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Variation of the relationships between lengths and weights applied to 123 fish species observed at Réunion Island (Indian Ocean)

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Abstract :

Body length–weight (L–W) relationships of 123 fish species (122 Actinopterygii and 1 Elasmobranchii) were studied from 10 218 individuals caught around Réunion Island from 2000 to 2021. All species, except for 4 with a very small number of individuals and limited length range, showed a significant relationship between total length and total weight. For 52 species, the data showed the body becoming more elongated (i.e. b < 3.0) over their lifespan, while for 63 species the individuals became thicker (i.e. b > 3.0); only 4 species had a b-value equal to 3.0, signifying isometric growth. Of 72 species for which macroscopic observation allowed identification of sex, there was sexual dimorphism for only 9 species (12.5%), with a significant difference between the slopes of the length–weight relationships. Temporal effects were also investigated, using the annual component of time of capture for 75 species and the seasonal component for 73 species. A temporal effect was significant for 27 species (36.0%) when the sampling year was taken into account, and for 14 species (19.2%) when the sampling quarter (season) was taken into account. Finally, among 120 species tested, the relationship between total length and standard length was significant, and among 114 species the relationship between total weight and gutted (eviscerated) weight was significant.

Keywords : generalised linear model, gutted weight, L–W relationship, marine fish, sexual dimorphism, standard length, temporal effect

Introduction

Length–weight (L–W) relationships are important in fisheries science, notably to convert length-frequency tables of catches to biomass, to estimate fish biomass from underwater visual censuses (Graham and McClanahan 2013), to assess population structure (Le Cren 1951; Froese 2006), and also the health condition of both fish and habitats, and finally to study the morphological characteristics of fish. However, both metrics are not always available, for technical reasons, and thus allometric relationships between body length and weight of marine fishes are often used to estimate weight from length or vice versa. Moreover, there are several metrics to obtain the size or weight according to the species' morphometry or the choice of metric of local scientific teams. If an accurate conversion between different metrics is not available, this can present a problem to researchers using morphometric data (Pol et al. 2011; Hansen et al. 2020). The main metrics of measuring fish for research purposes are total length (TL), standard length (SL) and weight (W). For weight data, total weight (W_T) and gutted weight (W_G) are the two main metrics. In this study, these four main morphometric metrics were used and combined to obtain the different size–weight relationships that can be described for 123 fish species at Réunion Island. The influence of factors such as sex and sampling period (year and/or quarter) on the L–W relationships was evaluated.

Materials and methods

A total of 10 218 marine fishes were caught around Réunion Island in all quarters during 11 years of sampling (2000, 2011–2012, and 2014–2021, inclusive). All specimens were weighed (total weight: W_T and gutted weight: W_G; precision ± 0.1 g) and measured (total length: TL and standard length: SL; precision ± 0.1 cm). For several species of lyretail fish, specimens have a potential bias in the length measurement because the caudal fin is emarginated by trailing filaments. In our study, this type of bias was standardised to limit it (i.e. the length of the trailing filament was not included in the total length). Standard length was defined as the body length from the snout to the end of the last vertebra. Gutted (eviscerated) weight was defined as the weight after the removal of the viscera. For 72 species, sex was determined by macroscopic observation of the gonads. Among the 10 218 individuals, 37 families belonging to the

Actinopterygii were represented (Acanthuridae, Apogonidae, Atherinidae, Aulostomidae, Balistidae, Belonidae, Berycidae, Bramidae, Carangidae, Centrophoridae, Chaetodontidae, Cirrhitidae, Congridae, Diodontidae, Fistulariidae, Gempylidae, Holocentridae, Kuhliidae, Kyphosidae, Labridae, Lethrinidae, Lutjanidae, Malacanthidae, Monacanthidae, Mugilidae, Mullidae, Muraenidae, Polymixiidae, Polynemidae, Pomacentridae, Priacanthidae, Scaridae, Scorpaenidae, Serranidae, Siganidae, Sparidae, Sphyraenidae; n = 9 569) and one family belonging to the Elasmobranchii (Squalidae; n = 649). Among the Actinopterygii, several families had a large number of species, such as Lutjanidae (16 species), Serranidae (15 species), Mullidae (11 species), Acanthuridae (11 species), Scaridae (10 species), and Holocentridae (8 species).

Prior to the characterisation of the L–W relationship for a given species, all pairs of data were plotted in order to identify and delete obvious outliers. In order to estimate the parameters of the allometric L–W relationship (Eqn 1), its linear form (Eqn 2) was fitted to the base-10 log transformed data using a least squares approach:

$$W_T = a\mathrm{TL}^b \quad (1)$$

$$\log W_T = \log a + b \log \mathrm{TL} \quad (2)$$

where 'a' is the intercept or the body shape coefficient and 'b' is the slope i.e. the growth coefficient (Le Cren 1951; Ricker 1975; Froese 2006). The relationship between the two weight metrics or between the two length metrics is expressed as a linear relationship:

$$W_T = aW_G + b \quad (3)$$

$$\mathrm{TL} = a\mathrm{SL} + b \quad (4)$$

To investigate variation in the L–W relationship for each species according to the explanatory variables of sex (S; 72 tested species) and time (i.e. sampling period), as year (Y; 75 tested species) and quarter (Q; 73 tested species) (Supplementary Tables S1, S2), a completed generalised linear model was used. For each species, the individual weight was modelled, with body length (TL) as a continuous effect and S, Y and Q as factors:

$$\log W_T \sim \log \mathrm{TL} + \log \mathrm{TL} \times S + \log \mathrm{TL} \times Y + \log \mathrm{TL} \times Q + \varepsilon \quad (5)$$

When a factor appeared to have a significant effect ($p < 0.05$) on the L–W relationship, parameters were estimated for each factor modality. All statistical analyses were carried out using the 'CAR' package (Fox and Weisberg 2011) in the R statistical environment (R Core Team 2021).

Results

Summarised information for each species is presented in Table 1, with the number of measured specimens and, for the four metrics (TL; SL; W_T and W_G), the minimum, maximum mean and standard deviation. Measured total length and weight ranged respectively from 4.9 cm (*Kuhlia mugil*) to 189 cm (*Thyrsitoides marleyi*) and from 0.74 g (*Acanthurus triostegus*) to 18 000 g (*Thyrsitoides marleyi*) (Table 1). Among the 123 tested species, all but four species (*Ostorhinchus taeniophorus, Conger cinereus, Gymnothorax javanicus,* and *Sphyraena forsteri*) showed a significant correlation ($p < 0.05$) between TL and W_T (Table 2). For the four species without a significant correlation, the number of individuals and the length range were very small. The parameters of the L–W relationships showed that the body shape coefficient '*a*' varied from 1.24×10^{-5} in *Gymnothorax undulatus* to 2.72×10^{1} in *Diodon hystrix* while the growth coefficient 'b' ranged from 2.02 (SD 0.27) in *Diodon hystrix* to 3.77 (SD 0.15) in *Gymnothorax undulatus*. Among 119 species showing a significant relationship between TL and W_T, only four species presented $b = 3.0$, i.e. they followed the rule that the volume of a three-dimensional object is roughly proportional to the cube of length for a regularly shaped solid. Most species of fish change their shape as they grow and so a cube relationship between length and weight would not be expected. For 52 species, fishes showed the body becoming more elongated (i.e. $b < 3.0$) over the lifespan while for 63 species the individuals became thicker (i.e. $b > 3.0$) and only 4 species showed the b value egal to 3.0 . However, for all species, there was a significant relationship between the body shape coefficient ('*a*') and the growth coefficient ('*b*') (Figure 1).

Among the 123 tested species, the influence of sex was estimated for the 72 species for which macroscopic observation allowed sex identification, and the slopes of the L–W relationships were significantly different between males and females for only 9 of those species (12.5%): *Naso elegans, Centrophorus moluccensis, Decapterus tabl, Lutjanus notatus, Mulloidichthys pfluegeri, Scarus falcipinnis, Scarus russelii, Epinephelus fasciatus* and *Squalus megalops* (Table 2). In the event of significant sexual dimorphism, the '*b*' values of males were bigger than those of females in 5 out of 9 cases (Supplementary Table S3). Similarly, we studied the temporal effect on the slopes of the L–W relationships, by sampling year for 75 species and by sampling quarter for 73 species. The effect of sampling year was significant for 27 species

(36%) and the effect of sampling quarter was significant for 14 species (19%). The effect of both sampling year and sampling quarter could be tested for 25 species, of which only 5 species showed significant differences between the slopes of the L–W relationships according to both the year and the quarter: *Kyphosus cinerascens, Priacanthus hamrur, Lethrinus rubrioperculatus, Acanthurus triostegus* and *Pristipomoides filamentosus.* Among 120 tested species, the total length–standard length relationship was significant for all species ($p < 0.05$; Table 3). Moreover, the total weight–gutted weight relationship assessed for 114 species was significant in all cases (Table 3).

