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SCIENTIFIC NOTE

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LENGTH-WEIGHT RELATIONSHIP OF 55 SPECIES OF FISH CAUGHT BY ARROWHEAD FIXED TRAPS "CURRAIS" IN THE COAST OF PERNAMBUCO (BRAZIL)

Relação peso-comprimento de 55 espécies de peixes capturadas por armadilhas fixas "currais" na costa de Pernambuco (Brasil)

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ABSTRACT

The length-weight relationship (LWR) of 55 species was estimated in captures conducted in arrowhead fixed traps off the northern coast of Pernambuco (Northeast, Brazil) using frequentist and Bayesian statistical approaches. The fish were obtained between the months of May 2014 and November 2020, with one or two days of sampling each month. The most diverse families were Carangidae and Haemulidae with 13 and 10 species, respectively. A new maximum length was recorded for *Oligoplites saurus*. Except for *Odontoscion dentex*, all other species exhibited condition factor values greater than 1.00. The species *Chloroscombrus chrysurus*, *Diapterus auratus*, *Diapterus rhombeus*, *Harengula clupeola*, *O. saurus*, and *Opisthonema oglinum* showed continuations of their estimates from previous Bayesian analyses, contributing to the improvement of data for these species.

Keywords: Somatic growth, traditional fishing, tropical waters, condition factor, bayesian analysis.

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RESUMO

As relações peso-comprimento (RPC) de 55 espécies foram estimadas em capturas realizadas em currais na costa norte de Pernambuco (Nordeste, Brasil), utilizando abordagens estatísticas frequentista e bayesiana. Os peixes foram obtidos entre os meses de maio de 2014 e novembro de 2020 em um ou dois dias de cada mês. As famílias mais diversificadas foram Carangidae e Haemulidae com 13 e 10 espécies, respectivamente. Um novo comprimento máximo foi registrado para a espécie Oligoplites saurus*. Exceto* Odontoscion dentex*, todas as outras espécies apresentaram valores do fator de condição superior a 1.00. As espécies* Chloroscombrus chrysurus*,* Diapterus auratus*,* Diapterus rhombeus*,* Harengula clupeola*,* O. saurus *e* Opisthonema oglinum *apresentaram continuações das suas estimativas com análises bayesianas anteriores, o que confere em melhoramento dos dados dessas espécies.*

Palavras- chave: *Crescimento somático, pescaria tradicional, águas tropicais, fator de condição, análise bayesiana.*

INTRODUCTION

The analyses of length-weight relationships (LWR) provide a diverse set of data that can be directly utilized, such as the direct conversion of length to weight (Merella *et al*., 1997). Indirectly, LWR contributes to biomass calculations and generates information on maturity, reproduction, and nutrition (Froese *et al*., 2014; Vaz-dos-Santos & Wongtschowski, 2013; Silva *et al*., 2020). Conventionally, LWRs are performed using frequentist approaches, as they are simpler and do not require knowledge of statistical distributions, modeling processes, and specialized software like Bayesian approaches (Bijak & Bryant, 2016).

The inclusion of previous LWR estimates of species should be considered and adopted as a trend to enhance the robustness of these analyses. Bayesian approaches are an effective tool to incorporate prior knowledge into an analysis and produce a combined output using priors along with the data available (Bijak & Bryant, 2016). The use of Bayesian approaches to LWR is recent in fisheries sciences, the method generates posteriori distributions for parameters a and b for a target species using prior data, which may be available in FishBase and from estimates made on previous samples or at nearby locations (Froese & Pauly, 2019). The approach has already been used successfully in analyses of ichthyofauna carried out in inland and coastal waters of Brazil (Lima & Sousa, 2020; Lima & Andrade, 2021). This type of analysis allows for the utilization of existing information, establishing a standard of continuity in LWR estimates, which tends to increase long-term reliability and contribute to a better understanding of potential temporal variations in species.

