LENGTH–WEIGHT RELATIONS OF 70 FISH SPECIES (ACTINOPTERYGII) FROM TROPICAL COASTAL REGION OF PERNAMBUCO, NORTHEAST BRAZIL

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Abstract. The presently reported study provides length–weight relations (LWR) of 70 fish species (Actinopterygii) from the tropical coastal region of Pernambuco, Northeast Brazil: *Achirus declivis*, *Achirus lineatus*, *Anchoa spinifer*, *Anchoa tricolor*, *Anchovia clupeoides*, *Archosargus rhomboidalis*, *Aspistor luniscutis*, *Aspistor quadriscutis*, *Bagre bagre*, *Bagre marinus*, *Bairdiella ronchus*, *Bathygobius soporator*, *Carangoides bartholomaei*, *Caranx hippos*, *Caranx latus*, *Caranx ruber*, *Centropomus parallelus*, *Centropomus pectinatus*, *Centropomus undecimalis*, *Chaetodipterus faber*, *Chloroscombrus chrysurus*, *Citharichthys spilopterus*, *Conodon nobilis*, *Ctenogobius boleosoma*, *Cynoscion virescens*, *Diapterus auratus*, *Diapterus rhombeus*, *Engraulis anchoita*, *Etropus crossotus*, *Eucinostomus argenteus*, *Eucinostomus gula*, *Eucinostomus havana*, *Gobionellus oceanicus*, *Gobionellus stomatus*, *Haemulon plumierii*, *Isopisthus parvipinnis*, *Larimus breviceps*, *Lutjanus alexandrei*, *Lutjanus analis*, *Lutjanus jocu*, *Lutjanus synagris*, *Lycengraulis grossidens*, *Macrodon ancylodon*, *Menticirrhus americanus*, *Micropogonias furnieri*, *Mugil curema*, *Mugil liza*, *Nebris microps*, *Opisthonema oglinum*, *Paralonchurus brasiliensis*, *Pellona harroweri*, *Polydactylus virginicus*, *Pomadasys corvinaeformis*, *Rhinosardinia bahiensis*, *Sciades herzbergii*, *Selene brownii*, *Selene vomer*, *Sparisoma radians*, *Sphoeroides greeleyi*, *Sphoeroides testudineus*, *Sphyraena guachancho*, *Stellifer brasiliensis*, *Stellifer microps*, *Stellifer rastrifer*, *Stellifer stellifer*, *Symphurus plagusia*, *Symphurus tessellatus*, *Thalassophryne nattereri*, *Trichiurus lepturus*, and *Trinectes paulistanus.* Data were collected between 2011 to 2014, using different fishing gears. The variation of the b coefficient for the majority of species felt within the expected range of $2.5 < b < 3.5$. Additionally, this work provides the first LWR values for 3 fish species: *Lutjanus alexandrei* Moura et Lindeman, 2007; *Rhinosardinia bahiensis* (Steindachner, 1879); and *Thalassophryne nattereri* Steindachner, 1876

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The Length–Weight Relation (LWR) is very important for the fisheries management and for environmental monitoring programs (Morey et al. 2003) and it has been used to:

- Estimate the weight of individual fish from its length (Beyer 1991);
- Relate the changes of body shape and weight associated with different situations as growth or anthropogenic factors;
- Infer body condition indices;
- To compare fish populations or species from different regions and environment (Froese 2006, Siegle et al. 2014).

The objective of this study was to estimate the LWR for 70 fish species from the tropical coastal region of Pernambuco, Northeast Brazil.

Fish were collected in the estuarine and coastal regions of Pernambuco, Northeast Brazil, specifically in the district of Barra de Sirinhaém, southern littoral, and Itapissuma/Itamaracá, northern littoral. From 2011 to 2014, gill net, fixed trap, beach seine, fixed net, and trawler were deployed with the purpose to collects samples representing as many species as possible and representing different sizes. The species caught were identified based on the specific taxonomic keys (Figueiredo and Menezes

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2000, Allen 1985, Whitehead 1985, Carpenter 2002). Fishes were measured, weighed, and, whenever possible, the sexes were determined.