Discussion

This study reports the length–weight relationships of 123 species. Previously, relationships were reported for only 29 marine fish species from Réunion Island, belonging to 14 families (Letourneur 1998). Other studies concerning several species presented in this paper have been undertaken in different locations in the western Indian Ocean (Agembe et al. 2010; Bandana Das et al. 2017; Ogongo et al. 2017; Akinyi et al. 2018; Shahul Hameed et al. 2021). However, for a number of species, this study presents the first length–weight (L–W) relationship in the Indian Ocean. All the previous studies conducted in the western Indian Ocean showed that, for these marine animal species, it is possible to use the L–W relationship to estimate weight from length or vice versa because the length–weight relationship is significant. In theory, the volume of a 3-dimensional object is roughly proportional to the cube of length for a regularly shaped solid (i.e. resulting in isometric growth for a particular organism). In this study, a value of 3.0 for the allometric coefficient *b* was obtained for only 4 species (3.2% of the total). However, calculated values for *b* were largely within the expected range of 2.5–3.5 (Froese 2006). The exact relationship between length and weight differs among species of fish according to their inherited body shape, and, within a species, according to the condition (robustness) of individual fish (Froese et al. 2011). Within any given species, there are some potential factors that could have a significant effect on the L–W relationship, such as the physiological aspect (difference between life stages; male versus female; reproduction period versus other period) and the environment (difference of habitats) (Mahé et al. 2018). In the present study, sexual dimorphism was analysed for 72 species, of which 9 (12.5%) showed a significant difference between the slopes of the L–W relationship for males and females. These results corroborate those from two previous analyses on Atlantic Ocean species showing that the effect of sex is species-dependent (Morato et al. 2001; Mahé et al. 2018). In the present study, the effect of time of sampling on the L–W relationship was investigated because seasonal or annual differences in the relationship can generally be related to reproduction (gonad development and spawning period) or feeding activities (food

availability and feeding rate) (Bagenal and Tesch 1978; Weatherley and Gill 1987; Wootton 1990), if the length range is comparable between samplings. The effect of sampling period was significant for 27 species (i.e. 36.0%) for the sampling year, and for 14 species (i.e. 19.2%) for the sampling quarter. Hence it appears that period of sampling might also be a species-dependent factor. Finally, the relationships between two length measurements (standard length versus total length) and two weight measurements (total weight versus gutted weight) were presented for 120 and for 114 species, respectively, because the same metrics are not always used in different studies. There is a debate about the accuracy of length measurements and therefore which metric to use (William 1942). For all species tested in this study, there were no significant differences between using standard length or total length to describe fish length, which corroborates previous studies based on a large number of species (Echeverria and Lenarz 1984; Gaygusuz et al. 2006). The same question is pertinent for the best metric to describe fish weight. The relationship between total weight and gutted weight was tested, and for all species it would be possible to use either weight measure without a loss of data quality because the two were significantly correlated. However, the proportion of total weight that is represented by gutted weight differs between and even within species, with the conversion factor defined by species and sometimes by geographical area (FAO 2000).

The length–weight relationships reported here for 123 fish species from 10 218 individuals caught around Réunion Island from 2000 to 2021 are adequate for several species because the sampling range was comparable to the species length range and the sample size was substantial. However, for some species, whereas this study reported the first L–W relationship the sample size was small. Consequently, the samples should be supplemented by additional studies.

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Figure legends

Figure 1: Plot of length–weight relationships (log *a* vs *b*) in 123 fish species sampled at Réunion Island between 2000 and 2021

Table 1: Characteristics of the 123 fish species caught around Réunion Island from 2000 to 2021. Number of sampled individuals (*n*) for four different metrics: total length (TL), standard length (SL), total weight (W_T) and gutted weight (W_G). Species with an asterisk (*) are the lyretail fish with a potential bias in the length measurement because the caudal fin is emarginated by trailing filaments

Family	Species	*n*	TL (cm)			SL (cm)			W_T (g)			W_G (g)		
			Mean	SD	Range (min.–max.)	Mean	SD	Range (min.–max.)	Mean	SD	Range (min.–max.)	Mean	SD	Range (min.–max.)
Acanthuridae	*Acanthurus blochii* *	5	42.8	4.3	36.9–48	32.1	2.7	27.5–34.2	1478.1	334.9	990–1823	1288.5	276.7	879–1560
	Acanthurus dussumieri *	27	34.2	8.6	22.1–46.2	26.0	6.3	17.5–35.7	928.1	490.5	316–1864	780.6	436.2	191–1638
	Acanthurus guttatus	63	22.9	2.2	17.2–27.2	17.9	1.9	13.8–21.9	361.5	98.6	149–3562	308.1	81.2	137–474
	*Acanthurus nigrofuscus**	34	16.3	3.1	11.4–22.5	12.3	2.1	8.7–16	85.9	53.7	25–206	71.6	43.6	22–178
	Acanthurus tennentii	14	25.4	3.8	20.9–35.8	18.6	2.5	15.3–24.2	288.4	130.0	150–636	246.4	116.3	135–571
	Acanthurus triostegus	529	15.2	2.1	3.4–19.9	12.2	1.9	2.7–16.3	92.2	32.4	1–181	76.4	26.6	1–153
	Ctenochaetus striatus	29	21.2	2.5	15.3–25.7	15.7	2.3	10.8–21.6	173.6	60.6	58–291	155.9	54.9	48–273
	*Naso elegans**	56	32.3	8.7	16.7–46.9	21.2	4.4	13.6–28.5	310.3	175.5	76–760	281.8	155.3	68–616
	Naso hexacanthus	13	50.1	5.1	39–61.6	42.5	7.5	29.2–56	1658.5	629.9	712–3450	1669.4	771.0	657–3290
	Naso unicornis *	163	30.0	9.5	15.7–55.7	23.0	6.5	12.5–44	396.3	334.2	54–1930	344.7	306.8	48–1600
	Zebrasoma desjardinii	6	31.6	5.2	21.4–35.5	25.6	4.5	17.1–29	670.6	256.0	179–900	557.9	206.4	159–747
Apogonidae	*Ostorhinchus taeniophorus*	5	16.9	1.0	15.4–18	13.8	0.8	12.5–14.9	73.8	16.1	52–104	67.3	17.6	45–100
Atherinidae	*Atherinomorus lacunosus*	77	11.3	0.5	10.5–12.8	9.4	0.4	8.7–10.5	12.6	1.5	10–17	12.2	1.9	10–16
Aulostomidae	*Aulostomus chinensis*	6	25.1	7.0	19.1–34.9	33.1	–	33.1–33.1	24.3	21.9	6–53	–	–	–
Balistidae	*Rhinecanthus aculeatus*	12	16.6	6.3	3.7–21.5	14.0	5.3	3.1–18.3	162.3	92.4	1–270	175.5	53.8	67–242
Belonidae	*Tylosurus crocodilus*	7	44.6	26.5	22.9–77.5	66.8	3.9	63.6–71.2	289.7	312.4	11–677	538.3	150.4	326–649
Berycidae	*Beryx decadactylus*	48	50.3	6.8	35–61	39.6	5.9	27.8–49.7	1843.9	729.6	581–3300	1666.8	649.8	554–2790
Bramidae	*Eumegistus illustris*	133	69.5	13.3	45.2–100	52.9	9.6	37.4–73.5	4813.0	2131.8	1–12000	4374.0	1863.9	1290–8850
Carangidae	*Caranx melampygus*	33	59.1	9.2	43.3–83.8	50.0	8.8	35.9–73.2	2679.6	1299.1	886–6320	2532.9	1245.7	847–6120
	Caranx sexfasciatus	5	30.8	15.4	22–58.3	25.0	13.0	17.5–48.1	541.6	843.6	131–2050	1026.3	1278.0	122–1930
	Decapterus tabl	56	26.7	2.6	19.3–32.6	22.6	2.2	16.3–27.1	200.0	59.5	70–379	181.1	58.4	65–348
	Selar crumenophthalmus	24	19.0	5.2	12.3–30.9	12.2	1.4	10.6–14.2	79.8	89.9	15–325	26.0	10.2	14–40
Centrophoridae	*Centrophorus moluccensis*	56	72.6	13.0	30.1–87.6	67.7	13.2	28.8–82.5	2345.8	1191.1	133–4580	1728.4	740.8	111–2790
Chaetodontidae	*Chaetodon lunula*	5	15.5	2.0	12.3–17	13.2	1.9	10.2–14.8	116.1	39.4	57–149	104.0	34.9	51–135
Cirrhitidae	*Cirrhitus pinnulatus*	69	18.9	2.2	14–25.2	15.6	1.9	11.7–21.8	166.9	68.3	68–434	157.4	65.2	61–415
Congridae	*Conger cinereus*	7	75.2	32.0	22.4–117.5	73.0	32.0	20.3–115	1259.2	1073.9	268–3340	1179.0	985.8	257–3070
Diodontidae	*Diodon hystrix*	6	42.8	9.6	30.7–52.7	35.7	8.4	25.2–44.6	2671.8	1162.5	1354–4264	2416.6	1069.1	951–3700

