

Short communication

Length–weight relationships for seven fish species from the southeastern Black Sea

By S. A. Demirhan and M. F. Can

Mustafa Kemal University, Faculty of Fisheries, Tayfur Sokmen Campus, Serinyol, Antakya, Hatay, Turkey

Summary

This study reports the parameters a and b of the length–weight relationships for seven fish species (*Gobius niger*, *Mesogobius batrachocephalus*, *Mullus barbatus*, *Neogobius melanostomus*, *Raja clavata*, *Scorpaena porcus*, *Uranoscopus scaber*) from the southeastern Black Sea.

Introduction

Length (L)–weight (W) relationship parameters (a , b) are important in stock assessment studies (Froese, 1998; Can et al., 2002; Moutopoulos and Stergiou, 2002), but these were not readily available for some demersal species in the south-eastern Black Sea, such as *Uranoscopus scaber*, *Mullus barbatus*, *Scorpaena porcus*, *Raja clavata*, *Neogobius melanostomus*, *Gobius niger*, and *Mesogobius batrachocephalus*.

The present contribution aims to compensate for this lack of information.

Material and methods

The surveys were carried out using a stern trawler (14 m, 200 hp) during January to June 2002 in the southeastern Black Sea. Fishing took place within an area defined by the following coordinates: 40°30' E–41°04' N, 40°30' E–41°07' N, 41°00' E–41°12' N and 41°00' E–41°15' N.

Fishing gear used was a commercial otter board trawl. Average haul duration was 30 min. and towing speed varied from 2.0 to 3.0 knots at 25–80 m depths. The catch was sorted into species and the number of each species recorded. Samples were preserved in iceboxes for further examination in the laboratory. Total lengths (TL) (to nearest mm) and wet weight (W) (to nearest 0.01 g) of all specimens were recorded. TL–W pairs were first plotted in order to identify and delete obvious outliers. Weight–length relationships were estimated by fitting an exponential curve, $W = aL^b$, to the data. All calculations were made in MS Excel.

Table 1

Total lengths (TL) (cm), weights (W) (g) and length–weight relationships based on $W = aL^b$ for seven species of the southeastern Black Sea

Sex	n	TL (cm)		L–W Relationships					r^2
		min	max	a	95% CL of a	b	95% CL of b		
<i>Mullus barbatus</i> (Linnaeus, 1758)									
Female	248	6.8	18.0	0.0047	0.0040–0.0055	3.27	3.20–3.34	0.98	
Male	173	6.8	14.6	0.0057	0.0045–0.0082	3.19	3.03–3.29	0.94	
All	432	6.8	14.6	0.0051	0.0044–0.0059	3.24	3.17–3.29	0.97	
<i>Scorpaena porcus</i> (Linnaeus, 1758)									
Female	287	4.6	17.5	0.0119	0.0099–0.0140	3.21	3.11–3.29	0.95	
Male	178	5.1	12.1	0.0129	0.0095–0.0172	3.17	3.02–3.31	0.91	
All	470	4.6	17.5	0.0124	0.0101–0.0140	3.19	3.11–3.26	0.94	
<i>Uranoscopus scaber</i> (Linnaeus, 1758)									
Female	45	5.3	21.8	0.0140	0.0100–0.0180	3.07	2.94–3.20	0.98	
Male	22	5.7	15.2	0.0140	0.0080–0.0240	3.09	2.82–3.34	0.97	
All	69	5.3	21.8	0.0150	0.0177–0.0180	3.05	2.95–3.14	0.98	
<i>Raja clavata</i> (Linnaeus, 1758)									
Female	17	10.9	88.2	0.0015	0.0008–0.0025	3.33	3.14–3.50	0.99	
Male	10	10.7	95.2	0.0023	0.0014–0.0038	3.19	3.02–3.35	0.99	
All	27	10.7	95.2	0.0019	0.0013–0.0026	3.24	3.13–3.35	0.99	
<i>Neogobius melanostomus</i> (Pallas, 1814)									
Female	41	9.4	19.1	0.0043	0.0021–0.0086	3.45	3.16–3.73	0.94	
Male	27	9.2	13.6	0.0051	0.0020–0.0130	3.38	2.99–3.76	0.93	
All	99	8.6	19.1	0.0047	0.0031–0.0069	3.39	3.24–3.57	0.95	
<i>Gobius niger</i> (Linnaeus, 1758)									
Female	31	7.6	12.8	0.0113	0.0056–0.0228	3.02	2.71–3.32	0.93	
Male	49	8.5	13.2	0.0099	0.0053–0.0184	3.05	2.80–3.31	0.92	
All	113	7.6	13.2	0.0113	0.0074–0.0172	3.00	2.82–3.18	0.91	
<i>Mesogobius batrachocephalus</i> (Pallas, 1814)									
Female	5	7.2	13.3	0.0093	0.0021–0.0410	3.10	2.46–3.72	0.99	
Male	3	9.0	10.0	0.0076	Not estimated	3.23	Not estimated	0.99	
All	37	7.2	13.3	0.0203	0.0107–0.0380	2.75	2.48–3.02	0.93	

