0,7073 + 0,2395 * TL	2223	Negative	0,931	0,065	-551,61
HL-FL	HL= -0,5801 + 0,2673 * FL	2202	Negative	0,93	0,073	-469,68
HL-SL	HL= -0,5678 + 0,2876 * SL	2213	Negative	0,932	0,077	-453,22
BH-TL	BH= -2,9822 + 0,1407 * TL	2224	Negative	0,809	0,068	-596,81
BH-FL	BH= -2,9385 + 0,1574 * FL	2199	Negative	0,811	0,076	-520,6
BH-SL	BH= -2,9459 + 0,1692 * SL	2222	Negative	0,81	0,082	-478,86
DFL-TL	DFL= -0,6498 + 0,0938 * TL	2232	Negative	0,918	0,029	-1493,66
DFL-FL	DFL= -0,6013 + 0,1069 * FL	2209	Negative	0,918	0,032	-1311,72
DFL-SL	DFL= -0,6021 + 0,1150 * SL	2231	Negative	0,915	0,035	-1194,32
D_AL-TL	D-AL= 1,4620 + 0,2599 * TL	2214	Negative	0,962	0,051	-682,84
D_AL-FL	D-AL= 1,6038 + 0,2899 * FL	2196	Negative	0,961	0,058	-573,74
D_AL-SL	D-AL= 1,5086 + 0,3127 * SL	2221	Negative	0,963	0,061	-530,96

Three relationships (TL- FL; TL- SL; FL-SL) indicated an isometric growth while all the others indicated negative allometric growth. In figure 1 the relationships between HL- TL, BH-TL, DFL- TL and D_AL-TL are presented. The relationships between the different lengths of the species (TL, FL, SL) showed $r^2 = 0.998$. Statistically significant relationships were observed in all cases. Unfortunately, there is no any other morphometric information for this species, except some data available at www.fishbase.org where the relationship TL-FL: $b = 1.113$ and TL-SL:

$b = 1.151$ but the measurements were based on only two individuals. Future studies on stock identification need to be conducted over a larger study area as population structure is considered a basic element of conservation biology and finally for fisheries management. Poor understanding of the biology of fishes in a fishery management could lead to dramatic changes in the biological attitudes and productivity of species [4].

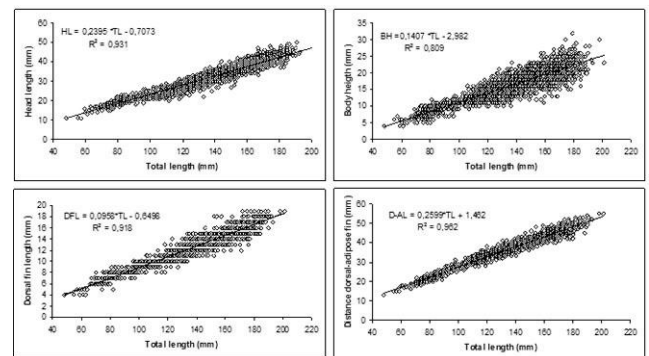


Fig. 1. Relationships of head length (HL), body height (BH), dorsal fin length (DFL) and distance dorsal-adipose fin with the total length of *C. agassizi* (TL).

References

- 1 - Petrakis, G.; Papaconstantinou C., 1998: Preliminary results of a trawl survey in deep water of Ionian Sea (Greece). *Proceedings of the 6th Symposium of Greek Ichthyologist*. Association of Greek Ichthyologist, Thessaloniki, Greece, pp. 25-34.
- 2 - Politou C-Y., Kavadas S., Mytilineou CH., Tursi A., Carlucci R. and Lembo, G., 2003. Fisheries Resources in the Deep Waters of the Eastern Mediterranean (Greek Ionian Sea). *J. Northw. Atl. Fish. Sci.*, 31: 35-46.
- 3 - Anastasopoulou, A., 2005: "Biology of Chlorophthalmus agassizi (Bonaparte, 1840) in the Ionian Sea." PhD. Thesis, Univ. of Athens. 250 pages (in Greek).
- 4 - Smith P.J., Francis R. and McVeagh, M., 1991. Loss of genetic diversity due to fishing pressure. *Fish Resh.*, 10: 309-316.