Fistulariidae	*Fistularia commersonii*	21	86.1	18.7	50.6–21	70.1	16.9	19–103	318.3	228.2	109–1032	315.4	204.1	115–934
Gempylidae	*Promethichthys prometheus*	86	38.1	7.7	21.6–56.4	32.7	6.6	18.8–48.9	221.1	131.7	29–657	215.8	116.0	28–595
	Rexea prometheoides	132	30.3	3.5	22.2–42.5	25.8	3.0	19–36.2	157.6	59.6	54–409	137.9	51.3	52–380
	Thyrsitoides marleyi	36	109.2	46.3	22.2–189	108.4	25.4	19.2–136.1	4223.2	3628.3	36–18000	4644.4	2108.0	35–9050
Holocentridae	*Myripristis berndti*	117	23.3	4.3	12.6–30.8	18.4	3.6	9.5–24.8	249.0	114.5	34–480	237.7	107.8	32–442
	Myripristis chryseres	84	20.6	2.0	15–25.5	16.4	1.8	11.2–20.2	160.9	49.7	54–345	153.9	48.0	52–329
	Myripristis hexagona	13	18.5	1.1	16.4–20.6	14.4	1.0	12.6–16.3	105.7	18.0	80–143	99.7	15.6	76–132
	Myripristis kuntee	9	18.2	0.9	17.1–19.3	14.2	0.8	13.3–15.2	105.7	16.7	84–135	98.0	15.6	78–125
	Myripristis murdjan	66	20.0	3.0	14.5–25.5	15.5	2.4	11.0–20.0	144.5	61.2	51–274	136.7	55.6	47–248
	Ostichthys kaianus	39	28.3	4.4	16.5–36	23.4	3.8	13.7–29	599.4	219.8	113–984	572.6	212.3	98–945
	Sargocentron spiniferum	37	26.8	5.2	18.1–37.1	22.2	4.4	14.9–31.4	373.5	240.4	109–1022	349.3	222.2	103–925
	Sargocentron tiere	26	27.2	3.6	18.5–33.1	21.7	2.8	15.4–25.9	335.1	134.2	95–571	310.2	121.1	90–521
Kuhliidae	*Kuhlia mugil*	32	6.3	1.2	4.9–10.6	4.9	0.8	4–6.9	2.8	2.2	1–12	5.0	0.3	5–5
Kyphosidae	*Kyphosus bigibbus*	26	31.7	2.8	24.4–36.5	25.1	2.3	19.5–28.8	486.1	122.3	194–745	425.0	104.5	187–644
	Kyphosus cinerascens	32	32.8	6.3	20.5–47	26.4	5.0	16–38.5	702.8	409.2	129–1760	603.0	336.6	117–1390
	Kyphosus vaigiensis	25	30.7	4.9	20.3–39.5	23.9	4.4	14–32.2	450.9	218.1	100–907	397.3	190.5	93–818
Labridae	*Anampses caeruleopunctatus*	8	21.9	4.7	16.2–28.6	17.9	3.7	13.8–23	227.8	135.5	73–410	196.3	128.8	65–395
	Cheilinus trilobatus	76	31.4	7.7	18.4–47.7	24.4	4.8	15.5–34.7	690.0	410.3	130–1649	673.9	389.9	164–1546
	Coris aygula	9	42.6	7.0	33.5–54	35.4	5.7	28–45	1350.8	733.9	640–2710	1297.5	706.2	610–2610
	Thalassoma trilobatum	9	17.9	4.7	9.5–23.5	15.2	4.0	7.7–19.7	120.1	80.4	12–257	123.5	76.2	11–247
Lethrinidae	*Gnathodentex aureolineatus*	43	23.6	3.7	15.5–30.3	18.9	3.0	11.6–24.5	213.0	102.3	45–452	203.3	87.8	41–417
	Gymnocranius griseus	25	19.7	9.2	7.8–37.5	14.5	6.9	6.5–29.4	175.8	191.8	5–809	261.2	168.5	86–743
	Lethrinus rubrioperculatus	53	31.3	7.0	19.4–43	24.7	5.7	15.1–34.8	432.8	265.3	94–990	412.5	253.5	88–944
	Monotaxis grandoculis	8	33.9	12.1	18.9–51.4	26.7	10.1	14.3–41	912.8	825.9	105–2400	855.3	762.9	99–2193
Lutjanidae	*Aphareus furca*	12	34.9	2.7	30.3–40.5	27.0	2.0	24.1–31	464.4	87.4	331–645	448.4	83.9	319–621
	Aphareus rutilans	116	43.7	9.3	21.1–78.6	32.7	6.6	16.3–58.7	748.3	492.1	89–3294	717.1	472.2	85–3178
	Aprion virescens	32	43.0	12.6	21.2–74.8	33.4	10.4	16.4–60.9	871.4	800.2	99–3689	829.7	749.6	96–3364
	Etelis carbunculus	1608	27.7	7.1	13.9–125	21.9	4.8	11.2–80.3	360.3	1425.5	26–28100	309.8	1058.2	25–25790
	Etelis coruscans	146	43.7	23.2	20.6–112.4	31.1	14.7	16.1–75.8	2329.3	2962.8	90–10200	2185.3	2777.0	86–503
	Etelis radiosus	14	62.6	22.1	27.2–100.5	47.1	16.6	21.5–77.8	3067.7	2658.8	201–9040	2972.3	2566.5	193–8670
	Lutjanus bengalensis	25	17.7	1.9	14.7–21.7	14.3	1.7	11.6–17.7	85.9	34.7	48–173	78.4	28.5	46–142
	Lutjanus fulvus	6	32.1	3.1	29.4–37	25.9	2.7	23.2–29.4	563.0	155.4	422–796	537.3	153.2	403–783

	Lutjanus kasmira	590	21.5	3.3	11–33.6	17.3	2.7	9.2–27.7	156.9	76.6	20–587	150.7	75.6	19–606
	Lutjanus notatus	298	21.3	2.2	14.3–27.7	17.1	2.0	4.4–22	158.8	50.9	43–337	150.3	49.0	40–329
	Paracaesio xanthura	9	30.6	6.6	19.8–37.7	23.9	5.4	15.1–29.9	382.5	197.3	97–624	368.5	190.3	94–602
	Pristipomoides argyrogrammicus	608	23.2	3.2	12.2–31.7	18.4	2.5	9.6–25.4	167.4	68.8	23–418	157.5	62.9	21–397
	Pristipomoides auricilla	10	24.7	3.1	21–31.4	19.9	2.6	16.7–25.5	181.6	78.5	108–357	172.6	74.8	97–339
	Pristipomoides filamentosus	290	26.4	5.0	15.5–57.6	20.7	3.9	12.5–45.4	232.5	154.1	42–1770	221.9	146.9	41–1680
	Pristipomoides multidens	201	49.5	11.9	27–86.5	38.8	9.7	21–68	1552.6	1128.7	205–7350	1484.8	1069.1	198–6930
	Pristipomoides zonatus	7	29.0	7.2	21.3–41.5	22.8	5.6	16.8–32.4	359.4	277.6	119–912	341.0	264.1	116–871
Malacanthidae	*Branchiostegus doliatus*	33	34.3	4.3	24.7–42.2	28.6	3.9	20.2–35.8	458.5	186.0	178–901	456.3	196.8	165–872
Monacanthidae	*Cantherhines dumerilii*	56	28.0	3.5	18.5–35.5	23.9	3.1	16–31.3	515.0	234.4	138–1248	443.3	191.6	118–1130
Mullidae	*Mulloidichthys flavolineatus*	388	13.7	6.3	8.5–35.7	11.1	5.0	7–29.7	64.0	269.3	5–4739	78.6	100.1	5–478
	Mulloidichthys pfluegeri	51	33.3	6.1	19.3–45.2	26.8	5.1	15.6–36.2	529.5	280.8	83–1181	506.5	266.1	79–1094
	Mulloidichthys vanicolensis	32	22.6	6.6	11.6–34.8	17.9	5.5	9.4–28.3	235.9	451.7	13–2635	153.2	125.7	13–506
	Parupeneus barberinus	15	23.2	4.8	14.8–33.1	18.3	3.8	11.7–26.3	158.6	96.2	41–389	152.4	93.0	39–378
	Parupeneus ciliatus	9	22.9	6.3	11.2–31.4	17.7	5.7	9.2–26	191.8	131.0	19–430	162.6	136.5	17–410
	Parupeneus cyclostomus	14	24.6	9.8	13.8–43.7	20.0	8.0	11–35.8	270.8	343.4	32–1012	242.1	300.6	41–954
	Parupeneus macronemus	19	17.8	2.2	14–20.5	14.4	1.6	11.2–16.2	76.2	26.3	32–116	71.5	25.3	30–112
	Parupeneus pleurostigma	9	23.6	7.4	16–33.9	19.2	6.4	12.5–28	202.3	177.2	48–473	241.3	188.9	52–453
	Parupeneus rubescens	9	29.9	12.0	14.4–46.2	23.9	9.2	11.4–37.2	552.1	532.2	42–1483	336.5	374.7	36–905
	Parupeneus spp.	33	22.6	4.0	14.5–31.8	18.1	3.3	12.6–25.7	140.5	88.2	1–417	–	–	–
	Parupeneus trifasciatus	252	22.6	5.6	7.9–40.1	18.2	4.6	6.1–32.8	190.8	170.1	6–1036	189.6	170.7	6–1003
Muraenidae	*Gymnothorax flavimarginatus*	8	64.6	15.5	51.6–99.5	63.9	15.5	50.1–98.5	592.8	530.0	240–1828	549.3	473.6	207–1638
	Gymnothorax javanicus	7	86.1	35.0	10.3–109	96.6	14.8	76–108.5	2516.5	960.8	1025–653520	2362.3	973.9	935–3370
	Gymnothorax undulatus	16	70.5	11.4	49.9–88	68.8	11.7	49.2–87.4	780.7	423.7	199–1451	698.3	404.8	193–1378
Polymixiidae	*Polymixia berndti*	70	23.0	6.4	15.1–43	16.6	4.2	12.2–34.4	203.6	241.6	46–1195	154.5	220.9	59–1064
	Polydactylus sexfilis	93	30.9	14.9	7–51.9	22.0	10.5	5.5–38.5	412.0	309.4	2–1221	532.1	178.6	220–1144
	Polydactylus sextarius	11	7.5	0.5	6.8–8.2	5.7	0.4	5.1–6.1	3.5	0.6	3–5	–	–	–
	Polymixia berndti	70	23.0	6.4	15.1–43	16.6	4.2	12.2–34.4	203.6	241.6	46–1195	154.5	220.9	59–1064
Pomacentridae	*Abudefduf septemfasciatus*	26	20.6	1.1	18–22.7	15.5	1.1	13.1–17.3	241.3	42.6	164–331	211.3	39.4	143–305
	Stegastes limbatus	7	13.7	2.0	10.2–15.8	12.0	–	12.0–12.0	69.5	28.7	23–97	82.2	NA	82–82
Priacanthidae	*Cookeolus japonicus*	8	47.0	7.9	38–55.4	39.1	6.4	31–45.2	1728.5	754.9	944–2600	1704.3	736.1	879–2390