In Brazil, there are numerous studies on LWRs (*e.g.* Lima & Sousa, 2020; Lima & Andrade, 2021; Aquino *et al.,* 2024), but for traditional fisheries, such as the “curral” (fixed traps with arrowheads), these are limited. The curral is a trap used mainly in tidal areas, rocky shores, estuaries, and coastal reefs, with their main purpose being to restrict fish escape (Gabriel & von Brandt, 2005). In this study, we determined the LWR for 55 fish species commonly captured in arrowhead fixed traps in the coastal waters of the Pernambuco region, Northeast Brazil.

MATERIAL AND METHODS

Sampling methods and study area

The samples were collected from May 2014 to November 2020 by arrowhead fixed traps located on the northern coast of the state of Pernambuco, Brazil (7°36'40.70" S/34°46′48.00" W and 7°40'26.65" S/34°48′57.60" W). On one or two days each month, we established contact with a local fisherman and jointly proceeded with the sample collection during commercial fishing activities. After landing, the fish were properly identified, and their standard length (SL, to the nearest 0.1 cm) and total weight (TW, to the nearest 0.01 g) were carried out on-site. All the fish remained with the fishermen for commercial purposes. However, the specimens that could not be identified at the species level were documented through photographs, to be meticulously identified in the laboratory.

Data analyses

The LWR was determined by regular linear regression and Bayesian analysis (Froese, 2006; Froese *et al*., 2014). In conventional analyses, length-weight function was calculated by the equation $W = aL^b$, where W is the weight (g), L is the standard length (cm), a is the intercept, and b is the allometric coefficient. The parameters a and b were determined by linear regression: $\log(W) = \log(a) + b.\log(L)$. Outliers observed in the length-weight relationship of all species were excluded from the regression. The 95% confidence interval (CI) was determined for parameters a and b. The correlation coefficient of Pearson r-squared (r) was estimated. The allometric condition factor K_{rel} was calculated according to the equation $K_{rel} = \frac{W}{aL^b}$ (Le Cren, 1951). The Bayesian approach (code-to-use) was extracted according to Froese and Pauli (2019) as well as the necessary information for combining existing knowledge (prior probabilities) with the new data from this study (likelihood function) (Froese & Pauly, 2023). We sought to obtain the a priori probabilities of LWR estimates using existing Bayesian analyses. When Bayesian estimates were not obtainable, we turned to data from Pernambuco or other coastal states in Brazil. In the absence of such data, we resorted to additional coastal countries, taking into account length ranges as similar as possible for each species addressed in this study. All the analyses were done using the software R Statistical Environment (R core team, 2024). The package R2jags (Su and Yajima, 2021) and the JAGS sampler software (Plummer, 2023) were used for Bayesian analyses.

RESULTS AND DISCUSSION

The number of individuals for certain species, although lower, was consistent with that reported in several other studies on LWR (*e.g.*, Lima & Sousa, 2020; Andrade *et al*., 2022; Aquino *et al.,* 2024), including results comparable to the number of specimens for *O. palometa* (Andrade *et al*., 2022) and *L. alexandrei* (Freitas *et al.,* 2023). The most diverse families were Carangidae and Haemulidae, with 13 and 10 species, respectively. We recorded a new maximum length value for the species *Oligoplites saurus* (Bloch and Schneider, 1801). Except for *Odontoscion dentex* (Cuvier, 1830) and *A. chirurgus*, all other species exhibited a condition factor greater than 1.00. *Chloroscombrus chrysurus* (Linnaeus, 1766), *Diapterus auratus* Ranzani, 1842, *Diapterus rhombeus* (Cuvier, 1829), *Harengula clupeola* (Cuvier, 1829), *O. saurus*, and *Opisthonema oglinum* (Lesueur, 1818) showed continuity in their estimates in existing Bayesian analyses.