Prior to calculation of the LWR, outliers for each species were graphically identified using total length (TL) vs. total weight (TW) plots (Froese and Binohlan 2000) and removed. The LWR values were estimated using the equation (Santos et al. 2002, Froese 2006, Froese et al. 2011):

$$TW = a \times TL^b$$

where TW is the total weight (in g); TL is the total length (in cm); *a* is the intercept of the regression curve (intercept of TW when TL is zero or initial growth coefficient) and *b* is the regression slope (coefficient indicating isometric or allometric growth). The relation is considered to be isometric when $b = 3$, hypoallometric or negative allometric when $b < 3$, and hyperallometric or positive allometric when $b > 3$ (Froese et al. 2011). LWR for combined sexes was estimated for 70 species, whereas for 32, the relation was also estimated by sex: 20 species—both sexes, 3 species—males, and 9 species—females.

To investigate whether the slope *b* was significantly different from the isometric value, a *t*-test were performed ($H_0 = 3$), with a confidence level of 95% (Zar 2010). The differences between males and females were also compared by the Student's *t*-test. The fit of the model to the data was measured by the coefficient of Pearson *r*-squared (R^2).

A total of 28 099 specimens from 70 species belonging to 23 families and 7 orders were analysed (Table 1). The result of LWR for combined sex showed that the *b* coefficient ranged from 2.71 to 3.47, (mean ± SD = 3.10 ± 0.1). Twenty-seven species presented an allometric relation: 24 WLR resulted in positive allometry, with *b* ranging from 3.10 to 3.47 (3.25 ± 0.1), and 3 in negative allometry, with *b* ranging between 2.87 and 2.93 (2.89 ± 0.03) (Table 1).

Considering the relation by gender, allometry was observed for 18 species, where 11 females and 7 males resulted in positive allometry, with *b* ranging from 3.11 to 3.44 (3.28 ± 0.1) (Table 1). Comparisons between sex of the LWR slope *b,* presented significant differences for 11 species (Table 1).

The variation of the LWR slope for the majority of species occurred within the expected range, between 2.50 and 3.50, as demonstrated by Froese (2006). Allometric tendencies may be the result of adaptations, such as ontogenetic, reproductive or environmental variations, mainly between sexes (Froese 2006). The estimates of *a* and *b* for the majority of species also felt within the obtained by the Bayesian approach for estimating LWR in fishes proposed by Froese et al. (2014) and the values are available in the database of FishBase (Froese and Pauly 2016).

The LWR of 3 species: *Lutjanus alexandrei* Moura et Lindeman, 2007; *Rhinosardinia bahiensis* (Steindachner, 1879); and *Thalassophryne nattereri* Steindachner, 1876 were determined for first time and will be included in the online database of FishBase (Froese and Pauly 2016).

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Table 1

Weight-Length relations for 70 fish species captured in the coastal regions of Pernambuco, Northeast Brazil, from 2011 to 2014 (see table's footnote for symbol explanation)