	Heteropriacanthus cruentatus	20	22.5	7.2	9.6–32	19.1	6.3	7.9–27.5	224.4	164.5	7–529	206.3	151.2	7–477
	Priacanthus hamrur	20	35.4	3.7	23.2–40.3	25.2	5.3	14.3–30.8	435.5	188.2	83–657	464.1	112.2	144–614
Scaridae	*Calotomus carolinus*	67	35.5	5.5	18.6–45.6	28.7	4.2	15.7–38	868.5	360.8	128–1930	795.5	332.8	114–1750
	Chlorurus enneacanthus	161	32.1	8.4	17.5–76.5	26.6	6.7	15–54.5	808.5	775.4	107–6760	740.2	700.4	99–6250
	Chlorurus sordidus	17	35.3	3.9	29–42.5	29.9	3.1	25–37	1054.4	327.5	526–1592	952.5	303.3	471–1468
	Scarus caudofasciatus	6	30.4	7.9	18–41.5	24.7	6.3	15.1–34.5	590.1	417.6	115–1349	408.9	199.7	106–616
	Scarus falcipinnis	16	24.9	2.5	19.8–29.5	20.7	2.3	16–24.3	316.9	92.1	152–475	294.0	85.5	144–448
	Scarus ghobban	9	30.4	8.5	23.6–49	25.7	7.0	19.8–39.8	622.3	633.8	247–2190	613.6	600.3	230–1980
	Scarus globiceps	18	28.9	3.2	22.4–34.4	23.8	2.7	18–28	506.5	172.6	223–811	478.9	159.6	217–751
	Scarus psittacus	111	27.9	4.7	12.1–36.4	22.2	3.4	10.3–28	413.2	179.4	30–785	386.6	169.4	27–9910
	Scarus russelii	20	31.5	8.5	18.5–47.7	27.1	7.3	15.8–42.3	835.5	689.2	137–2495	732.0	594.4	123–2181
	Scarus scaber	20	31.3	7.9	18.2–43.4	24.7	5.9	15.8–33.6	627.5	378.7	118–1286	569.6	348.5	108–1155
Scorpaenidae	*Neoscorpaena nielseni*	6	25.5	3.6	20–29	19.8	3.6	15.6–23.5	264.6	111.8	128–440	215.8	112.0	120–339
	Pontinus nigerimum	36	27.6	5.2	16.1–38	22.4	4.3	13.4–30.8	333.9	145.3	69–663	308.0	141.3	65–639
Serranidae	*Aulacocephalus temminckii*	7	27.5	5.7	20.5–35.6	23.7	5.0	17.4–30.9	304.0	192.3	98–619	289.5	187.6	88–599
	Cephalopholis aurantia	198	22.8	3.4	13.9–31.8	19.5	2.9	11.8–27.2	225.2	111.6	46–574	223.0	105.1	44–554
	Cephalopholis nigripinnis	30	16.9	2.7	11.9–23	14.1	2.3	9.6–19.2	87.7	45.8	25–215	85.4	44.1	24–203
	Cephalopholis spiloparaea	40	17.3	2.4	13–23.6	14.4	2.1	10.8–20.2	83.7	39.0	35–216	80.1	37.5	34–208
	Epinephelus fasciatus	232	23.2	4.8	10–37.6	19.4	4.1	8.3–31	212.9	144.7	14–804	203.0	136.7	14–761
	Epinephelus flavocaeruleus	6	38.4	5.3	32.5–46.9	32.5	4.8	27.5–40.2	1061.4	465.0	678–1875	1000.2	438.5	628–1768
	Epinephelus hexagonatus	311	16.6	2.8	11.2–24.1	13.6	2.4	8.9–19.6	82.7	44.0	21–211	77.6	42.2	20–204
	Epinephelus macrospilos	12	39.3	10.4	24.4–55.2	33.1	9.5	20.2–48.2	1426.4	913.6	235–3293	1182.5	882.2	219–3101
	Epinephelus merra	133	18.1	2.9	12–25.4	15.1	2.4	9.7–21.4	105.9	56.0	25–310	98.1	51.6	24–295
	Epinephelus morrhua	5	22.2	5.0	15.8–28.2	18.8	4.2	13.4–23.7	186.1	134.8	54–393	176.9	126.6	51–370
	Hyporthodus octofasciatus	5	36.2	11.8	21–50	31.2	12.8	18–43.5	898.4	688.8	149–1850	935.8	798.6	142–1740
	Epinephelus radiatus	83	37.6	10.6	12.3–65.3	32.5	9.3	10.3–57.2	1023.4	998.0	23–4520	976.2	931.6	22–4300
	Epinephelus tauvina	70	26.8	6.8	15.8–51.8	22.5	5.9	13.1–43.7	354.6	350.1	57–2283	333.4	340.0	51–2263
	Variola albimarginata *	80	35.3	7.4	18.5–55.5	26.0	5.4	13.8–41.5	530.1	315.1	66–1736	505.2	302.6	62–1688
	Variola louti *	35	52.6	10.9	28.7–74.6	38.0	8.1	21–56.3	1717.0	1082.2	248–4939	1615.8	1024.1	234–4588
Siganidae	*Siganus argenteus*	18	28.2	10.3	14.6–44.8	23.1	9.1	11.3–36.4	409.9	419.5	40–1471	435.4	378.7	65–1224
Sparidae	*Argyrops filamentosus*	61	24.0	2.2	19.5–29	18.9	1.7	15.5–23	249.1	66.3	123–433	241.4	63.2	120–409
Sphyraenidae	*Sphyraena forsteri*	8	50.5	1.7	47.3–52.9	43.6	1.6	40.9–45.7	589.8	80.0	462–705	542.8	67.5	439–632

Squalidae	*Squalus megalops*	649	55.6	12.1	30.9–82	50.1	11.4	28.5–73.1	999.1	677.2	136–3100	762.6	488.9	122–2040

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Table 2: Relationship between total weight and total length, with the coefficients *a* and *b* and the quality index *p*(L–W) for 123 fish species caught around Reunion Island, 2000–2021. Grey shading indicates that the L–W relationship is significant and/or that the effects of the explanatory factors (Sex, Quarter and Year) are significant

Family	Latin name	*p*(L–W)	*a*		*b*		*p* (explanatory factors)		
			Value	SD	Value	SD	Sex	Quarter	Year
Acanthuridae	*Acanthurus blochii*	<0.001	7.95E–01	6.02E–01	2.38	0.23	–	–	–
	Acanthurus dussumieri	<0.001	1.21E+00	6.03E–01	2.30	0.12	0.984	0.347	0.841
	Acanthurus guttatus	<0.001	3.67E–02	1.42E–02	2.96	0.09	0.522	0.253	0.319
	Acanthurus nigrofuscus	<0.001	1.20E–02	5.18E–03	3.08	0.11	0.207	0.707	0.012
	Acanthurus tennentii	<0.001	5.78E–02	3.91E–02	2.78	0.20	–	–	0.318
	Acanthurus triostegus	<0.001	2.26E–02	2.50E–03	3.02	0.02	0.914	0.002	<0.001
	Ctenochaetus striatus	<0.001	5.11E–03	2.56E–03	3.23	0.13	0.097	0.916	0.026
	Naso elegans	<0.001	9.74E–01	2.62E–01	2.18	0.05	0.022	0.798	0.857
	Naso hexacanthus	<0.001	1.67E–03	1.34E–03	3.33	0.26	–	–	0.54
	Naso unicornis	<0.001	1.33E–01	2.00E–02	2.58	0.03	0.469	0.977	0.078
	Zebrasoma desjardinii	<0.001	8.88E–03	7.25E–03	3.14	0.30	–	–	–
Apogonidae	*Ostorhinchus taeniophorus*	0.22	7.45E+00	7.43E+00	2.59	1.15	–	–	–
Atherinidae	*Atherinomorus lacunosus*	<0.001	4.48E–02	1.76E–02	2.65	0.11	–	–	–
Aulostomidae	*Aulostomus chinensis*	<0.001	1.20E–04	7.24E–05	3.42	0.17	–	–	–
Balistidae	*Rhinecanthus aculeatus*	<0.001	4.04E–02	6.74E–03	2.92	0.04	–	0.427	0.374
Belonidae	*Tylosurus crocodilus*	<0.001	4.52E–04	2.30E–04	3.16	0.12	–	–	–
Berycidae	*Beryx decadactylus*	<0.001	4.51E–03	2.20E–03	3.18	0.11	0.499	0.342	<0.001
Bramidae	*Eumegistus illustris*	<0.001	1.78E–02	4.10E–03	2.95	0.04	0.846	0.423	<0.001
Carangidae	*Caranx melampygus*	<0.001	6.62E–03	2.36E–03	3.09	0.07	0.412	–	0.189
	Caranx sexfasciatus	<0.001	2.86E–02	5.52E–03	2.84	0.04	–	–	–
	Decapterus tabl	<0.001	2.29E–03	9.80E–04	3.27	0.10	0.039	0.707	0.276
	Selar crumenophthalmus	<0.001	1.38E–03	4.31E–04	3.35	0.07	–	–	0.018
Centrophoridae	*Centrophorus moluccensis*	<0.001	5.04E–04	1.87E–04	3.36	0.07	<0.001	0.613	0.006
Chaetodontidae	*Chaetodon lunula*	<0.001	3.86E–02	1.57E–02	2.95	0.10	–	–	–
Cirrhitidae	*Cirrhitus pinnulatus*	<0.001	3.18E–03	8.57E–04	3.38	0.06	0.629	0.634	0.741
Congridae	*Conger cinereus*	0.13	2.16E+03	2.08E+03	0.93	0.52	–	–	–
Diodontidae	*Diodon hystrix*	<0.001	2.72E+01	2.20E+01	2.02	0.27	–	–	–
Fistulariidae	*Fistularia commersonii*	<0.001	2.53E–03	2.04E–03	2.75	0.24	–	<0.001	–
Gempylidae	*Promethichthys prometheus*	<0.001	3.05E–03	8.72E–04	3.02	0.06	0.515	0.048	0.092
	Rexea prometheoides	<0.001	5.25E–03	2.21E–03	3.00	0.10	0.165	0.657	0.506
	Thyrsitoides marleyi	<0.001	4.80E–02	1.35E–02	2.57	0.05	0.052	0.214	0.063
Holocentridae	*Myripristis berndti*	<0.001	2.25E–02	4.32E–03	2.96	0.04	0.444	0.078	0.189
	Myripristis chryseres	<0.001	1.20E–02	3.38E–03	3.07	0.06	0.583	0.411	0.345
	Myripristis hexagona	<0.001	3.78E–01	2.98E–01	2.40	0.30	0.6	–	–
	Myripristis kuntee	<0.001	2.63E–02	2.24E–02	2.93	0.37	–	–	–
	Myripristis murdjan	<0.001	2.08E–02	5.67E–03	2.96	0.06	0.099	0.439	0.968
	Ostichthys kaianus	<0.001	6.69E–02	2.99E–02	2.82	0.11	0.768	0.93	0.556
	Sargocentron spiniferum	<0.001	1.09E–02	3.54E–03	3.08	0.07	0.775	0.747	0.157
	Sargocentron tiere	<0.001	7.26E–03	3.00E–03	3.14	0.10	0.063	0.032	–
Kuhliidae	*Kuhlia mugil*	<0.001	8.48E–03	3.77E–03	3.03	0.14	–	–	0.01
Kyphosidae	*Kyphosus bigibbus*	<0.001	2.53E–02	1.73E–02	2.91	0.20	0.333	0.685	–
	Kyphosus cinerascens	<0.001	6.84E–03	2.92E–03	3.17	0.10	0.95	0.008	0.025
	Kyphosus vaigiensis	<0.001	1.82E–03	1.07E–03	3.36	0.16	0.946	0.861	0.198