The expected range of 2.5 < *b* < 3.5 (Froese, 2006) was confirmed for 50 species. However, the species *Acanthurus bahianus* Castelnau, 1855, *Albula nemoptera* (Fowler 1911), *Diodon holocanthus* Linnaeus, 1758, *Ocyurus chrysurus* (Bloch, 1791), and *Sphyraena guachancho* Cuvier, 1829, exhibited values below the lower limit. The condition factor below 1.00 for *O. dentex* and *A. chirurgus* indicates that only this species displayed a low nutritional state in the study area (Froese, 2006).

In six species, Bayesian analyses were extended, as previously conducted in the state of Pernambuco (Lima & Andrade, 2021), leading to the refinement and continuation of data for these species. The values of the *b* coefficient increased in the species *C. chrysurus* from 2.690 to 3.010 and *O. oglinum* from 2.870 to 3.090, while decreases occurred for the species *O. saurus* from 3.390 to 3.110, *H. clupeola* from 3.280 to 3.110, *D. auratus* from 3.130 to 2.920 and *D. rhombeus* from 3.2300 to 2.5900.

Fish growth is influenced by numerous factors, and the LWR also varies accordingly, with such disparity possibly stemming from fluctuations in the abundance of food resources (Li *et al*., 2023). Individuals of the omnivorous species (*C. chrysurus* and *O. oglinum*) and the invertivorous species (*H. clupeola*) exhibited better conditions during the time and location of the present study compared to the carnivorous (*O. saurus*) and detritivorous (*D. auratus*) species, in relation to individuals of the same species previously investigated in the coastal region of northern Pernambuco (Lima & Andrade, 2021). Still, within the Bayesian approach, data about the state of Pernambuco were accessible for 18 of the species examined in this study, while data for 13 other species were recorded in various regions of Brazil, and data for 18 species were obtained from other countries, thereby facilitating estimation through Bayesian analyses (Froese & Pauly, 2023).

Although frequentist statistical approaches in LWR analyses are highly necessary, Bayesian approaches should continue as a trend to be encouraged. In this way, previous studies with the same species can be employed as tools to enhance the accuracy of the information acquired in this type of estimation, to avoid its underutilization. As concluded, the obtained results add a new maximum length for the species *O. saurus* and provide updated data on the remaining species in a study using a Bayesian approach.

Table 1 - Length-weight relationship determined by linear regression and Bayesian analysis of 55 fish species captured in coast of Pernambuco, Brazil

Family/Species	N	SL(cm)		TW (g)		LW Regression parameters				Bayesian analyses	
		Min	Max	Min	Max	a (95¨% CI)	b (95% CI)	r (95% CI)	Krel (SD)	Mean log10 a (SD)	b (SD)
Echeneidae											
Echeneis naucrates Linnaeus, 1758	70	12.2	74.8	3.86	1640	0.0010 (0.0006-0.0016)	3.3894 (3.2543-3.5245)	0.987 (0.979-0.992)	1.073 (0.583)	- 2.9900 (0.0005)	3.3900 (0.0008)
Ephippidae											
Chaetodipterus faber (Broussonet, 1782)	568	6.4	24.5	23	721	0.1386 (0.1246-0.1542)	2.6872 (2.6449-2.7295)	0.961(0.955-0.967)	1.006 (0.109)	- 0.8590 (0.0022)	2.6900 (0.0015)
Haemulidae											
Anisotremus surinamensis (Bloch, 1791)	10	6.4	37	7	1614	0.0300 (0.0161-0.0556)	3.0684 (2.8381-3.2988)	0.996 (0.982-0.999)	1.040 (0.365)	- 1.5200 (0.0031)	3.0700 (0.0022)
Anisotremus virginicus (Linnaeus, 1758)	124	5.66	15.5	5.06	143	0.0420 (0.0290-0.0610)	2.9230 (2.7620-3.0840)	0.956 (0.938-0.969)	1.013 (0.170)	- 1.3800 (0.0044)	2.9200 (0.0031)
Pempheridae											
Pempheris schomburgkii Müller & Troschel, 1848	373	4.2	11	3	29	0.0314 (0.0243-0.0406)	2.8750 (2.7443-3.0057)	0.914 (0.895-0.929)	1.009 (0.146)	- 1.5000 (0.0140)	2.8700 (0.0099)
Trichiuridae											
Trichiurus lepturus Linnaeus, 1758	129	32.5	107	34	1172	0.0031 (0.0013-0.0073)	2.6778 (2.4827-2.8729)	0.924 (0.893-0.946)	1.021 (0.210)	- 3.9400 (0.0009)	2.7400 (0.0020)
Acanthuridae											
Acanthurus bahianus Castelnau, 1855	64	5.97	22	16	392	0.2541 (0.1353-0.4772)	2.2713 (2.0106-2.5320)	0.911 (0.857-0.945)	1.034 (0.380)	- 0.5960 (0.0029)	2.2700 (0.0020)
Acanthurus chirurgus (Bloch, 1787)	46	7.12	23.02	15.05	663.49	0.0395 (0.0259-0.0602)	3.0242 (2.8512-3.1971)	0.983 (0.969-0.990)	0.994 (0.281)	- 1.4000 (0.0054)	3.0200 (0.0038)