Species	Sex	N	Total length [cm]			Total weight [g]			Regression parameters				
			Mean	SD	Range	Mean	SD	Range	a	95% CI of *a*	*b*	95% CI of *b*	R^2
Achirus declivis	CS	97	10.7	3.4	2.8–18.1	30.7	23.9	0.2–140.8	0.0102	0.0089–0.0118	3.25	3.19–3.31	0.99
	F	56	12.2	2.0	7.5–17.9	32.7	19.5	6.9–111.6	0.0176	0.0103–0.0301	3.03	2.81–3.24	0.93
Achirus lineatus	CS	1065	4.4	2.2	2.0–15.3	3.1	7.2	0.1–84.1	0.0091	0.0087–0.0095	**3.31+**	3.29–3.35	0.97
	F	89	9.6	1.5	6.0–15.3	16.1	11.7	3.9–84.1	0.0124	0.0083–0.0186	3.18	3.00–3.36	0.93
Anchoa spinifer	CS	103	9.0	2.8	4.1–20.2	6.9	9.3	0.2–70.5	0.0046	0.0035–0.0059	**3.17+**	3.06–3.30	0.96
Anchoa tricolor	CS	258	7.4	1.3	3.9–14.9	3.2	2.3	0.4–24.1	0.0064	0.0050–0.0083	3.02	2.91–3.16	0.89
Anchovia clupeoides	CS	163	13.8	1.1	11.8–16.6	18.7	4.8	10.7–31.9	0.0045	0.0033–0.0062	3.15	3.03–3.28	0.94
	F	43	14.6	0.0	12.8–16.0	21.9	0.1	12.3–27.6	0.0061	0.0024–0.0153	3.04	2.70–3.38	0.88
Archosargus rhomboidalis	CS	1231	6.1	2.1	2.5–27.9	5.9	19.6	0.2–404.8	0.0126	0.0117–0.0136	**3.14+**	3.10–3.19	0.95
Aspistor luniscutis	CS	138	24.1	5.2	10.7–36.5	146.9	97.3	11.0–470.1	0.0040	0.0026–0.0078	3.26	3.03–3.39	0.97
	F	49	28.5	3.5	18.5–36.5	209.3	89.6	61.7–456.6	0.0064	0.0027–0.0155	3.11	2.85–3.38	0.92
Aspistor quadriscutis	CS	31	25.7	7.0	5.7–40.2	181.2	116.4	1.5–465.0	0.0062	0.0041–0.0091	3.11	2.98–3.23	0.98
Bagre bagre	CS	52	13.2	8.8	6.2–34.1	39.9	74.7	1.3–246.0	0.0045	0.0038–0.0052	3.09	3.03–3.17	0.94
Bagre marinus	CS	198	16.0	10.1	7.0–50.5	90.2	216.1	1.7–1155.0	0.0027	0.0023–0.0031	**3.30+**	3.26–3.36	0.97
Bairdiella ronchus[1]	CS	185	13.7	3.8	6.6–21.1	38.5	27.8	2.7–135.5	0.0050	0.0042–0.0056	**3.33+**	3.28–3.38	0.98