Labridae	*Anampses caeruleopunctatus*	<0.001	1.12E–02	6.01E–03	3.10	0.14	–	–	–
	Cheilinus trilobatus	<0.001	2.20E–01	4.82E–02	2.58	0.04	0.305	0.062	0.001
	Coris aygula	<0.001	1.16E–02	9.07E–03	3.05	0.25	–	–	–
	Thalassoma trilobatum	<0.001	5.36E–03	2.21E–03	3.22	0.10	–	–	–
Lethrinidae	*Gnathodentex aureolineatus*	<0.001	2.69E–03	9.44E–04	3.31	0.08	0.893	0.904	0.195
	Gymnocranius griseus	<0.001	4.76E–03	1.87E–03	3.21	0.10	–	0.762	0.089
	Lethrinus rubrioperculatus	<0.001	2.86E–02	4.24E–03	2.86	0.03	0.917	0.034	0.006
	Monotaxis grandoculis	<0.001	6.95E–03	1.77E–03	3.15	0.05	–	–	–
Lutjanidae	*Aphareus furca*	<0.001	5.53E–01	4.07E–01	2.33	0.23	–	–	–
	Aphareus rutilans	<0.001	6.93E–02	1.39E–02	2.65	0.04	0.782	<0.001	0.073
	Aprion virescens	<0.001	2.67E–02	5.70E–03	2.82	0.04	0.892	0.507	0.352
	Etelis carbunculus	<0.001	9.58E–03	5.98E–04	3.03	0.01	0.109	0.273	<0.001
	Etelis coruscans	<0.001	5.17E–02	6.02E–03	2.70	0.02	0.511	0.078	0.006
	Etelis radiosus	<0.001	1.70E–02	3.21E–03	2.91	0.03	–	–	–
	Lutjanus bengalensis	<0.001	3.35E–03	1.91E–03	3.29	0.16	0.91	0.435	0.021
	Lutjanus fulvus	<0.001	5.27E–02	3.81E–02	2.80	0.22	–	–	–
	Lutjanus kasmira	<0.001	1.02E–02	1.25E–03	3.07	0.02	0.304	0.009	0.107
	Lutjanus notatus	<0.001	1.32E–02	2.16E–03	3.03	0.03	0.013	<0.001	0.195
	Paracaesio xanthura	<0.001	2.53E–02	4.73E–03	2.87	0.04	–	–	–
	Pristipomoides argyrogrammicus	<0.001	1.10E–02	1.85E–03	3.02	0.03	0.683	0.478	<0.001
	Pristipomoides auricilla	<0.001	4.68E–03	2.93E–03	3.16	0.18	–	–	–
	Pristipomoides filamentosus	<0.001	2.97E–02	3.99E–03	2.83	0.03	0.256	<0.001	0.046
	Pristipomoides multidens	<0.001	8.31E–03	8.04E–04	3.04	0.02	0.612	0.086	0.149
	Pristipomoides zonatus	<0.001	1.24E–02	4.30E–03	3.00	0.08	–	–	–
Malacanthidae	*Branchiostegus doliatus*	<0.001	3.28E–03	1.76E–03	3.20	0.13	0.634	0.321	0.042
Monacanthidae	*Cantherhines dumerilii*	<0.001	2.96E–03	1.31E–03	3.36	0.10	0.17	0.037	0.13
Mullidae	*Mulloidichthys flavolineatus*	<0.001	4.27E–03	3.29E–04	3.15	0.02	0.43	0.187	<0.001
	Mulloidichthys pfluegeri	<0.001	4.50E–03	1.42E–03	3.18	0.07	0.012	0.25	0.495
	Mulloidichthys vanicolensis	<0.001	2.34E–03	4.56E–04	3.29	0.04	0.764	0.395	0.325
	Parupeneus barberinus	<0.001	3.41E–02	9.59E–03	2.80	0.06	–	0.076	–
	Parupeneus ciliatus	<0.001	1.29E–02	3.91E–03	3.00	0.07	–	–	–
	Parupeneus cyclostomus	<0.001	9.67E–03	3.87E–03	3.04	0.09	–	–	0.447
	Parupeneus macronemus	<0.001	2.11E–03	1.19E–03	3.35	0.16	0.272	–	–
	Parupeneus pleurostigma	<0.001	1.18E–02	4.04E–03	3.00	0.08	–	–	–
	Parupeneus rubescens	<0.001	8.07E–03	2.16E–03	3.10	0.06	–	–	–
	Parupeneus spp.	<0.001	1.77E–02	5.24E–03	2.93	0.07	–	0.976	–
	Parupeneus trifasciatus	<0.001	4.06E–03	4.55E–04	3.22	0.02	0.858	0.121	0.738
Muraenidae	*Gymnothorax flavimarginatus*	<0.001	9.67E–04	6.69E–04	3.10	0.18	–	–	–
	Gymnothorax javanicus	1	2.31E+06	1.85E+06	2.46	0.25	–	–	–
	Gymnothorax undulatus	<0.001	1.24E–05	7.85E–06	3.77	0.15	–	–	–
Polymixiidae	*Polymixia berndti*	<0.001	2.56E–02	1.10E–02	2.87	0.10	0.385	0.074	0.023
	Polydactylus sexfilis	<0.001	4.77E–03	3.40E–04	3.10	0.01	0.498	0.063	0.093
	Polydactylus sextarius	<0.001	7.35E–02	4.41E–02	2.49	0.21	–	–	–
	Polymixia berndti	<0.001	2.56E–02	1.10E–02	2.87	0.10	0.385	0.074	0.023
Pomacentridae	*Abudefduf septemfasciatus*	<0.001	6.71E–02	5.15E–02	2.83	0.27	0.745	0.652	0.923
	Stegastes limbatus	<0.001	5.38E–03	3.86E–03	3.31	0.26	–	–	–
Priacanthidae	*Cookeolus japonicus*	<0.001	9.69E–02	3.93E–02	2.70	0.09	–	–	–

	Heteropriacanthus cruentatus	<0.001	1.11E–03	2.80E–04	3.47	0.05	0.566	–	0.956
	Priacanthus hamrur	<0.001	1.04E–01	6.77E–02	2.62	0.18	0.375	0.02	0.009
Scaridae	*Calotomus carolinus*	<0.001	3.46E–02	9.31E–03	2.89	0.05	0.098	0.186	0.01
	Chlorurus enneacanthus	<0.001	5.78E–02	8.30E–03	2.82	0.03	0.119	0.933	0.071
	Chlorurus sordidus	<0.001	3.23E–02	1.67E–02	2.94	0.12	–	0.922	0.203
	Scarus caudofasciatus	<0.001	3.92E–02	1.94E–02	2.86	0.12	–	–	–
	Scarus falcipinnis	<0.001	1.69E–02	9.30E–03	3.03	0.14	0.005	<0.001	0.238
	Scarus ghobban	<0.001	2.24E–02	8.84E–03	2.96	0.09	–	–	–
	Scarus globiceps	<0.001	7.18E–03	4.79E–03	3.18	0.19	–	0.3	0.951
	Scarus psittacus	<0.001	2.77E–02	5.70E–03	2.92	0.04	0.607	0.324	0.585
	Scarus russelii	<0.001	1.34E–02	3.51E–03	3.08	0.05	0.032	–	–
	Scarus scaber	<0.001	5.53E–02	1.57E–02	2.80	0.06	0.362	–	0.473
Scorpaenidae	*Neoscorpaena nielseni*	0.02	1.52E–01	1.48E–01	2.58	0.65	–	–	–
	Pontinus nigerimum	<0.001	6.83E–02	3.14E–02	2.73	0.11	0.753	0.118	<0.001
Serranidae	*Aulacocephalus temminckii*	<0.001	3.01E–03	1.02E–03	3.26	0.07	–	–	–
	Cephalopholis aurantia	<0.001	3.70E–03	8.64E–04	3.29	0.05	0.934	0.288	<0.001
	Cephalopholis nigripinnis	<0.001	4.49E–03	1.30E–03	3.26	0.07	0.437	0.398	0.254
	Cephalopholis spiloparaea	<0.001	9.48E–03	3.83E–03	3.09	0.10	0.562	0.655	0.347
	Epinephelus fasciatus	<0.001	7.70E–03	1.00E–03	3.12	0.03	0.002	0.718	0.006
	Epinephelus flavocaeruleus	<0.001	3.24E–02	2.82E–02	2.90	0.34	–	–	–
	Epinephelus hexagonatus	<0.001	1.41E–02	1.94E–03	3.03	0.03	0.174	0.437	<0.001
	Epinephelus macrospilos	<0.001	4.31E–03	1.46E–03	3.23	0.07	–	–	–
	Epinephelus merra	<0.001	6.44E–03	1.51E–03	3.18	0.05	0.337	0.53	0.839
	Epinephelus morrhua	<0.001	2.17E–03	1.46E–03	3.35	0.21	–	–	–
	Hyporthodus octofasciatus	<0.001	2.32E–02	1.31E–02	2.93	0.14	–	–	–
	Epinephelus radiatus	<0.001	7.97E–03	1.45E–03	3.11	0.03	0.6	0.061	0.02
	Epinephelus tauvina	<0.001	7.39E–03	1.84E–03	3.12	0.05	0.95	0.009	0.721
	Variola albimarginata	<0.001	8.06E–03	1.66E–03	3.05	0.04	0.565	0.319	0.09
	Variola louti	<0.001	1.46E–02	6.12E–03	2.95	0.09	0.214	0.566	0.391
Siganidae	*Siganus argenteus*	<0.001	2.51E–02	1.17E–02	2.89	0.11	0.659	0.173	–
Sparidae	*Argyrops filamentosus*	<0.001	3.19E–02	1.22E–02	2.89	0.09	0.847	0.358	0.982
Sphyraenidae	*Sphyraena forsteri*	0.1	1.35E–01	1.35E–01	2.50	1.26	–	–	–
Squalidae	*Squalus megalops*	<0.001	2.41E–03	3.27E–04	3.11	0.02	<0.001	0.243	0.1

