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Length-weight Relationship of Fishes from Coral Reefs and Lagoons of New Caledonia - An Update

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Abstract

Length-weight relationships of 316 reef and lagoon fish from New Caledonia (SW Pacific Ocean) belonging to 68 families are computed. A total of 43 750 individuals was used for this purpose. Fish were sampled by different techniques, such as rotenone poisoning, handline and bottom longline fishing, gill and trammel nets, and trawling in various biotopes (coral reefs, lagoon bottoms and mangroves).

Introduction

For the last 15 years, the ORSTOM Centre of Nouméa has conducted stock estimates of lagoon fish in New Caledonia. For most of these studies, underwater visual censuses (UVC) are used to estimate densities and biomasses of a large spectrum of fish species (Kulbicki 1988, 1997; Letourneur et al. 1997a; Wantiez et al. 1997). In order to make biomass estimates it is necessary to know the length-weight relationships of the species studied. These relationships are es-

timated from specimens obtained by experimental fishing in various biotopes.

The present work is an update of the work presented by Kulbicki et al. (1993). The previous work on New Caledonian reef and lagoon fish gave length-weight relationships for 279 coral reef and lagoonal species based on data from New Caledonia. This work had also cited literature on relationships for 56 species occurring in New Caledonia but based on data from other Indo-Pacific locations. The present update takes into ac-

count 9 300 new specimens (on a total of 43 700 individuals). The aim is both to improve previous length-weight relationships of reef and lagoon fish, and to add relationships for a number of species for which no previous information was available from New Caledonia. Most of this new information comes from the northern lagoons of New Caledonia which had previously never been sampled (Labrosse et al. 1996, 1997; Letourneur et al. 1997b), and from studies on juvenile fishes (Rossier and Kulbicki, unpublished data).



Materials and Methods

Fish were caught by different methods: rotenone poisoning, handline and bottom longline fishing, gillnet and trammel nets and trawls. Spearfishing was also used in some circumstances, mainly on coral reefs. Nets were mainly used in mangrove areas, whereas handlines were mainly used near the reefs, and both longlines and trawls on the bottom of the lagoon.

Fork length was the measure taken for all species, except for some particular cases: total length for sharks, standard length for Anguilliform fish, and disk width for rays. The sexes are not differentiated here, although we are aware that males and females may have different length-weight relationships.

The parameters *a* and *b* of relationships of the form

$$W = a \cdot L^b \quad \dots 1)$$

were estimated through logarithmic transformation, i.e.,

$$\ln W = \ln a + b \ln L \quad \dots 2)$$

with *a* and *b* estimated by ordinary least squares regression; *L* and *W* are length in cm and weight in g, respectively.

Results and Discussion

The results are presented in Table 1. The identifications are essentially based on Rivaton et al. (1989) with recent updates in the literature being taken into account. Species are arranged by families according to Eschmeyer (1990), and species within each family are presented alphabetically. The present data set covers 316 species, which represents an addition of 37 species compared to the previous work of Kulbicki et al. (1993). This updated data set also gives additional information on 191 out of

the 279 species from the previous study, resulting in a larger range of fish size and better values of the correlation coefficient (*r*) for the log-transformed L-W pairs.

Our present knowledge suggests that the ichthyofauna of the New Caledonian lagoons comprises approximately 1 500 fish species in the 0-80 m depth range (Kulbicki and Rivaton 1997). Thus, despite the relatively high number of species for which L-W relationships are now available, still much needs to be known on the smaller species, mainly from coral reefs. These species are probably not major contributors to total biomass, but might play a significant role in trophodynamic processes and fish production. Additional sampling is underway to complete this data set. Those interested in information at the family or genus level should contact the second author directly.

Table 1. Length-weight relationships of 306 species of fish occurring in New Caledonia. Fish names in parentheses indicate previous misidentifications in Kulbicki et al. (1993).