	F	92	13.1	0.1	7.5–21.1	36.0	0.5	3.7–135.5	0.0043	0.0036–0.0053	**3.38+**	3.30–3.45	0.98
	M	74	14.7	2.9	6.6–19.2	42.9	18.5	2.7–87.1	0.0061	0.0046–0.0081	3.24	3.13–3.34	0.98
Bathygobius soporator	CS	74	6.8	1.7	3.0–9.9	5.6	3.2	0.3–13.0	0.0088	0.0074–0.0104	3.16	3.08–3.25	0.98
Carangoides bartholomaei	CS	36	23.8	7.7	13.0–41.8	203.3	197.5	33.9–720.0	0.0298	0.0207–0.0380	2.71	2.63–2.82	0.99
Caranx hippos	CS	231	21.0	25.6	4.3–105.0	848.4	2205.7	1.0–10115.0	0.0126	0.0117–0.0136	2.97	2.94–3.00	0.99
	F	26	57.8	30.5	15.0–100.8	2620.0	3410.3	44.2–9460.0	0.0231	0.0194–0.0275	2.83	2.63–2.82	0.99
Caranx latus	CS	89	14.5	12.4	6.0–86.3	218.4	994.7	2.6–6750.0	0.0132	0.0117–0.0150	3.02	2.97–3.07	0.99
Caranx ruber	CS	29	18.2	2.1	16.0–24.6	81.9	40.0	55.0–180.0	0.0197	0.0106–0.0327	2.86	2.68–3.07	0.97
Centropomus parallelus	CS	177	7.2	4.0	8.4–32.0	56.2	44.7	5.3–348.6	0.0067	0.0053–0.0085	3.11	3.02–3.19	0.97
Centropomus pectinatus	CS	28	23.4	5.8	14.8–33.4	104.1	70.8	22.6–252.7	0.0110	0.0071–0.0173	2.86	2.71–3.00	0.98
Centropomus undecimalis	CS	143	26.96	10.1	9–62.3	230.1	399.1	5.2–2150	0.0044	0.0037–0.0053	3.15	3.09–3.21	0.98
Chaetodipterus faber	CS	55	14.9	7.4	4.1–30.0	188.5	220.6	2.3–895.4	0.0507	0.0418–0.0617	2.86	2.79–2.94	0.99
Chloroscombrus chrysurus	CS	143	7.3	5.4	1.7–20.4	10.8	17.1	0.05–80.0	0.0111	0.0099–0.0125	2.93	2.87–2.99	0.98
Citharichthys spilopterus	CS	375	7.3	3.3	2.5–21	6.5	12.1	0.1–99.4	0.0050	0.0046–0.0054	**3.23+**	3.20–3.28	0.98
Conodon nobilis[1]	CS	297	14.5	3.9	6.6–26.9	53.2	40.4	3.8–266.7	0.0096	0.0084–0.0111	3.14	3.09–3.19	0.97
	F	115	15.6	0.1	6.6–24.5	64.0	0.4	3.8–182.5	0.0093	0.0077–0.0112	3.16	3.09–3.23	0.98