313 **Table 3:** Relationships between total length and standard length, and between total weight and gutted weight (significant relationships shown in grey)

Family	Species	TL–SL			W_T–W_G		
		p-value	*a*	*b*	*p*-value	*a*	*b*
Acanthuridae	*Acanthurus blochii*	0.02	–41.59	1.46	<0.001	–73.18	1.20
	Acanthurus dussumieri	<0.001	–11.26	1.36	<0.001	13.59	1.14
	Acanthurus guttatus	<0.001	25.30	1.14	<0.001	–15.28	1.22
	Acanthurus nigrofuscus	<0.001	–3.93	1.39	<0.001	2.35	1.06
	Acanthurus tennentii	<0.001	–31.31	1.52	<0.001	1.20	1.15
	Acanthurus triostegus	<0.001	7.45	1.17	<0.001	–3.81	1.21
	Ctenochaetus striatus	<0.001	57.03	0.99	<0.001	5.59	1.07
	Naso elegans	<0.001	–98.64	1.99	<0.001	–1.81	1.13
	Naso hexacanthus	<0.001	152.90	0.83	<0.001	17.26	1.04
	Naso unicornis	<0.001	–26.30	1.40	<0.001	–2.50	1.16
	Zebrasoma desjardinii	<0.001	27.32	1.13	<0.001	–19.48	1.24
Apogonidae	*Ostorhinchus taeniophorus*	0.03	26.11	1.05	<0.001	12.88	0.91
Atherinidae	*Atherinomorus lacunosus*	<0.001	8.41	1.12	<0.001	0.55	1.02
Aulostomidae	*Aulostomus chinensis*	–	–	–	–	–	–
Balistidae	*Rhinecanthus aculeatus*	<0.001	2.82	1.17	<0.001	0.24	1.11
Belonidae	*Tylosurus crocodilus*	–	–	–	–	–	–
Berycidae	*Beryx decadactylus*	<0.001	59.13	1.09	<0.001	–31.56	1.09
Bramidae	*Eumegistus illustris*	<0.001	–57.26	1.36	<0.001	–59.00	1.08
Carangidae	*Caranx melampygus*	<0.001	51.81	1.09	<0.001	41.47	1.04
	Caranx sexfasciatus	<0.001	11.28	1.19	–	–	–
	Decapterus tabl	<0.001	–6.64	1.21	<0.001	–1.74	1.09
	Selar crumenophtalmus	<0.001	–11.33	1.30	<0.001	–0.06	1.06
Centrophoridae	*Centrophorus moluccensis*	<0.001	1.92	1.08	<0.001	–252.98	1.60
Chaetodontidae	*Chaetodon lunula*	<0.001	16.68	1.05	<0.001	–0.98	1.13
Cirrhitidae	*Cirrhitus pinnulatus*	<0.001	11.60	1.14	<0.001	2.12	1.05
Congridae	*Conger cinereus*	<0.001	21.65	1.00	<0.001	–24.52	1.09
Diodontidae	*Diodon hystrix*	<0.001	25.47	1.13	<0.001	505.21	1.01
Fistulariidae	*Fistularia commersonii*	<0.001	269.99	0.86	<0.001	–15.53	1.15
Gempylidae	*Promethichthys prometheus*	<0.001	1.21	1.16	<0.001	–5.65	1.11
	Rexea prometheoides	<0.001	4.87	1.15	<0.001	–3.78	1.16
	Thyrsitoides marleyi	<0.001	12.37	1.14	<0.001	–35.79	1.11
Holocentridae	*Myripristis berndti*	<0.001	12.56	1.20	<0.001	–0.69	1.07
	Myripristis chryseres	<0.001	21.73	1.12	<0.001	1.48	1.04
	Myripristis hexagona	<0.001	38.42	1.02	<0.001	–6.49	1.12
	Myripristis kuntee	<0.001	8.20	1.22	<0.001	2.60	1.05
	Myripristis murdjan	<0.001	16.24	1.19	<0.001	–3.19	1.10
	Ostichthys kaianus	<0.001	9.18	1.16	<0.001	–5.26	1.07
	Sargocentron spiniferum	<0.001	7.87	1.17	<0.001	–0.16	1.09
	Sargocentron tiere	<0.001	–14.22	1.31	<0.001	–13.68	1.12
Kuhliidae	*Kuhlia mugil*	<0.001	6.22	1.15	–	–	–
Kyphosidae	*Kyphosus bigibbus*	<0.001	26.65	1.16	<0.001	–5.78	1.16
	Kyphosus cinerascens	<0.001	14.31	1.20	<0.001	4.30	1.19
	Kyphosus vaigiensis	<0.001	39.58	1.12	<0.001	–2.65	1.14
Labridae	*Anampses caeruleopunctatus*	<0.001	–16.31	1.29	<0.001	6.09	1.02
	Cheilinus trilobatus	<0.001	–53.29	1.52	<0.001	5.53	1.05

	Coris aygula	<0.001	–5.49	1.22	<0.001	3.18	1.04
	Thalassoma trilobatum	<0.001	7.41	1.17	<0.001	1.95	1.04
Lethrinidae	*Gnathodentex aureolineatus*	<0.001	14.63	1.18	<0.001	–2.16	1.09
	Gymnocranius griseus	<0.001	–5.14	1.30	<0.001	–5.44	1.08
	Lethrinus rubrioperculatus	<0.001	8.15	1.23	<0.001	1.22	1.05
	Monotaxis grandoculis	<0.001	19.16	1.20	<0.001	–12.67	1.08
Lutjanidae	*Aphareus furca*	<0.001	–11.15	1.34	<0.001	–1.32	1.04
	Aphareus rutilans	<0.001	–17.73	1.39	<0.001	3.17	1.04
	Aprion virescens	<0.001	19.35	1.22	<0.001	–13.80	1.07
	Etelis carbunculus	<0.001	7.82	1.21	<0.001	–9.53	1.09
	Etelis coruscans	<0.001	–46.81	1.52	<0.001	–19.94	1.08
	Etelis radiosus	<0.001	–3.24	1.29	<0.001	–11.28	1.04
	Lutjanus bengalensis	<0.001	13.11	1.15	<0.001	–9.01	1.21
	Lutjanus fulvus	<0.001	27.77	1.13	<0.001	19.87	1.01
	Lutjanus kasmira	<0.001	11.13	1.18	<0.001	10.33	0.97
	Lutjanus notatus	<0.001	30.88	1.07	<0.001	2.88	1.04
	Paracaesio xanthura	<0.001	12.71	1.23	<0.001	0.60	1.04
	Pristipomoides argyrogrammicus	<0.001	3.22	1.24	<0.001	–0.43	1.07
	Pristipomoides auricilla	<0.001	14.33	1.17	<0.001	0.30	1.05
	Pristipomoides filamentosus	<0.001	2.72	1.26	<0.001	–1.16	1.05
	Pristipomoides multidens	<0.001	17.18	1.23	<0.001	–12.88	1.06
	Pristipomoides zonatus	<0.001	0.76	1.27	<0.001	1.16	1.05
Malacanthidae	*Branchiostegus doliatus*	<0.001	9.42	1.16	<0.001	9.79	1.02
Monacanthidae	*Cantherhines dumerilii*	<0.001	14.57	1.11	<0.001	–13.94	1.23
Mullidae	*Mulloidichthys flavolineatus*	<0.001	–3.39	1.27	<0.001	0.01	1.07
	Mulloidichthys pfluegeri	<0.001	11.10	1.21	<0.001	–4.02	1.05
	Mulloidichthys vanicolensis	<0.001	12.52	1.19	<0.001	–1.51	1.09
	Parupeneus barberinus	<0.001	3.45	1.25	<0.001	1.01	1.03
	Parupeneus ciliatus	<0.001	6.69	1.20	<0.001	0.23	1.05
	Parupeneus cyclostomus	<0.001	2.03	1.22	<0.001	–2.04	1.06
	Parupeneus macronemus	<0.001	–2.09	1.26	<0.001	2.21	1.04
	Parupeneus pleurostigma	<0.001	11.97	1.16	<0.001	4.28	1.04
	Parupeneus rubescens	<0.001	2.33	1.23	<0.001	2.51	1.07
	Parupeneus spp.	<0.001	7.54	1.21	–	–	–
	Parupeneus trifasciatus	<0.001	7.85	1.21	<0.001	1.97	1.04
Muraenidae	*Gymnothorax flavimarginatus*	<0.001	5.83	1.00	<0.001	–21.41	1.12
	Gymnothorax javanicus	–	–	–	<0.001	192.11	0.98
	Gymnothorax undulatus	<0.001	5.74	1.00	<0.001	3.13	1.05
Polymixiidae	*Polymixia berndti*	<0.001	4.53	1.23	<0.001	–3.88	1.11
	Polydactylus sexfilis	<0.001	–3.98	1.41	<0.001	–25.89	1.13
	Polydactylus sextarius	<0.001	0.51	1.33	–	–	–
	Polymixia berndti	<0.001	4.53	1.23	<0.001	–3.88	1.11
Pomacentridae	*Abudefduf septemfasciatus*	<0.001	55.70	0.97	<0.001	18.40	1.06
	Stegastes limbatus	–	–	–	–	–	–
Priacanthidae	*Cookeolus japonicus*	<0.001	–16.82	1.27	<0.001	43.96	1.04
	Heteropriacanthus cruentatus	<0.001	7.94	1.14	<0.001	1.17	1.08
	Priacanthus hamrur	<0.001	–11.71	1.33	<0.001	–5.95	1.10