N, sample size; SL, standard length; TW, total weight; LW, length weight; SL max in bold indicating the new maximum length recorded; CI, confidence interval; r, Pearson r-squared for log–log regression, SD, standard deviation; Krel, allometric condition factor; a and b, parameters of the relationship; Mean log10 a and b in bold indicate the continuation of Bayesian analyses.

Table 1 - Length-weight relationship determined by linear regression and Bayesian analysis of 55 fish species captured in coast of Pernambuco, Brazil (cont.)

Family/Species	N	SL(cm)		TW (g)		LW Regression parameters				Bayesian analyses	
		Min	Max	Min	Max	a (95¨% CI)	b (95% CI)	r (95% CI)	Krel (SD)	Mean log10 a (SD)	b (SD)
Albulidae											
Albula nemoptera (Fowler 1911)	14	17.45	47.5	81.73	910	0.1399 (0.0823-0.2380)	2.2469 (2.0899-2.4039)	0.994 (0.980-0.998)	1.003 (0.079)	- 0.8540 (0.0032)	2.2500 (0.0022)
Carangidae											
Caranx bartholomaei Cuvier, 1833	447	7.5	27.5	10	425	0.0411 (0.0332-0.0510)	2.8096 (2.7305-2.8888)	0.957 (0.949-0.964)	1.021 (0.323)	- 1.3900 (0.0017)	2.8100(0.0012)
Caranx crysos (Mitchill, 1815)	230	10	31	30.18	605	0.0429 (0.0327-0.0562)	2.7807 (2.6883-2.8731)	0.969 (0.960-0.976)	1.017 (0.244)	- 1.3700 (0.0027)	2.7800 (0.0019)
Caranx hippos (Linnaeus, 1766)	38	7.4	73.5	12	7500	0.0433 (0.0325-0.0576)	2.7995 (2.7090-2.8900)	0.995 (0.991-0.998)	1.019 (0.200)	- 1.3900 (0.0063)	2.8100 (0.0055)
Caranx latus Agassiz, 1831	33	12	23.6	47.61	340	0.0205 (0.0140-0.0299)	3.1019 (2.9691-3.2348)	0.993 (0.986-0.997)	1.002 (0.059)	- 1.6900 (0.0012)	3.1000 (0.0088)
Chloroscombrus chrysurus (Linnaeus, 1766)	380	8	27.3	8	243	0.0167 (0.0142-0.0197)	3.0232 (2.9539-3.0925)	0.943 (0.930-0.953)	1.014 (0.176)	**- 1.7600 (0.0141)**	**3.0100 (0.0097)**
Oligoplites palometa (Cuvier, 1832)	14	14.59	36.8	29.3	511	0.0094 (0.0039-0.0228)	3.0257 (2.7476-3.3037)	0.989 (0.966-0.997)	1.008 (0.128)	- 2.0200 (0.0010)	3.0200 (0.0007)
Oligoplites saurus (Bloch & Schneider, 1801)	119	15.2	**43.7**	37.72	921	0.0093 (0.0068-0.0127)	3.0517 (2.9497-3.1537)	0.956 (0.937-0.970)	1.008 (0.126)	**- 2.1100 (0.0078)**	**3.1100 (0.0027)**
Selar crumenophthalmus (Bloch, 1793)	355	6.49	23.5	3.7	239	0.0070 (0.0058-0.0084)	3.3446 (3.2665-3.4227)	0.976 (0.971-0.980)	1.021 (0.245)	- 2.0500 (0.0038)	3.3400 (0.0058)
Selene brownii (Cuvier, 1816)	292	7.6	25	13	518	0.0333	2.9849	0.987	1.005	- 1.4800	2.9900