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Table 1 cont.

Species	Sex	N	Total length [cm]			Total weight [g]			Regression parameters				
			Mean	SD	Range	Mean	SD	Range	a	95% CI of *a*	*b*	95% CI of *b*	R^2
	M	93	16.1	3.6	8.6–26.9	68.3	41.5	8.1–266.7	0.0134	0.0108–0.0166	3.02	2.95–3.10	0.98
Cynoscion virescens	CS	74	14.9	6.0	2.9–31.5	39.2	49.0	0.3–262.7	0.0108	0.0067–0.0174	2.86	2.69–3.04	0.93
Ctenogobius boleosoma	CS	130	4.7	0.5	3.3–5.9	0.7	0.2	0.2–1.2	0.005	0.0036–0.0063	**3.13+**	2.96–3.31	0.90
Diapterus auratus	CS	489	15.7	5.1	3.7–42.8	67.2	85.8	0.6–1005.4	0.0095	0.0084–0.0109	3.09	3.05–3.14	0.97
	F	97	19.5	0.1	9.6–42.8	124.0	0.4	12.3–1005.4	0.0139	0.0108–0.0178	2.98	2.90–3.07	0.98
	M	100	17.5	4.8	9.4–33.6	89.7	89.4	10.2–559.6	0.0145	0.0112–0.0189	2.96	2.87–3.05	0.97
Diapterus rhombeus	CS	549	7.7	4.5	4.2–42.3	15.7	67.3	1–1000	0.0100	0.0094–0.0105	**3.10+**	3.07–3.13	0.98
	F	31	13.2	0.1	10.2–19.5	37.4	0.2	15.4–109	0.0230	0.0120–0.0439	2.83	2.58–3.08	0.94
	M	27	16.2	3.0	11–22.5	56.6	33.4	17.2–143	0.0197	0.0087–0.0447	2.84	2.54–3.13	0.88
Engraulis anchoita	CS	43	9.2	0.5	8.2–10.3	6.6	1.2	4.4–9.0	0.0048	0.0022–0.0105	3.24	2.89–3.59	0.90
Etropus crossotus	CS	115	6.3	2.4	2.9–13.5	3.6	5.5	0.4–25.9	0.0089	0.0072–0.0112	2.99	2.86–3.11	0.95
Eucinostomus argenteus	CS	1914	7.4	4.0	2.5–18	9.4	14.7	0.13–73.9	0.0085	0.0083–0.0087	**3.13+**	3.12–3.14	0.98
	F	306	10.7	0.2	3.3–18	19.7	0.5	0.5–73.7	0.0090	0.0085–0.0095	**3.11+**	3.09–3.13	0.99
	M	95	11.6	3.0	4.7–15.9	21.5	13.7	1.3–57.8	0.0102	0.0086–0.0120	3.06	2.99–3.12	0.98
Eucinostomus gula	CS	1504	7.0	2.6	3.2–16.2	6.3	7.3	0.4–51.8	0.0072	0.0067–0.0072	**3.26+**	3.26–3.29	0.98