Scaridae	*Calotomus carolinus*	<0.001	11.97	1.21	<0.001	33.61	1.07
	Chlorurus enneacanthus	<0.001	–6.37	1.23	<0.001	–10.42	1.10
	Chlorurus sordidus	<0.001	–17.34	1.24	<0.001	29.59	1.08
	Scarus caudofasciatus	<0.001	0.09	1.23	<0.001	2.81	1.07
	Scarus falcipinnis	<0.001	36.33	1.03	<0.001	–4.62	1.08
	Scarus ghobban	<0.001	–21.38	1.28	<0.001	–19.10	1.11
	Scarus globiceps	<0.001	12.59	1.16	<0.001	–8.55	1.09
	Scarus psittacus	<0.001	–19.50	1.34	<0.001	–1.75	1.09
	Scarus russelii	<0.001	4.63	1.15	<0.001	–7.67	1.15
	Scarus scaber	<0.001	–10.49	1.31	<0.001	–13.46	1.11
Scorpaenidae	*Neoscorpaena nielseni*	–	–	–	–	–	–
	Pontinus nigerimum	<0.001	2.05	1.20	<0.001	4.93	1.04
Serranidae	*Aulacocephalus temminckii*	<0.001	7.03	1.13	<0.001	7.17	1.03
	Cephalopholis aurantia	<0.001	11.78	1.12	<0.001	–1.30	1.05
	Cephalopholis nigripinnis	<0.001	2.72	1.18	<0.001	0.13	1.04
	Cephalopholis spiloparaea	<0.001	11.45	1.12	<0.001	0.46	1.04
	Epinephelus fasciatus	<0.001	6.97	1.16	<0.001	–1.64	1.06
	Epinephelus flavocaeruleus	<0.001	24.58	1.11	<0.001	0.98	1.06
	Epinephelus hexagonatus	<0.001	8.04	1.16	<0.001	1.92	1.04
	Epinephelus macrospilos	<0.001	32.20	1.09	<0.001	6.82	1.06
	Epinephelus merra	<0.001	2.49	1.19	<0.001	–0.13	1.08
	Epinephelus morrhua	<0.001	–3.83	1.20	<0.001	–2.24	1.07
	Hyporthodus octofasciatus	–	–	–	–	–	–
	Epinephelus radiatus	<0.001	8.87	1.13	<0.001	–8.73	1.07
	Epinephelus tauvina	<0.001	8.43	1.15	<0.001	8.93	1.04
	Variola albimarginata	<0.001	13.30	1.31	<0.001	4.44	1.04
	Variola louti	<0.001	23.96	1.32	<0.001	11.33	1.06
Siganidae	*Siganus argenteus*	<0.001	5.86	1.23	<0.001	–3.01	1.19
Sparidae	*Argyrops filamentosus*	<0.001	11.06	1.21	<0.001	–0.05	1.05
Sphyraenidae	*Sphyraena forsteri*	<0.001	59.47	1.02	<0.001	–34.30	1.15
Squalidae	*Squalus megalops*	<0.001	19.51	1.05	<0.001	–48.18	1.30

316 **Supplementary Table S1:** The raw data for fish measured at Réunion Island between 2000 and 2021 for purposes of calculating length–weight, total length—standard length and total weight—gutted weight relationships

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Supplementary Table S2: Number of each fish species sampled at Réunion Island by each modality (sex, sampling quarter and sampling year). Ind. = indeterminate

Family	Species	Sex			Quarter				Year										
		M	F	Ind	Q1	Q2	Q3	Q4	2000	2011	2012	2014	2015	2016	2017	2018	2019	2020	2021
Acanthuridae	*Acanthurus blochii*	3	2	0	3	1	0	1	0	0	0	0	0	0	1	0	2	2	0
	Acanthurus dussumieri	12	11	4	13	1	4	9	0	0	0	0	1	0	12	2	2	10	0
	Acanthurus guttatus	30	30	3	15	2	7	39	0	0	0	0	2	9	29	10	3	10	0
	Acanthurus nigrofuscus	8	16	10	12	0	14	8	0	0	0	0	17	16	0	0	0	1	0
	Acanthurus tennentii	10	2	2	2	4	0	8	0	0	0	0	2	1	5	1	0	5	0
	Acanthurus triostegus	212	222	95	107	44	46	332	0	0	0	0	85	36	37	16	226	96	33
	Ctenochaetus striatus	8	7	14	9	3	2	15	0	0	0	0	0	1	11	4	7	2	4
	Naso elegans	37	15	4	10	8	20	18	0	0	0	0	24	5	4	8	10	5	0
	Naso hexacanthus	8	2	3	12	0	1	0	0	0	0	0	0	6	0	1	0	0	6
	Naso unicornis	92	60	11	28	29	59	47	0	0	0	0	50	11	15	38	22	27	0
	Zebrasoma desjardinii	1	4	1	1	0	1	4	0	0	0	0	0	1	0	2	2	1	0
Apogonidae	*Ostorhinchus taeniophorus*	0	4	1	3	0	2	0	0	0	0	0	0	0	2	2	0	1	0
Atherinidae	*Atherinomorus lacunosus*	2	18	57	0	0	77	0	0	0	0	0	0	0	0	0	77	0	0
Aulostomidae	*Aulostomus chinensis*	0	1	5	6	0	0	0	0	0	0	0	0	5	0	0	1	0	0
Balistidae	*Rhinecanthus aculeatus*	8	2	2	5	5	2	0	0	0	0	0	1	0	0	5	5	0	1
Belonidae	*Tylosurus crocodilus*	1	2	4	4	0	0	3	0	0	0	0	0	4	1	0	2	0	0
Berycidae	*Beryx decadactylus*	19	27	2	4	5	15	24	0	17	0	26	5	0	0	0	0	0	0
Bramidae	*Eumegistus illustris*	54	67	12	11	23	67	32	0	18	1	102	11	0	0	0	0	1	0
Carangidae	*Caranx melampygus*	24	9	0	29	1	0	3	0	0	0	1	0	0	1	0	0	16	15
	Caranx sexfasciatus	1	1	3	0	0	0	5	0	0	0	0	1	1	3	0	0	0	0
	Decapterus tabl	22	28	6	18	15	7	16	0	0	0	28	28	0	0	0	0	0	0
	Selar crumenophthalmus	0	0	24	24	0	0	0	0	0	0	0	0	17	7	0	0	0	0
Centrophoridae	*Centrophorus moluccensis*	29	27	0	10	13	19	14	0	6	0	38	12	0	0	0	0	0	0
Chaetodontidae	*Chaetodon lunula*	0	3	2	0	0	0	5	0	0	0	0	1	0	0	0	2	2	0
Cirrhitidae	*Cirrhitus pinnulatus*	42	24	3	61	0	0	8	0	0	0	2	1	1	55	4	0	1	5
Congridae	*Conger cinereus*	2	3	2	5	0	0	2	0	0	0	0	0	3	0	0	1	3	0
Diodontidae	*Diodon hystrix*	3	2	1	2	1	1	2	0	0	0	0	0	0	2	2	2	0	0
Fistulariidae	*Fistularia commersonii*	0	18	3	7	13	1	0	0	0	0	0	0	4	0	2	11	3	1
Gempylidae	*Promethichthys prometheus*	28	53	5	21	4	18	43	0	3	1	62	16	0	0	0	0	4	0

	Rexea prometheoides	16	114	2	33	28	20	51	0	31	0	57	43	0	0	0	0	0	1
	Thyrsitoides marleyi	9	24	3	3	11	6	16	0	11	0	20	5	0	0	0	0	0	0
Holocentridae	*Myripristis berndti*	59	51	7	65	3	14	35	0	0	0	13	10	14	27	18	8	27	0
	Myripristis chryseres	45	37	2	13	9	33	29	0	0	0	45	18	0	0	0	0	20	1
	Myripristis hexagona	6	7	0	0	0	0	13	0	0	0	0	0	0	0	0	13	0	0
	Myripristis kuntee	3	6	0	9	0	0	0	0	0	0	0	0	0	0	3	0	6	0
	Myripristis murdjan	21	41	4	48	0	8	10	0	0	0	6	2	17	8	21	3	8	1
	Ostichthys kaianus	16	21	2	9	12	6	12	0	4	0	19	15	0	0	0	0	1	0
	Sargocentron spiniferum	12	22	3	12	8	11	6	0	0	0	0	2	1	4	7	12	8	3
	Sargocentron tiere	10	12	4	15	0	3	8	0	0	0	1	3	4	2	4	3	9	0
Kuhliidae	*Kuhlia mugil*	0	0	32	32	0	0	0	0	0	0	0	0	5	0	2	0	25	0
Kyphosidae	*Kyphosus bigibbus*	14	12	0	17	1	5	3	0	0	0	2	2	10	4	3	1	4	0
	Kyphosus cinerascens	19	13	0	14	0	5	13	0	0	0	1	4	12	2	9	4	0	0
	Kyphosus vaigiensis	17	7	1	8	4	3	10	0	0	0	0	3	1	8	4	5	1	3
Labridae	*Anampses caeruleopunctatus*	3	5	0	2	0	2	4	0	0	0	0	1	5	1	0	1	0	0
	Cheilinus trilobatus	13	55	8	19	19	10	28	0	0	0	0	4	6	6	22	18	19	1
	Coris aygula	2	5	2	5	2	1	1	0	0	0	0	0	2	5	1	1	0	0
	Thalassoma trilobatum	5	0	4	6	0	1	2	0	0	0	0	0	5	1	3	0	0	0
Lethrinidae	*Gnathodentex aureolineatus*	10	27	6	19	1	4	19	0	0	0	0	8	6	3	2	3	21	0
	Gymnocranius griseus	4	9	12	11	4	1	9	0	0	0	0	0	1	1	0	8	10	5
	Lethrinus rubrioperculatus	10	42	1	27	9	6	11	0	0	0	0	0	14	0	1	0	15	23
	Monotaxis grandoculis	0	6	2	2	2	2	2	0	0	0	0	1	1	0	2	0	3	1
Lutjanidae	*Aphareus furca*	9	3	0	4	4	3	1	0	0	0	0	1	0	3	2	0	5	1
	Aphareus rutilans	67	47	2	76	21	15	4	0	0	0	0	0	0	0	0	0	76	40
	Aprion virescens	20	11	1	19	1	7	5	0	0	0	0	0	7	0	0	0	14	11
	Etelis carbunculus	830	737	41	354	404	259	591	0	138	2	795	458	0	0	2	0	175	38
	Etelis coruscans	67	69	10	30	50	29	37	0	7	0	94	35	0	0	0	0	5	5
	Etelis radiosus	11	2	1	2	2	9	1	0	0	0	10	2	0	0	0	0	2	0
	Lutjanus bengalensis	6	19	0	9	10	1	5	0	0	0	0	0	0	0	0	0	12	13
	Lutjanus fulvus	3	3	0	5	1	0	0	0	0	0	0	0	1	0	2	0	3	0
	Lutjanus kasmira	267	313	10	191	121	170	108	0	0	0	57	60	23	1	13	0	342	94
	Lutjanus notatus	152	145	1	62	60	75	101	0	0	0	77	62	0	0	0	0	122	37