Fish taxa	a	b	Length range		Length type
			L _{min}	L _{max}	
Carcharhinidae					
<i>Carcharhinus amblyrhynchos</i>	0.0088	3.050	45.1	120	TL
<i>Carcharhinus sorrah</i>	0.0285	2.239	29	91	TL
<i>Triaenodon obesus</i>	0.0014	3.382	52	108	TL
Sphymidae					
<i>Sphyma lewini</i>	0.0056	3.163	38	77	TL
Dasyatidae					
<i>Dasyatis kuhlii</i>	0.0340	2.989	17	49.5	WD
Elopidae					
<i>Elops machnata</i>	0.0277	2.675	18.5	85	FL
Megalopidae					
<i>Megalops cyprinoides</i>	0.0136	3.005	17	47	FL
Albulidae					
<i>Albula vulpes</i>	0.0341	2.745	39	78	FL
Muraeniade					
<i>Thyrsoidea macrura</i>	0.0108	2.325	22	260	SL
Muraenesocidae					
<i>Muraenesox bagio</i>	0.0032	2.781	56	106	SL
Clupeidae					
<i>Anodontostoma chacunda</i>	0.0207	3.039	3.5	24	FL
<i>Herklotsichthys quadrimaculatus</i>	0.0125	3.005	5	10.5	FL
<i>Sardinella fijiense</i>	0.0159	2.980	5.5	15.5	FL
Engraulidae					
<i>Thyssa baelama</i>	0.0048	3.317	5	11.5	FL
Chirocentridae					
<i>Chirocentrus dorab</i>	0.0520	2.391	32.5	63	FL
Chanidae					
<i>Chanos chanos</i>	0.0073	3.251	14.5	35	FL

continued

Table 1. (continued)

Fish taxa	a	b	Length range		Length type
			L _{min}	L _{max}	
Synodontidae					
<i>Saurida gracilis</i>	0.0062	3.178	7	21.2	FL
<i>Saurida nebulosa</i>	0.0062	3.183	8	18.5	FL
<i>Saurida undosquomus</i>	0.0116	2.933	6.5	33	FL
<i>Synodus dermatogenys</i>	0.0066	3.201	8	18	FL
<i>Synodus hoshinonis</i>	0.0034	3.409	9	19	FL
<i>Synodus variegatus</i>	0.0050	3.316	5	22.2	FL
Belonidae					
<i>Strongylura incisa</i>	0.0146	2.445	36.5	72.5	FL
<i>Strongylura leilura</i>	0.0098	2.515	43.5	75	FL
<i>Strongylura urvilli</i>	0.0006	3.298	29	73.5	FL
<i>Tylosurus crocodilus</i>	0.0008	3.205	29.5	88	FL
Atherinidae					
<i>Atherinomorus lacunosus</i>	0.0099	3.090	6.5	13	FL
Holocentridae					
<i>Myripristis berndti</i>	0.0289	2.988	4.5	22.5	FL
<i>Myripristis kuntee</i>	0.0206	3.151	6	14	FL
<i>Myripristis botche</i>	0.0256	3.070	4	19.5	FL
<i>Myripristis pralinia</i>	0.0241	3.069	5	15	FL
<i>Myripristis violacea</i>	0.0411	2.903	3.5	17	FL