	F	436	9.7	0.1	5.0–17.9	13.6	0.3	1.2–79.7	0.0099	0.0089–0.0111	**3.12+**	3.07–3.16	0.97
	M	73	9.9	1.6	5–14.2	14.5	6.8	1.8–38.1	0.0101	0.0072–0.0141	3.12	2.97–3.27	0.96
Eucinostomus havana	CS	27	11.7	2.8	7.8–15.0	23.4	15.1	5.3–53.6	0.0111	0.0089–0.0139	3.04	2.95–3.13	0.99
Gobionellus oceanicus	CS	1677	16.6	3.7	4.0–27.0	22.2	13.4	0.2–73.3	0.0061	0.0055–0.0066	**2.87–**	2.83–2.90	0.94
Gobionellus stomatus	F	211	10.9	0.0	8.2–13.3	6.1	0.1	2.3–10.7	0.0054	0.0033–0.0087	2.93	2.80–3.12	0.80
Haemulon plumierii	CS	54	16.2	1.6	9.4–22.3	69.9	21.9	11.3–187.6	0.0167	0.0084–0.0333	2.98	2.74–3.23	0.91
Isopisthus parvipinnis[1]	CS	804	11.5	5.0	3–41.5	24.4	46.8	0.2–740.8	0.0056	0.0052–0.0060	**3.18+**	3.16–3.22	0.98
	F	180	16.2	0.1	8.7–41.5	54.3	0.4	5.5–740.8	0.0047	0.0037–0.0059	**3.26+**	3.18–3.35	0.96
	M	158	15.0	3.9	6.8–33.2	40.0	40.7	2.8–348.1	0.0052	0.0041–0.0065	**3.22+**	3.14–3.30	0.97
Larimus breviceps	CS	994	11.9	3.0	6.0–23.2	21.2	24.0	2.6–152.6	0.0075	0.0068–0.0082	**3.16+**	3.12–3.20	0.96
	F	255	13.1	0.1	7.9–26.0	30.9	0.3	5.2–231.1	0.0068	0.0054–0.0086	**3.19+**	3.11–3.28	0.95
	M	323	12.5	3.0	6.8–23.4	27.9	30.0	3.1–177.4	0.0071	0.0057–0.0083	**3.18+**	3.12–3.27	0.94
Lutjanus alexandrei	CS	141	15.4	3.2	4.7–22.4	69.2	39.7	1.3–199.9	0.0136	0.0108–0.0167	3.07[2]	2.99–3.15	0.98
	M	54	16.6	2.4	11.8–22	80.8	34.4	27.4–173.8	0.0207	0.0117–0.0369	2.99	2.71–3.12	0.93
Lutjanus analis	CS	237	6.4	4.3	2.4–27.6	12.2	39.4	0.1–320	0.0122	0.0115–0.0130	3.07	3.06–3.13	0.99
Lutjanus jocu	CS	102	9.8	4.7	3.2–24.9	27.4	40.3	0.5–273.5	0.0156	0.0124–0.0199	3.00	2.90–3.11	0.97

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Table 1 cont.

