Length-Weight Relationships of Demersal Fishes from the Gulf of Salamanca, Colombia

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Abstract

The parameters a and b of the length-weight relationship of the form $W=a \cdot L^b$ were computed for 46 species caught in a series of demersal trawl hauls over the period 1995-1997 in the Gulf of Salamanca, Colombia.

Introduction

About 140 fish species have been caught during a trawl survey in the Gulf of Salamanca (Fig. 1) over the period 1995-1997. We present here the length-weight relationships (LWR) of 46 of these 140 species. LWR is an important piece of information in fishery assessment, e.g., when predicting weight from length required in yield assessments. However, as pointed out by D. Pauly (1993), interpretation of the biological meaning of the numerical values of the parameters a and b is not straightforward, except that when b = 3, a can be interpreted as a "condition factor". When b is not equal to 3, the interpretation of a as "condition factor" is questionable as it tends to vary inversely with b, i.e., it is not independent of the value of b (Caillouet 1993).

This paper aims to contribute LWR data for direct use in fishery assessment and for allowing future comparisons between populations of the same species at different locations. The fact that not much quantitative information is known (or has been published) on the biology of marine fishes in the southern Caribbean Sea also justifies this note.

Materials and Methods

This report covers data from trawl survey activities during the years 1995 to 1997 in the Gulf of Salamanca. Trawl hauls range in depth from 12 to 158 m. The parameters a and b of the LWR of the form:

$$W = a \cdot L^b \qquad ...1)$$

were estimated using the routines of the computer program FISHPARM (Prager et al. 1989) that implements Marquardt's algorithm for nonlinear least squares parameter estimation.

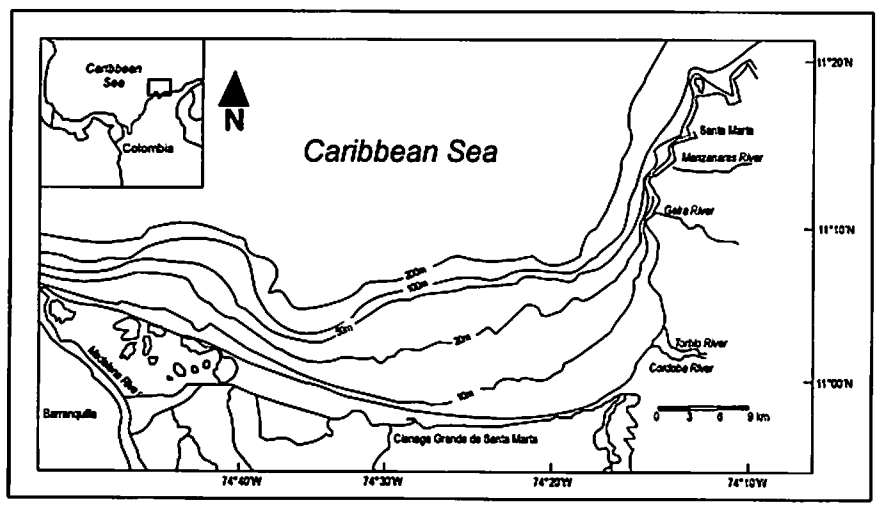

Fig. 1. Map of sampling area in the Gulf of Salamanca, Colombia.

Results

The results of the length-weight analysis are presented in Table 1. Fig. 2 shows the frequency distribution of the b values. It is interesting to note that the shape of the distribution is similar to those found by Torres (1992) and Entsua-Mensah et al. (1995) with a long tail to the left of the distribution. The b values varied between 2.12 (*Holocentrus ascensionis*) and 3.25 (*Trichiurus lepturus*) with mean b equal to 2.79 (n = 46; s.e. = 0.035).

Acknowledgements

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Table 1. Length-weight relationship (LWR) for 46 fish species caught in the Gulf of Salamanca, Colombia between December 1995 and December 1997 (70 hauls).