N, sample size; SL, standard length; TW, total weight; LW, length weight; SL max in bold indicating the new maximum length recorded; CI, confidence interval; r, Pearson r-squared for log–log regression, SD, standard deviation; Krel, allometric condition factor; a and b, parameters of the relationship; Mean log10 a and b in bold indicate the continuation of Bayesian analyses.

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		Min	Max	Min	Max	a (95¨% CI)	b (95% CI)	r (95% CI)	Krel (SD)	Mean log10 a (SD)	b (SD)
Selene vomer (Linnaeus, 1758)	181	8.4	27.8	24	552	0.0566 (0.0439-0.0728)	2.7782 (2.6842-2.8722)	0.975 (0.966-0.981)	1.010 (0.150)	- 1.2500 (0.0027)	2.7800 (0.0019)
Trachinotus carolinus (Linnaeus, 1766)	43	15.5	46	74	2000	0.0434 (0.0206-0.0915)	2.8659 (2.6289-3.1029)	0.967 (0.940-0.983)	1.013 (0.140)	- 1.3600 (0.0007)	2.8700 (0.0005)
Trachinotus falcatus (Linnaeus, 1758)	13	16.3	22.2	134	361	0.0315 (0.0140-0.0714)	3.0210 (2.7400-3.3000)	0.990 (0.967-0.997)	1.000 (0.044)	- 1.5000 (0.0007)	3.0200 (0.0005)
Trachinotus goodei Jordan & Evermann, 1896	24	15.6	19.8	103	222	0.0745 (0.0104-0.5313)	2.6629 (1.9745-3.3513)	0.858 (0.700-0.936)	1.005 (0.100)	- 1.1300 (0.0019)	2.6600 (0.0014)
Dactylopteridae											
Dactylopterus volitans (Linnaeus, 1758)	25	14.7	25.5	66	295.72	0.0424 (0.0178-0.1006)	2.7283 (2.4390-3.0177)	0.971 (0.935-0.987)	1.005 (0.101)	- 1.3700 (0.0022)	2.7300 (0.0016)
Diodontidae											
Diodon holocanthus Linnaeus, 1758	15	5	22	16	571.7	0.3992 (0.1528-1.0433)	2.3485 (2.0019-2.6951)	0.971 (0.913-0.991)	1.020 (0.204)	- 0.3990 (0.0008)	2.3500 (0.0006)
Dorosomatidae											
Harengula clupeola (Cuvier, 1829)	26	7.67	13.1	7	44	0.0170 (0.0076-0.0377)	3.0487 (2.7051-3.3922)	0.966 (0.925-0.985)	1.010 (0.145)	**- 1.8600 (0.0072)**	**3.1100 (0.0054)**
Opisthonema oglinum (Lesueur, 1818)	1579	4.9	26	3	188	0.0135 (0.0120-0.0153)	3.0966 (3.0447-3.1485)	0.947 (0.942-0.952)	1.043 (0.411)	**- 1.8600 (0.0082)**	**3.0900 (0.0058)**
Gerreidae											
Diapterus auratus Ranzani, 1842	817	9.2	24.2	26	451	0.0635 (0.0539-	2.7584 (2.6954-	0.949 (0.942-	1.009 (0.138)	**- 1.4200 (0.0059)**	**2.9200 (0.0043)**

N, sample size; SL, standard length; TW, total weight; LW, length weight; SL max in bold indicating the new maximum length recorded; CI, confidence interval; r, Pearson r-squared for log–log regression, SD, standard deviation; Krel, allometric condition factor; a and b, parameters of the relationship; Mean log10 a and b in bold indicate the continuation of Bayesian analyses.