Species	Sex	N	Total length [cm]			Total weight [g]			Regression parameters				
			Mean	SD	Range	Mean	SD	Range	a	95% CI of *a*	*b*	95% CI of *b*	R^2
Lutjanus synagris	CS	63	4.4	1.2	3.1–8.1	1.5	1.8	0.4–8.2	0.0125	0.0101–0.0155	3.08	2.93–3.23	0.97
Lycengraulis grossidens[1]	CS	353	11.9	3.5	3.7–22.0	16.3	14.7	0.3–92.9	0.0042	0.0038–0.0047	**3.22+**	3.18–3.26	0.98
	F	117	13.6	0.1	10.3–22.0	21.2	0.3	7.4–92.9	0.0036	0.0025–0.0051	**3.29+**	3.15–3.43	0.95
	M	89	12.6	1.4	9.0–15.5	15.5	5.6	4.1–29.9	0.0060	0.0034–0.0103	3.08	2.87–3.30	0.90
Macrodon ancylodon	CS	159	15.0	5.8	5.3–36.0	39.7	67.0	0.9–398.5	0.0056	0.0042–0.0075	3.08	2.97–3.19	0.95
	F	35	18.6	0.1	10.5–33.6	71.7	0.4	8.0–353.9	0.0074	0.0032–0.0175	3.01	2.71–3.31	0.92
	M	27	18.0	6.7	8.0–36.0	63.5	89.0	4.2–398.5	0.0060	0.0035–0.0101	3.06	2.88–3.25	0.97
Menticirrhus americanus[1]	CS	237	15.3	5.4	7.5–32.0	53.4	72.7	4.2–414.6	0.0045	0.0040–0.0051	**3.28+**	3.24–3.32	0.98
	F	110	18.1	0.1	9.0–32.0	86.6	0.4	6.9–414.6	0.0034	0.0029–0.0041	**3.38+**	3.32–3.44	0.99
	M	45	15.3	3.8	10.0–27.3	41.5	40.5	6.6–220.3	0.0056	0.0037–0.0083	3.19	3.05–3.34	0.97
Micropogonias furnieri[1]	F	65	30.4	0.1	17.0–47.5	353.4	0.4	51.1–980.0	0.0205	0.0137–0.0306	2.80	2.68–2.92	0.97
	M	50	26.1	7.8	16.5–47.0	217.3	195.5	32.0–845.0	0.0156	0.0078–0.0310	2.86	2.65–3.08	0.93
Mugil curema[1]	CS	2041	17.9	3.9	10.1–40	68.2	61.4	11.6–650	0.0108	0.0101–0.0116	2.98	2.96–3.01	0.96
	F	334	20.9	0.1	13.5–40.1	108.6	0.3	24.3–780.0	0.0143	0.0121–0.0167	2.90	2.85–2.95	0.97
	M	162	20.6	4.1	15.3–35.7	103.9	72.3	37.9–465.0	0.0182	0.0142–0.0233	2.82	2.74–2.90	0.96
Mugil liza	CS	31	21.2	4.5	14.8–33.0	110.8	78.8	34.3–370.0	0.0105	0.0072–0.0154	2.99	2.86–3.12	0.99
Nebris microps	CS	73	13.8	6.0	4.3–33.0	42.6	75.2	0.9–418.0	0.0094	0.0074–0.0119	3.00	2.91–3.09	0.98
Opisthonema oglinum	CS	249	16.1	5.2	5.8–26.0	47.6	40.9	1.4–155.9	0.0082	0.0075–0.0091	3.01	2.98–3.05	0.99
Paralonchurus brasiliensis[1]	CS	501	13.4	2.8	4.1–21.4	22.7	16.2	0.4–118.2	0.0023	0.0020–0.0027	**3.47+**	3.42–3.53	0.96
	F	220	14.7	0.1	9.3–21.3	30.1	0.3	5.0–113.6	0.0025	0.0017–0.0038	**3.44+**	3.29–3.59	0.90
	M	141	14.1	2.3	9.6–21.8	25.9	16.7	5.2–107.4	0.0026	0.0018–0.0039	**3.43+**	3.28–3.58	0.93
Pellona harroweri	CS	1594	10.0	1.7	6.0–15.3	9.7	4.5	1.9–33.0	0.0089	0.0274–0.0339	3.02	2.43–2.52	0.99
Polydactylus virginicus	CS	392	12.9	6.1	3.4–32.3	38.1	63.5	0.3–386.5	0.0065	0.006–0.0070	**3.13+**	3.10–3.160	0.98
	F	60	22.5	0.1	9.5–32.3	149.8	0.4	7.3–386.5	0.0075	0.0048–0.0118	3.11	2.96–3.26	0.96
	M	37	15.7	3.9	8.4–25.8	46.3	40.3	5.1–164.2	0.0049	0.0022–0.0108	3.24	2.96–3.53	0.93
Pomadasys corvinaeformis	CS	1191	13.0	2.9	8.3–19.8	31.3	21.1	6.8–103.0	0.0093	0.0087–0.0100	**3.15+**	3.12–3.17	0.97
	F	453	13.3	0.1	7.0–22.1	37.1	0.3	4.2–167.9	0.0106	0.0091–0.0124	3.09	3.04–3.15	0.96
	M	347	12.9	2.3	7.1–20.0	31.8	18.3	4.5–133.5	0.0108	0.009–0.0130	3.09	3.01–3.16	0.95
Rhinosardinia bahiensis	CS	51	8.1	0.7	6.5–9.9	4.9	1.1	2.1–7.3	0.0111	0.0065–0.0193	2.89[2]	2.63–3.16	0.91
Sciades herzbergii	CS	222	27.0	6.1	4.5–39.6	190.7	101.6	0.6–643.6	0.0059	0.0051–0.0066	3.11	3.07–3.15	0.99
	M	30	28.2	3.1	21.5–36.8	193.7	65.7	42.2–355.6	0.0052	0.0010–0.0265	3.14	2.65–3.63	0.85