<i>Neoniphon argenteus</i>	0.0337	2.802	4.5	16.5	FL
<i>Neoniphon sammara</i>	0.0310	2.842	4.5	19	FL
<i>Sargocentron diadema</i>	0.0286	2.895	5	15	FL
<i>Sargocentron rubrum</i>	0.1874	2.294	1	23	FL
<i>Sargocentron spiniferum</i>	0.0236	2.981	11.5	31.5	FL
Fistularidae					
<i>Fistularia petimba</i>	0.0003	3.158	19	44	FL
Scorpaenidae					
<i>Dendrochirus brachypterus</i>	0.0128	3.201	4	12	TL
<i>Scorpaenodes guamensis</i>	0.0230	2.986	4	3.5	TL
<i>Inimicus didactylus</i>	0.0251	2.829	6.5	21.5	TL
Platycephalidae					
<i>Onigocia spinosa</i>	0.0396	2.418	6	19	TL
<i>Onigocia macrolepis</i>	0.0280	2.584	6	17	TL
<i>Cymbacephalus staigeri</i>	0.0041	3.205	19.5	52	TL
Serranidae					
<i>Anyperodon leucogrammicus</i>	0.0032	3.328	30.5	51	TL
<i>Cephalopholis argus</i>	0.0186	2.987	25.5	44	TL
<i>Cephalopholis boenak</i>	0.0142	3.039	5.5	30.5	TL
<i>Cephalopholis miniata</i>	0.0256	2.864	23	45	TL
<i>Cephalopholis sonnerati</i>	0.0145	3.058	24	50	TL
<i>Epinephelus areolatus</i>	0.0141	2.984	6	42.5	FL
<i>Epinephelus caeruleopunctatus</i>	0.0213	2.907	3.5	69	TL
<i>Epinephelus coioides</i>	0.0105	3.084	6.5	111	TL
<i>Epinephelus cyanopodus</i>	0.0135	3.061	9.5	76	TL
<i>Epinephelus fasciatus</i>	0.0229	2.877	10	33.5	TL
<i>Epinephelus fuscoguttatus</i>	0.0126	3.066	18.5	100	TL
<i>Epinephelus howlandi</i>	0.0211	2.877	8.4	36	TL
<i>Epinephelus macrospilos</i>	0.0136	3.021	11	41	TL
<i>Epinephelus maculatus</i>	0.0144	2.990	6.5	60.5	TL
<i>Epinephelus malabaricus</i>	0.0128	3.034	8.5	128	TL
<i>Epinephelus merra</i>	0.0236	2.824	6	25	TL
<i>Epinephelus ongus</i>	0.0216	2.887	8.5	37	TL
<i>Epinephelus polyphkadion</i> (<i>E. microdon</i>)	0.0124	3.057	17	61	TL
<i>Epinephelus rivulatus</i>	0.0221	2.892	16	36.5	TL
<i>Plectropomus leopardus</i>	0.0119	3.057	24	91	FL
<i>Pseudonthias hypselosoma</i>	0.0154	3.085	5	9.5	FL
<i>Variola louti</i>	0.0120	3.081	22	66	FL
Pseudochromidae					
<i>Cypho purpurascens</i>	0.0167	2.863	4	8.1	TL
<i>Assessor macneilli</i>	0.0245	2.636	4.3	7	FL
Ambassidae					
<i>Ambassis interrupta</i>	0.0328	2.793	5.5	7.5	FL