Table 1 - Length-weight relationship determined by linear regression and Bayesian analysis of 55 fish species captured in coast of Pernambuco, Brazil (cont.)

Family/Species	N	SL(cm)		TW (g)		LW Regression parameters				Bayesian analyses	
		Min	Max	Min	Max	a (95¨% CI)	b (95% CI)	r (95% CI)	Krel (SD)	Mean log10 a (SD)	b (SD)
Diapterus rhombeus (Cuvier, 1829)	37	9.8	16.5	38	141	0.1035 (0.0563-0.1902)	2.5506 (2.3078-2.7934)	0.964 (0.930-0.981)	1.003 (0.084)	**- 1.0400 (0.0056)**	**2.5900 (0.0039)**
Eucinostomus argenteus Baird & Girard, 1855	31	7.2	16.98	10	157.98	0.0341 (0.0168-0.0694)	2.8885 (2.5961-3.1810)	0.966 (0.930-0.984)	1.007 (0.123)	- 1.6700 (0.0062)	3.0200 (0.0039)
Eucinostomus lefroyi (Goode, 1874)	16	10.36	14.5	27.84	77.1	0.0210 (0.0046-0.0965)	3.0875 (2.4792-3.6957)	0.946 (0.847-0.981)	1.004 (0.093)	- 1.6800 (0.0094)	3.0900 (0.0066)
Haemulidae											
Genyatremus luteus (Bloch, 1790)	16	11.5	29	53.45	676	0.0675 (0.0353-0.1290)	2.7468 (2.5241-2.9694)	0.990 (0.971-0.997)	1.007 (0.125)	- 1.1700 (0.0040)	2.7500 (0.0029)
Haemulon aurolineatum Cuvier, 1830	223	5.5	13.7	3.7	69	0.0190 (0.0161-0.0225)	3.1305 (3.0566-3.2044)	0.984 (0.980-0.988)	1.009 (0.133)	- 1.7200 (0.0093)	3.1300 (0.0066)
Haemulon chrysargyreum Günther, 1859	169	6.1	14	8	80	0.0118 (0.0090-0.0155)	3.3511 (3.2361-3.4661)	0.976 (0.967-0.982)	1.030 (0.160)	- 1.9300 (0.0038)	3.3500 (0.0027)
Haemulon parra (Desmarest, 1823)	329	5.4	25.7	5	373	0.0429 (0.0366-0.0502)	2.8325 (2.7744-2.8906)	0.983 (0.979-0.986)	1.005 (0.103)	- 1.3700 (0.0032)	2.8300 (0.0023)
Haemulon plumierii (Lacepède, 1801)	808	8.5	21	20.08	244	0.0419 (0.0357-0.0492)	2.8582 (2.7964-2.9201)	0.954 (0.948-0.960)	1.008 (0.138)	- 1.3800 (0.0061)	2.8600 (0.0043)
Haemulon atlanticus Carvalho, Marceniuk, Oliveira & Wosiacki 2020	27	10	15	23	86.26	0.0338 (0.0123-0.0930)	2.9316 (2.5272-3.3361)	0.948 (0.888-0.976)	1.208 (0.131)	- 1.4700 (0.0044)	2.8600 (0.0031)
Orthopristis scapularis Fowler 1915	22	10.5	15.8	30.54	129.44	0.0143 (0.0050-	3.2728 (2.8693-	0.967 (0.920-	1.004 (0.085)	- 1.8500 (0.0020)	3.2700 (0.0014)

N, sample size; SL, standard length; TW, total weight; LW, length weight; SL max in bold indicating the new maximum length recorded; CI, confidence interval; r, Pearson r-squared for log–log regression, SD, standard deviation; Krel, allometric condition factor; a and b, parameters of the relationship; Mean log10 a and b in bold indicate the continuation of Bayesian analyses.