Family/ Species	n	Length range (cm)	a	b
Acanthuridae				
Acanthurus chirurgus	28	11.9-24.0	0.0294	2.33
Albulidae				
Albula nemoptera	59	20.0-34.5	0.0174	2.92
Albula vulpes	43	22.5-37.0	0.0395	2.73
Balistidae				
Balistes vetula	18	19.5-43.5	0.0518	2.81
Carangidae				
Caranx crysos	18	13.5-48.0	0.0463	2.78
Chloroscombrus chysurus	339	10.0-24.5	0.0699	2.52
Selar crumenophthalmus	50	15.0-22.8	0.0225	3.01
Selene brownii	68	8.0-28.0	0.0480	2.83
Selene setapinnis	129	7.0-23.0	0.0358	2.95
Selene vomer	22	9.0-27.4	0.0429	2.20
Clupeidae				
Opisthonema oglinum	118	10.5-20.3	0.0336	2.83
Diodontidae				
Diodon holocanthus	56	8.0-24.0	0.0755	2.93
Elopidae				
Elops saurus	19	30.5-44.0	0.0136	2.90
Ephippidae				
Chaetodipterus faber	206	14.5-24.2	0.0591	2.26
Gerreidae				
Diapterus rhombeus	26	10.0-13.5	0.0466	3.02
Eucinostomus argenteus	234	7.0-15.3	0.0619	2.70
Eucinostomus gula	635	6.2-14.4	0.0484	2.80
Eugerres plumieri	193	8.6-21.5	0.0666	2.80
Haemulidae				
Conodon nobilis	70	14.2-26.0	0.0342	2.92
Pomadasys steindachneri	200	6.6-22.5	0.0390	2.91
Pomadasys corvinaeformis	79	9.6-16.5	0.0276	3.00
Holocentridae				
Holocentrus ascesionis	26	17.1-23.2	0.0413	2.12
Lutjanidae				
Lutjanus analis	294	8.5-50.5	0.0195	3.10
Lutjanus apodus	20	9.7-34.2	0.0157	2.52
Lutjanus jocu	40	24.0-60.0	0.0436	2.90
Lutjanus synagris	2 015	8.0-33.5	0.0898	2.63
Pristipomoides aquilonaris	122	6.0-20.3	0.0464	2.84
Rhomboplites aurorubens	49	7.4-26.5	0.0487	2.79
Mocacanthidae				
Aluterus monoceros	96	20.0-38.0	0.0194	2.96
Ostraciidae				
Acanthostracion polygonius	84	10.0-31.0	0.0105	2.69
Lactophrys bicaudalis	30	15.0-26.0	0.0117	2.63
Polynemidae				
Polydactylus virginicus	19	11.4-22.2	0.0530	2.71
Priacanthidae				
Priacanthus arenatus	19	13.0-29.0	0.0676	2.71
Pristigasteridae				
Pellona harroweri	45	10.4-15.0	0.0271	2.82
Rhinobatidae				
Rhinobatos percellens	23	16.0-57.5	0.0811	2.81
Sciaenidae				
Ctenosciaena gracilicirrhus	405	8.3-24.0	0.0455	2.80
Larimus breviceps	107	11.0-18.2	0.0304	2.92
Micropogonias furnieri	146	15.4-36.4	0.0231	2.91
Protosciaena trewavasae	35	12.5-18.0	0.0242	3.01

continued

Table 1. (continued)

Family/ Species	n	Length range[a] (cm)	a	b
Umbrina broussonnetii	90	14.0-28.0	0.0231	2.99
Umbrina coroides	134	13.0-20.6	0.0339	2.88
Scombridae				
Scomberomorus brasiliensis	21	28.0-60.5	0.0817	3.01
Sparidae				
Calamus penna	320	15.0-34.5	0.0221	2.44
Calamus pennatula	24	20.0-31.0	0.0378	3.01
Sphyraenidae				
Sphyraena guachancho	41	21.0-44.2	0.0132	2.88
Trichiuridae				
Trichiurus lepturus	20	59.3-112.0	0.0220	3.25

[a] All data in standard length units except for *Balistes vetula* (fork length) and *Trichiurus lepturus* (total length).

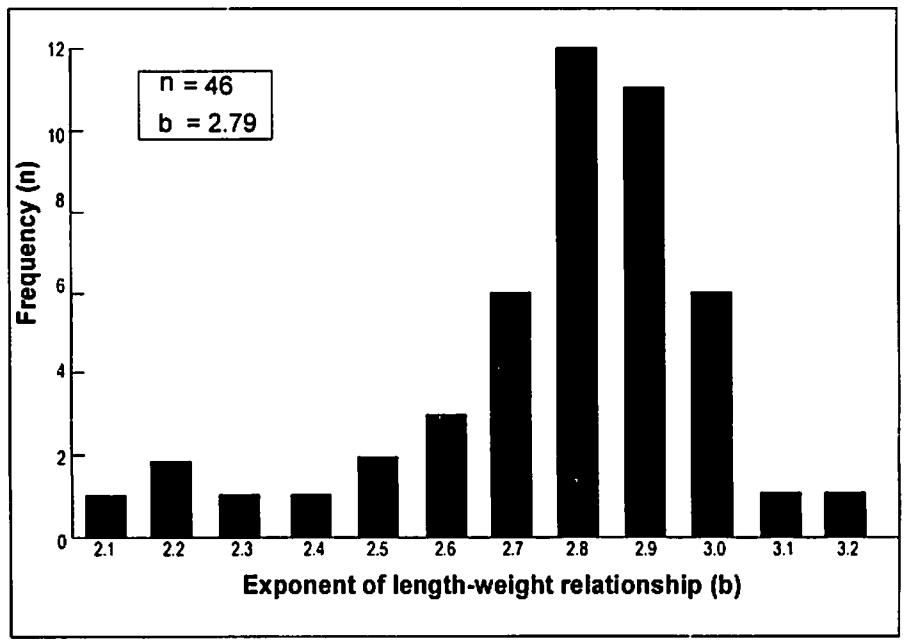

Fig. 2. Distribution of b values for 46 fish species from the Gulf of Salamanca, Colombia.

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