continued

Table 1. (continued)

Fish taxa	a	b	Length range		Length type
			L _{min}	L _{max}	
Terapontidae					
<i>Terapon jarbua</i>	0.0154	3.082	2	28.5	FL
Kuhliidae					
<i>Kuhlia marginata</i>	0.0133	3.121	4	17.5	FL
Priacanthidae					
<i>Priacanthus hamrur</i>	0.0325	2.775	4.5	38	FL
Apogonidae					
<i>Apogon angustatus</i>	0.0233	2.937	2.6	16	FL
<i>Apogon aureus</i>	0.0081	3.409	6.2	12	FL
<i>Apogon bandanensis</i>	0.0228	2.966	4.5	8.5	FL
<i>Apogon cyanosoma</i>	0.0323	2.719	4	6.5	FL
<i>Apogon doederleini</i>	0.0124	3.284	3.5	9.4	FL
<i>Apogon ellioti</i>	0.0246	2.832	5.5	13	TL
<i>Apogon exostigma</i>	0.0205	2.985	4	10	FL
<i>Apogon fraenatus</i>	0.0161	3.054	3.5	11	FL
<i>Apogon fuscus</i>	0.0464	2.643	4	15	FL
<i>Apogon hyalosoma</i>	0.0092	3.347	6	15	FL
<i>Apogon kallopterus</i>	0.0147	3.134	4.5	12	FL
<i>Apogon lateralis</i>	0.0255	2.857	3.5	8.5	FL
<i>Apogon nigrofasciatus</i>	0.0121	3.324	3.5	8	FL
<i>Apogon trimaculatus</i>	0.0956	2.344	2	15.5	FL
<i>Archamia lineolata</i>	0.0170	2.991	6	7.5	FL
<i>Archamia fucato</i>	0.0199	2.921	6	8.5	FL
<i>Archamia zosterophora</i>	0.0313	2.697	5.5	7.5	FL
<i>Cheilodipterus macrodon</i>	0.0041	3.577	6	12.5	FL
<i>Cheilodipterus quinquelineatus</i>	0.0163	3.004	3.5	11	FL
<i>Cheilodipterus singapurensis</i>	0.0028	3.717	9	13.5	FL
<i>Fowleria marmorata</i>	0.0032	2.942	4	7.5	TL
<i>Fowleria variegata</i>	0.0185	3.191	3	6.5	TL
Sillaginidae					
<i>Sillago ciliata</i>	0.0037	3.304	15.5	31	FL
<i>Sillago sihama</i>	0.00586	3.130	3.5	29	FL
Echeneidae					
<i>Echeneis naucrates</i>	0.00102	3.290	14	88	TL
Carangidae					
<i>Atule mate</i>	0.0213	2.859	10	26.5	FL
<i>Carangoides caeruleopinnatus</i>	0.0354	2.870	32	51	FL
<i>Carangoides chrysophrys</i>	0.0281	2.886	12.5	60	FL
<i>Carangoides ferdau</i>	0.0456	2.792	24.5	60.5	FL
<i>Carangoides fulvoguttatus</i>	0.0461	2.705	16	81	FL
<i>Carangoides gymnotethus</i>	0.0468	2.743	8.5	86	FL
<i>Carangoides hedlandensis</i>	0.0413	2.839	9.5	32	FL
<i>Carangoides orthogrammus</i>	0.0175	2.994	28	62	FL
<i>Caranx ignobilis</i>	0.0151	3.086	7	87	FL
<i>Caranx melampygus</i>	0.0235	2.920	5.5	54	FL
<i>Caranx papuensis</i>	0.0249	2.910	6.5	65	FL
<i>Decapterus russelli</i>	0.0146	2.948	11.5	30	FL
<i>Gnathanodon speciosus</i>	0.0194	3.008	4	74.5	FL
<i>Scomberoides lysan</i>	0.0117	2.896	11.5	55.5	FL
<i>Scomberoides tol</i>	0.0174	2.746	3.5	28	FL
<i>Selar crumenophthalmus</i>	0.0187	2.982	18	27.5	FL
Leiognathidae					
<i>Gazza minuta</i>	0.0367	2.831	2.5	21	FL
<i>Leiognathus bindus</i>	0.1060	2.190	3	9	FL
<i>Leiognathus equulus</i>	0.0296	2.944	2.5	20	FL
<i>Leiognathus fasciatus</i>	0.0212	3.072	5	15.5	FL
<i>Leiognathus leuciscus</i>	0.0069	3.505	5	9	FL
<i>Leiognathus rivulatus</i>	0.0406	2.653	6	10	FL
<i>Leiognathus splendens</i>	0.0393	2.803	4.5	11.5	FL
<i>Secutor ruconius</i>	0.0533	2.563	3.5	6.5	FL
Lutjanidae					
<i>Aprion virescens</i>	0.0255	2.870	22.5	88	FL
<i>Lutjanus adetii</i>	0.0070	3.268	18.5	46	FL
<i>Lutjanus argentimaculatus</i>	0.0336	2.792	5.5	67.5	FL
<i>Lutjanus bohar</i>	0.0170	3.035	4	75	FL

continued

Table 1. (continued)