Table 1 - Length-weight relationship determined by linear regression and Bayesian analysis of 55 fish species captured in coast of Pernambuco, Brazil (cont.)

Family/Species	N	SL(cm)		TW (g)		LW Regression parameters				Bayesian analyses	
		Min	Max	Min	Max	a (95¨% CI)	b (95% CI)	r (95% CI)	Krel (SD)	Mean log10 a (SD)	b (SD)
Haemulopsis corvinaeformis (Steindachner, 1868)	235	9.6	19.1	24. 31	200	0.0492 (0.0344-0.0704)	2.7494 (2.6158-2.8829)	0.936 (0.918-0.950)	1.009 (0.141)	- 1.3200 (0.0036)	2.7600 (0.0030)
Holocentridae											
Holocentrus adscensionis (Osbeck, 1765)	98	8.96	17.5	17	118	0.0326 (0.0212-0.0498)	2.8975 (2.7287-3.0663)	0.961 (0.942-0.974)	1.006 (0.108)	- 1.4900 (0.0060)	2.9000 (0.0043)
Lutjanidae											
Lutjanus alexandrei Moura & Lindeman, 2007	10	12.3 8	18.93	60. 82	248. 74	0.0598 (0.0104-0.3433)	2.7771 (2.1319-3.4223)	0.962 (0.842-0.991)	1.007 (0.128)	- 1.2200 (0.0037)	2.7800 (0.0027)
Lutjanus analis (Cuvier, 1828)	130	13	37.5	59	139 7	0.0316 (0.0218-0.0457)	2.9394 (2.8145-3.0643)	0.972 (0.960-0.980)	1.012 (0.176)	- 1.5200 (0.0042)	2.9500 (0.0029)
Lutjanus synagris (Linnaeus, 1758)	56	10.3	28.3	39	654	0.0449 (0.0257-0.0783)	2.8266 (2.6166-3.0365)	0.965 (0.941-0.979)	1.010 (0.147)	- 1.3500 (0.0057)	2.8300 (0.0041)
Ocyurus chrysurus (Bloch, 1791)	24	9.3	15.5	24	103	0.0929 (0.0448-0.1928)	2.4918 (2.2027-2.7810)	0.967 (0.925-0.986)	1.005 (0.100)	- 1.0300 (0.0062)	2.4900 (0.0043)
Mullidae											
Pseudupeneus maculatus (Bloch, 1793)	42	11.7	18	36	123	0.0323 (0.0141-0.0740)	2.8871 (2.5789-3.1953)	0.948 (0.906-0.972)	1.005 (0.097)	- 1.4900 (0.0031)	2.8900 (0.0021)
Polynemidae											
Polydactylus virginicus (Linnaeus, 1758)	10	14.5 8	19.9	56. 36	155	0.0576 (0.0030-1.0968)	2.6333 (1.5741-3.6924)	0.897 (0.614-0.976)	1.021 (0.217)	- 1.2600 (0.0048)	2.6500 (0.0037)
Pomacentridae											
Abudefduf saxatilis (Linnaeus,	32	4.5	12	5	98	0.0952	2.7285	0.933	1.024	- 1.0200	2.7300

N, sample size; SL, standard length; TW, total weight; LW, length weight; SL max in bold indicating the new maximum length recorded; CI, confidence interval; r, Pearson r-squared for log–log regression, SD, standard deviation; Krel, allometric condition factor; a and b, parameters of the relationship; Mean log10 a and b in bold indicate the continuation of Bayesian analyses.

Table 1 - Length-weight relationship determined by linear regression and Bayesian analysis of 55 fish species captured in coast of Pernambuco, Brazil (cont.)