Results and discussion

The parameters of the length–weight relationships for the seven fish species are given in Table 1, together with the sex, number of specimens measured (n), size of the smallest (min) and largest (max) specimen measured, coefficient of determination (r^2), and confidence limit of parameter a and exponent b (CL, 95%).

The exponent (b) often has a value close to 3, but varies between 2 and 4 (Tesch, 1971); our findings are inside this range. In general, b -values outside this range are considered to be erroneous (Carlander, 1969; Ricker, 1975).

In previous studies median values for the length–weight parameters for *Scorpaena porcus* were reported as $a = 0.00176$ (range: 0.0130–0.0430), $b = 3$ (range: 2.84–3.08) for *Mullus barbatus barbatus* were $a = 0.0129$ (range: 0.0059–0.0493), $b = 3.11$ (range: 2.50–3.29) and for *Raja clavata* were $a = 0.0024$ (range: 0.0019–0.0187), $b = 3.2$ (range 3.0–3.3) (Froese and Pauly, 2006).

The aim of the study was to contribute to the knowledge of weight–length relationships of species common in the shallow waters of the Southeastern Black Sea. The W–L parameters reported here will be of considerable use in ongoing studies of by-catch and discards of Eastern Black Sea commercial fisheries of Turkey.

References

- Can, M. F.; Basusta, N.; Cekic, M., 2002: Weight-length relationships for selected fish species of the small-scale fisheries of the south coast of the Iskenderun Bay. 2002 Turk. J. Vet. Anim. Sci. **26**, 1181–1183.
- Carlander, K. D., 1969: Handbook of freshwater fishery biology, Vol. 1. Iowa State University Press, Ames, IO.
- Froese, R., 1998: Length–weight relationships for 18 less-studied fish species. J. Appl. Ichthyol. **14**, 117–118.
- Froese, R.; Pauly, D., (Eds), 2006: Fishbase. World Wide Web electronic publication, <http://www.fishbase.org> (last accessed: 17 June 2006).
- Moutopoulos, D. K.; Stergiou, K. I., 2002: Length–weight relationship of fishes from the Aegean Sea (Greece). J. Appl. Ichthyol. **18**, 200–203.
- Ricker, W. E., 1975: Computation and interpretation of biological statistics of fish populations. Bull. Fish. Res. Board Can. **191**, 1–382.
- Tesch, F. W., 1971: Age and growth. In: Methods for assessment of fish production in fresh waters. W. E. Ricker (Ed.). Blackwell Scientific Publications, Oxford. pp. 98–130.
- Author's address:** Sefa Ayhan Demirhan, Mustafa Kemal University, Faculty of Fisheries, Tayfur Sokmen Campus, TR-31040 Serinyol, Antakya, Hatay, Turkey.
E-mail: sademirhan@mku.edu.tr