Fish taxa	a	b	Length range		Length type
			L _{min}	L _{max}	
<i>Lutjanus fulviflammus</i>	0.0239	2.906	5	37	FL
<i>Lutjanus fulvus</i>	0.0243	2.928	4	31	FL
<i>Lutjanus gibbus</i>	0.0153	3.091	15.5	40.5	FL
<i>Lutjanus kasmira</i>	0.0117	3.136	4	26	FL
<i>Lutjanus lutjanus</i>	0.0201	2.932	8.5	28	FL
<i>Lutjanus monostigma</i>	0.0184	2.970	25	43.5	FL
<i>Lutjanus quinquelineatus</i>	0.0296	2.851	5.5	23	FL
<i>Lutjanus russellii</i>	0.0201	2.907	9.5	37	FL
<i>Lutjanus sebae</i>	0.0128	3.128	24.5	77	FL
<i>Lutjanus vitta</i>	0.0169	2.978	6	38.5	FL
<i>Symphorus nematophorus</i>	0.0303	2.874	44.5	92	FL
Caesionidae					
<i>Caesio caerulea</i>	0.0221	2.946	8.5	21	FL
<i>Pterocaesio diagramma</i>	0.0079	3.283	8	15.5	FL
<i>Pterocaesio trilineata</i>	0.0124	3.112	6	14	FL
Gerreidae					
<i>Gerres filamentosus</i>	0.0266	2.966	5	23	FL
<i>Gerres ovulatus</i>	0.0238	2.986	3	19	FL
<i>Gerres oyena</i>	0.0120	3.232	4	20	FL
Haemulidae					
<i>Diagramma pictum</i>	0.0151	2.979	7	75	FL
<i>Plectorhinchus chaetodonoides</i>	0.0148	3.083	14	53.5	FL
<i>Plectorhinchus gibbosus</i>	0.0398	2.761	7	38	TL
<i>Plectorhinchus goldmanni</i>	0.0137	3.054	19.5	44	FL
<i>Plectorhinchus obscurum</i>	0.0304	2.853	17.5	55.5	FL
<i>Plectorhinchus picus</i>	0.0144	3.030	36	54.5	FL
<i>Pomadasy argenteus</i>	0.0195	2.943	4	43	FL
Sparidae					
<i>Acanthopagrus berda</i>	0.0238	3.022	5	36	FL
Lethrinidae					
<i>Gnathodentex aurolineatus</i>	0.0217	2.986	8.5	20.5	FL
<i>Gynocranius euanus</i> (<i>G. lethrinoides</i>)	0.0263	2.958	10	49	FL
<i>Gynocranius grandoculis</i> (<i>G. rivulatus</i>)	0.0336	2.870	16	67.5	FL
<i>Lethrinus atkinsoni</i> (<i>L. mahsena</i>)	0.0216	3.000	5.7	45.5	FL
<i>Lethrinus genivittatus</i> (<i>L. nematacanthus</i>)	0.0204	2.946	2.5	33	FL
<i>Lethrinus harak</i>	0.0178	3.026	6	32	FL
<i>Lethrinus lentjan</i>	0.0274	2.886	6.5	44.5	FL
<i>Lethrinus nebulosus</i>	0.0204	2.975	3.5	69.5	FL
<i>Lethrinus obsoletus</i> (<i>L. ramak</i>)	0.0197	2.979	11	46	FL
<i>Lethrinus olivaceus</i>	0.0351	2.808	22.5	72.5	FL
<i>Lethrinus rubrioperculatus</i>	0.0170	3.026	16.5	39.5	FL
<i>Lethrinus sermicinctus</i>	0.0134	3.072	3	29	FL
<i>Lethrinus xanthochilus</i>	0.0240	2.915	22	62.5	FL
<i>Monotaxis grandoculis</i>	0.0239	3.011	4	45	FL
Nemipteridae					
<i>Nemipterus zysron</i>	0.0103	3.167	11.5	27	FL
<i>Nemipterus peronii</i>	0.0157	3.029	16	24.5	FL
<i>Scolopsis bilineatus</i>	0.0149	3.141	4.5	19	FL
<i>Scolopsis temporalis</i>	0.0262	2.846	7	21	FL
Mullidae					
<i>Mulloidichthys flavolineatus</i>	0.0152	2.992	10	19.5	FL
<i>Parupeneus barberinus</i>	0.0151	3.078	13.5	41	FL
<i>Parupeneus ciliatus</i> (<i>P. dispirilus</i>)	0.0122	3.188	3.5	24.5	FL
<i>Parupeneus heptacanthus</i> (<i>P. pleurospilos</i>)	0.0221	2.977	5.5	23.5	FL
<i>Parupeneus indicus</i>	0.0152	3.087	3.5	36	FL
<i>Parupeneus multifasciatus</i> (<i>P. trifasciatus</i>)	0.0920	2.415	6.5	21	FL
<i>Parupeneus spirilus</i> (<i>P. signatus</i>)	0.0808	2.574	16	29.5	FL

continued

Table 1. (continued)