Table continues on next page.

Table 1 cont.

Species	Sex	N	Total length [cm]			Total weight [g]			Regression parameters				
			Mean	SD	Range	Mean	SD	Range	a	95% CI of *a*	*b*	95% CI of *b*	R^2
Sparisoma radians	CS	128	6.7	2.3	4.1–17.2	6.7	14.2	0.4–88.9	0.0057	0.0036–0.0090	**3.42+**	3.18–3.66	0.86
Sphoeroides greeleyi	CS	385	4.8	1.0	2.0–8.5	2.2	1.5	0.1–9.9	0.0217	0.0189–0.0250	**2.87–**	2.78–2.95	0.91
Sphoeroides testudineus	CS	1925	10.2	4.2	1.8–25.5	37.5	39.5	0.1–288.7	0.0213	0.0203–0.0224	**2.93–**	2.91–2.95	0.97
	F	73	16.6	0.1	7.6–25.5	105.6	0.4	9.7–330.1	0.0164	0.0122–0.0222	3.06	2.95–3.16	0.97
Selene brownii	CS	307	16.8	7.1	4.0–34.1	99.7	93.1	1.0–585.0	0.0123	0.0113–0.0134	3.03	3.00–3.06	0.99
Selene vomer	CS	115	21.3	10.9	2.6–45.7	224.8	234.9	0.3–1375.0	0.0167	0.0147–0.0188	2.93	2.89–2.97	0.99
Sphyraena guachancho	CS	76	15.6	5.7	6.9–45.0	26.6	46.9	2.0–376.2	0.0091	0.0075–0.0110	2.77	2.71–2.85	0.97
Stellifer brasiliensis[1]	CS	267	9.9	2.0	4.9–17.5	11.7	8.3	1.3–57.1	0.0096	0.0077–0.0122	3.03	2.93–3.13	0.92
	F	181	10.2	0.1	6.1–17.5	12.7	0.3	2.0–57.1	0.0106	0.0080–0.0140	3.00	2.87–3.12	0.92
	M	62	9.8	1.8	6.5–16.5	11.3	8.2	2.0–53.5	0.0084	0.0051–0.0138	3.11	2.89–3.32	0.93
Stellifer microps[1]	CS	1549	11.1	2.2	5.1–19.5	17.3	13.6	1.5–122.1	0.0058	0.0054–0.0063	**3.26+**	3.22–3.29	0.96
	F	668	11.7	0.1	6.5–19.5	20.1	0.3	2.5–122.1	0.0064	0.0055–0.0074	**3.22+**	3.28–3.17	0.94
	M	449	11.2	2.0	6.1–17.5	17.7	11.4	2.1–84.0	0.0057	0.0047–0.0067	**3.27+**	3.20–3.35	0.94
Stellifer rastrifer[1]	CS	627	10.7	2.4	4.5–19.8	17.8	16.1	0.4–103.9	0.0050	0.0044–0.0056	**3.36+**	3.31–3.41	0.96
	F	228	11.2	0.1	6.0–19.8	21.1	0.3	2.2–103.9	0.0044	0.0037–0.0051	**3.41+**	3.34–3.48	0.97
	M	225	10.9	2.2	6.7–18.5	18.5	15.3	2.8–97.4	0.0050	0.0042–0.0061	**3.36+**	3.28–3.44	0.96
Stellifer stellifer	CS	501	9.6	2.0	4.4–18.8	11.2	8.6	0.9–88.7	0.0059	0.0052–0.0068	**3.26+**	3.20–3.310	0.96
	F	222	10.1	0.1	5.8–18.8	12.7	0.3	2.0–88.7	0.0066	0.0055–0.0079	**3.21+**	3.13–3.29	0.96
	M	140	10.1	1.7	6.1–17.2	12.4	7.8	1.8–69.5	0.0067	0.0049–0.0091	**3.21+**	3.08–3.35	0.93
Symphurus plagusia	CS	34	9.9	3.3	3.0–18.5	8.7	8.4	0.2–46.7	0.0033	0.0027–0.0039	3.29	3.21–3.37	0.99
Symphurus tessellatus	CS	111	14.0	2.6	3.9–17.8	21.6	9.7	0.2–43.4	0.0027	0.0022–0.0032	**3.35+**	3.28–3.42	0.98
	F	53	15.0	1.3	12.2–17.5	26.1	6.9	11.2–41.1	0.0040	0.0018–0.0092	3.22	2.91–3.52	0.90
Thalassophryne nattereri	CS	26	9.7	6.2	3.6–21.3	9.2	74.0	0.7–230.8	0.0117	0.0098–0.0139	3.23[2]	3.15–3.31	0.99
Trichiurus lepturus	CS	285	49.7	23.2	7.4–103.7	146.5	209.7	0.1–810.0	0.0001	0.0001–0.0001	**3.41+**	3.36–3.45	0.98
	M	70	38.6	6.3	28.0–75.1	35.8	32.4	15.0–281.0	0.0001	0.0001–0.0003	**3.40+**	2.74–3.23	0.91
Trinectes paulistanus	CS	228	9.3	3.6	2.2–16.6	20.6	16.0	0.1–80.9	0.0081	0.0073–0.0089	**3.33+**	3.29–3.38	0.98
	F	83	11.5	1.6	7.0–15.7	27.4	12.3	5.3–68.9	0.0105	0.0077–0.0143	3.23	3.10–3.35	0.96

CS = both sexes combined, F = female, M = male, SD = standard deviation, *a* = intercept of the regression curve, *b* = regression slope, R^2 = coefficient of Pearson *r*-squared; values in bold represent the significant difference for Student's t-test , where $H_0 = 3$, + = positive allometry, – = negative allometry; [1] significant difference for Student's t-test comparing the slopes of the regressions for males and females, where $H_0 = 3$; [2] = value of slope *b* as a first reference in the online FishBase database.

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