	Paracaesio xanthura	4	5	0	1	0	7	1	0	0	0	3	0	0	0	2	0	3	1
	Pristipomoides argyrogrammicus	292	303	13	153	174	73	208	0	50	0	274	180	0	0	0	0	79	25
	Pristipomoides auricilla	3	7	0	3	1	3	3	0	0	0	3	3	0	0	0	0	4	0
	Pristipomoides filamentosus	97	171	22	98	50	56	86	0	1	0	54	30	0	0	0	0	161	44
	Pristipomoides multidens	104	97	0	47	60	48	46	0	0	0	142	51	0	0	0	0	8	0
	Pristipomoides zonatus	2	3	2	2	3	2	0	0	0	0	4	1	0	0	0	0	2	0
Malacanthidae	*Branchiostegus doliatus*	16	15	2	6	8	6	13	0	10	0	15	7	0	0	0	0	1	0
Monacanthidae	*Cantherhines dumerilii*	25	25	6	14	8	4	30	0	0	0	0	4	7	7	4	20	14	0
Mullidae	*Mulloidichthys flavolineatus*	44	41	303	263	69	6	21	0	0	0	0	5	7	5	32	70	155	85
	Mulloidichthys pfluegeri	23	28	0	35	2	6	8	0	0	0	0	0	1	0	0	1	22	27
	Mulloidichthys vanicolensis	6	12	14	10	12	2	8	0	0	0	0	2	5	1	1	7	16	0
	Parupeneus barberinus	2	9	4	1	6	0	8	0	0	0	0	0	1	0	8	2	4	0
	Parupeneus ciliatus	3	2	4	5	1	3	0	0	0	0	0	2	0	1	2	4	0	0
	Parupeneus cyclostomus	2	6	6	3	4	4	3	0	0	0	0	0	1	2	0	1	5	5
	Parupeneus macronemus	5	5	2	2	2	2	6	0	0	0	0	1	3	1	4	2	1	0
	Parupeneus macronemus	2	2	3	3	0	3	1	0	0	0	0	0	0	0	0	0	4	3
	Parupeneus pleurostigma	4	2	3	2	0	5	2	0	0	0	0	0	0	0	0	0	6	3
	Parupeneus rubescens	1	4	4	3	4	1	1	0	0	0	0	0	1	0	0	2	3	3
	Parupeneus spp.	1	0	32	1	24	8	0	0	0	0	0	0	0	0	0	0	0	33
	Parupeneus trifasciatus	95	110	47	67	29	48	108	0	0	0	3	33	35	40	37	34	63	7
Muraenidae	*Gymnothorax flavimarginatus*	0	5	3	6	1	0	1	0	0	0	0	0	4	0	0	4	0	0
	Gymnothorax javanicus	3	3	1	0	2	0	5	0	0	0	1	0	0	2	0	3	1	0
	Gymnothorax undulatus	3	10	3	8	3	2	3	0	0	0	0	3	3	0	5	4	1	0
Polymixiidae	*Polymixia berndti*	17	45	8	16	17	8	29	0	31	0	21	15	0	0	0	0	0	3
	Polydactylus sexfilis	42	22	29	85	1	0	7	0	0	0	0	1	27	31	0	33	1	0
	Polydactylus sextarius	0	0	11	11	0	0	0	0	0	0	0	0	0	0	0	11	0	0
	Polymixia berndti	17	45	8	16	17	8	29	0	31	0	21	15	0	0	0	0	0	3
Pomacentridae	*Abudefduf septemfasciatus*	20	6	0	10	4	1	11	0	0	0	0	1	2	2	5	10	6	0
	Stegastes limbatus	2	3	2	7	0	0	0	0	0	0	0	0	6	0	0	0	0	1
Priacanthidae	*Cookeolus japonicus*	5	3	0	1	1	2	4	0	1	0	5	1	0	0	0	0	1	0
	Heteropriacanthus cruentatus	8	7	5	17	1	1	1	0	0	0	0	0	4	8	5	1	1	1

	Priacanthus hamrur	9	11	0	13	2	5	0	0	0	0	6	3	1	2	6	0	2	0
Scaridae	*Calotomus carolinus*	26	39	2	32	4	8	23	0	0	0	0	6	19	8	8	12	12	2
	Chlorurus enneacanthus	72	85	4	28	34	39	60	0	0	0	0	0	0	8	30	48	75	0
	Chlorurus sordidus	14	1	2	11	5	1	0	0	0	0	0	0	6	8	0	1	2	0
	Scarus caudofasciatus	3	2	1	0	1	2	3	0	0	0	0	0	0	1	5	0	0	0
	Scarus falcipinnis	7	7	2	3	8	0	5	0	0	0	0	0	0	3	1	7	5	0
	Scarus ghobban	6	2	1	3	2	1	3	0	0	0	0	3	1	1	0	3	1	0
	Scarus globiceps	14	3	1	4	0	7	7	0	0	0	3	3	0	5	5	0	2	0
	Scarus psittacus	65	42	4	50	20	10	31	0	0	0	0	6	3	7	44	24	27	0
	Scarus russelii	5	12	3	2	2	1	15	0	0	0	0	0	0	16	2	1	0	1
	Scarus scaber	5	13	2	4	4	9	3	0	0	0	0	0	0	3	6	0	10	1
Scorpaenidae	*Neoscorpaena nielseni*	1	3	2	2	2	1	1	0	2	0	1	1	0	0	0	0	2	0
	Pontinus nigerimum	12	15	9	12	11	4	9	0	9	1	12	14	0	0	0	0	0	0
Serranidae	*Aulacocephalus temminckii*	2	4	1	1	2	3	1	0	0	0	4	1	0	0	0	0	2	0
	Cephalopholis aurantia	48	137	13	49	40	80	29	0	0	0	1	5	13	0	0	0	107	72
	Cephalopholis nigripinnis	10	19	1	6	1	13	10	0	0	0	2	0	14	1	0	1	9	3
	Cephalopholis spiloparaea	17	23	0	6	11	21	2	0	0	0	0	0	0	0	1	0	26	13
	Epinephelus fasciatus	21	209	2	55	49	105	23	0	0	0	0	1	4	0	1	0	140	86
	Epinephelus flavocaeruleus	4	2	0	2	1	2	1	0	0	0	0	1	1	0	0	2	1	1
	Epinephelus hexagonatus	63	206	42	141	2	11	157	0	0	0	11	2	109	36	113	12	13	15
	Epinephelus macrospilos	0	11	1	4	5	2	1	0	0	0	0	1	0	2	3	0	3	3
	Epinephelus merra	16	107	10	20	29	41	43	0	0	0	0	8	17	10	38	34	13	13
	Epinephelus morrhua	0	5	0	3	0	0	2	0	0	0	0	3	0	0	0	0	2	0
	Hyporthodus octofasciatus	1	2	2	2	0	0	3	0	2	0	1	2	0	0	0	0	0	0
	Epinephelus radiatus	5	76	2	20	29	15	19	0	3	0	43	34	0	0	0	0	3	0
	Epinephelus tauvina	22	38	10	22	25	10	13	0	0	0	1	5	2	2	6	8	42	4
	Variola albimarginata	19	60	1	67	3	7	3	0	0	0	0	0	1	0	0	0	27	52
	Variola louti	11	24	0	15	8	8	4	0	0	0	0	7	3	4	3	0	6	12
Siganidae	*Siganus argenteus*	5	10	3	2	2	6	8	0	0	0	0	2	9	0	2	4	1	0
Sparidae	*Argyrops filamentosus*	34	22	5	18	16	11	16	0	2	0	35	22	0	0	0	0	2	0
Sphyraenidae	*Sphyraena forsteri*	4	4	0	4	1	0	3	0	0	0	0	0	0	0	1	0	6	1
Squalidae	*Squalus megalops*	269	378	2	122	249	110	168	0	222	1	293	123	0	0	0	0	5	5

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Supplementary Table S3: Parameters '*a*' and '*b*' for the relationship between total weight and body length, by sex, for each fish species sampled off Réunion Island that showed significant sexual dimorphism. *n* = sample size

Family	Species	Female					Male				
		n	*a*		*b*		*n*	*a*		*b*	
			Value	SD	Value	SD		Value	SD	Value	SD
Acanthuridae	*Naso elegans*	15	1.77E+00	7.48E–01	2.08	0.10	37	3.44E–01	1.18E–01	2.36	0.07
Carangidae	*Decapterus tabl*	28	2.42E–03	1.05E–03	3.26	0.10	22	4.78E–03	2.65E–03	3.13	0.15
Centrophoridae	*Centrophorus moluccensis*	27	6.51E–04	2.33E–04	3.33	0.07	29	2.41E–03	1.46E–03	3.11	0.14
Lutjanidae	*Lutjanus notatus*	145	1.20E–02	2.88E–03	3.05	0.05	152	1.14E–02	2.67E–03	3.06	0.05
Mullidae	*Mulloidichthys pfluegeri*	28	5.14E–03	1.04E–03	3.15	0.04	23	4.16E–03	2.43E–03	3.20	0.15
Scaridae	*Scarus falcipinnis*	7	1.84E–02	1.39E–02	3.02	0.26	7	1.63E–02	9.73E–03	3.03	0.17
Scaridae	*Scarus russelii*	12	5.84E–03	2.65E–03	3.22	0.11	5	1.38E–02	2.94E–03	3.09	0.04
Serranidae	*Epinephelus fasciatus*	209	9.03E–03	1.18E–03	3.09	0.03	21	2.48E–03	1.37E–03	3.33	0.15
Squalidae	*Squalus megalops*	378	2.46E–03	4.26E–04	3.12	0.03	269	6.14E–03	1.19E–03	2.96	0.04