Family/Species	N	SL(cm)		TW (g)		LW Regression parameters				Bayesian analyses	
		Min	Max	Min	Max	a (95¨% CI)	b (95% CI)	r (95% CI)	Krel (SD)	Mean log10 a (SD)	b (SD)
Scaridae											
Sparisoma radians (Valenciennes, 1840)	31	9.44	12.51	29.01	73.03	0.0355 (0.0107-0.1178)	3.0084 (2.5097-3.5072)	0.916 (0.832-0.959)	1.004 (0.088)	- 1.4500 (0.0035)	3.0100 (0.0028)
Sparisoma rubripinne (Valenciennes, 1840)	38	10.91	19.26	44.66	244.63	0.0689 (0.0439-0.1081)	2.7335 (2.5666-2.9004)	0.984 (0.969-0.992)	1.003 (0.072)	- 1.1600 (0.0023)	2.7300 (0.0016)
Sciaenidae											
Odontoscion dentex (Cuvier, 1830)	100	7.5	34.5	7	614	0.0633 (0.0533-0.0752)	2.5755 (2.5100-2.6411)	0.992 (0.988-0.995)	0.999 (0.138)	- 1.2000 (0.0061)	2.5800 (0.0044)
Scombridae											
Scomberomorus brasiliensis Collette, Russo & Zavala-Camin, 1978	65	12	57	13	1676	0.0089 (0.0058-0.0135)	3.0386 (2.9092-3.1680)	0.986 (0.977-0.991)	1.009 (0.136)	- 2.1500 (0.0083)	3.0400 (0.0026)
Sparidae											
Archosargus probatocephalus (Walbaum, 1792)	13	12.3	24.6	67	473	0.0364 (0.0227-0.0584)	2.9834 (2.8127-3.1541)	0.996 (0.987-0.999)	1.002 (0.059)	- 1.4400 (0.0016)	2.9800 (0.0012)
Archosargus rhomboidalis (Linnaeus, 1758)	202	10.6	29	39.38	761	0.0440 (0.0368-0.0527)	2.9082 (2.8455-2.9709)	0.988 (0.985-0.991)	1.006 (0.105)	- 1.3600 (0.0017)	2.9100 (0.0012)
Sphyraenidae											
Sphyraena guachancho Cuvier, 1829	12	18.7	44.5	51.2	564.1	0.0418 (0.0071-0.2440)	2.4860 (1.9800-2.9900)	0.961 (0.862-0.989)	1.010 (0.161)	- 1.3800 (0.0008)	2.4900 (0.0006)
Sphyraena picudilla Poey, 1860	20	26	32.9	147	306	0.0165 (0.0037-0.0723)	2.7995 (2.3627-3.2363)	0.954 (0.885-0.982)	1.002 (0.060)	- 1.7800 (0.0011)	2.8000 (0.0007)
Sphyraena tome Fowler, 1903	26	15	38.5	24	415	(0.0039-0.0087)	(2.9237-3.1646)	(0.990-0.998)	[illegible] (0.079)	[illegible] (0.0058)	[illegible] (0.0008)

N, sample size; SL, standard length; TW, total weight; LW, length weight; SL max in bold indicating the new maximum length recorded; CI, confidence interval; r, Pearson r-squared for log–log regression, SD, standard deviation; Krel, allometric condition factor; a and b, parameters of the relationship; Mean log10 a and b in bold indicate the continuation of Bayesian analyses.

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DECLARATION OF INTEREST

There are no conflicts of interest to declare.

AUTHOR'S CONTRIBUTIONS

Conceptualization: Lima, S.A.O.; Andrade, H.A.; **Data curation:** Andrade, H.A.; **Formal Analysis:** Lima, S.A.O.; Santoro, R.H.; Oliveira, N. S.; Alves, J. A.; Alves, V. O. **Investigation:** Lima, S.A.O.; Andrade, H.A.; **Methodology:** Lima, S.A.O.; **Writing – original draft:** Lima, S.A.O.; Santoro, R.H.; Oliveira, N. S.; **Writing – review & editing:** Lima, S.A.O.; Andrade, H.A.

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