Fish taxa	a	b	Length range		Length type
			L _{min}	L _{max}	
<i>Upeneus moluccensis</i>	0.0171	3.021	6.5	17	FL
<i>Upeneus sulphureus</i>	0.0193	2.984	11	17	FL
<i>Upeneus fragula</i>	0.0166	2.989	3.5	24	FL
<i>Upeneus vittatus</i>	0.0081	3.309	6	24	FL
Monodactylidae					
<i>Monodactylus argenteus</i>	0.0333	2.921	2	18.5	FL
Ephippidae					
<i>Platax orbicularis</i>	0.0425	2.975	4.5	50	TL
Scatophagidae					
<i>Scatophagus argus</i>	0.0377	2.922	5	36	TL
Chaetodontidae					
<i>Chaetodon auriga</i>	0.0312	2.953	4.5	19	TL
<i>Chaetodon citrinellus</i>	0.0409	2.791	3.1	10	TL
<i>Chaetodon flavirostris</i>	0.0229	3.148	3.6	16.5	TL
<i>Chaetodon melannotus</i>	0.0380	2.921	4	12.5	TL
<i>Chaetodon mertensii</i>	0.0042	3.808	7	10	TL
<i>Chaetodon pelewensis</i>	0.0384	2.872	5	9	TL
<i>Chaetodon plebeius</i>	0.1074	2.360	2	9.5	TL
<i>Chaetodon trifascialis</i>	0.0468	2.758	3	14	TL
<i>Heniochus acuminatus</i>	0.0271	3.061	3.5	17.5	TL
<i>Heniochus chrysostomus</i>	0.0132	3.369	5	14	TL
<i>Chaetodon trifasciatus</i>	0.0448	2.828	3.5	12	TL
<i>Heniochus monoceros</i>	0.0220	3.125	9	21	TL
Pomacanthidae					
<i>Centropyge bispinosus</i>	0.1313	2.260	2	11.5	TL
<i>Centropyge tibicen</i>	0.0601	2.692	2	10.5	TL
Pomacentridae					
<i>Abudefduf sexfasciatus</i>	0.0249	3.110	6	14.5	FL
<i>Amblyglyphidodon curacao</i>	0.0413	2.886	7	9.5	FL
<i>Amphiprion akindynos</i>	0.0375	2.866	4	12.5	FL
<i>Amphiprion tricoloratus</i>	0.0470	2.813	5.5	12	FL
<i>Chromis atripectoralis</i>	0.0204	3.217	3.5	9	FL
<i>Chromis chrysurus</i>	0.0306	3.090	5.5	12	FL
<i>Chromis fumea</i>	0.0185	3.238	4.5	9	FL
<i>Chromis iomelas</i>	0.0315	2.916	3.5	8	FL
<i>Chromis tematensis</i>	0.0430	2.889	5	7.5	FL
<i>Chromis viridis</i>	0.0642	2.518	2	7	FL
(<i>C. caerulea</i>)					
<i>Chrysiptera taupou</i>	0.0377	2.702	3.5	8	FL
(<i>C. cyanea</i>)					
<i>Dascyllus aruanus</i>	0.0716	2.635	2.4	6.5	FL
<i>Dascyllus reticulatus</i>	0.0612	2.747	3.5	8	FL
<i>Neopomacentrus azysron</i>	0.0297	2.868	3.5	6.5	FL
<i>Neopomacentrus taeniurus</i>	0.0724	2.262	1.5	5	FL
<i>Neoglyphidodon polyacanthus</i>	0.0254	3.054	4	10.8	FL
<i>Pomacentrus amboinensis</i>	0.1231	2.302	2.5	10.5	FL
<i>Pomacentrus chrysurus</i>	0.0215	3.225	4.5	8.2	FL
<i>Pomacentrus lepidogenys</i>	0.0281	3.084	4.5	8	FL
<i>Pomacentrus brachialis</i>	0.0135	3.312	4	9.5	FL
<i>Pomacentrus pava</i>	0.0365	2.775	2.5	9.5	FL
<i>Pomacentrus philippinus</i>	0.0508	2.707	3.5	10	FL
<i>Pomacentrus popei</i>	0.0703	2.64	3	8	FL
<i>Pomacentrus simsiang</i>	0.0586	2.683	5	7.5	FL
<i>Pomacentrus vaiuli</i>	0.0619	2.628	2.5	8.5	FL
<i>Pristotis jerdoni</i>	0.0290	2.890	7	10	FL
<i>Stegastes nigricans</i>	0.1681	2.367	2.5	12.5	FL
Cirrihitidae					
<i>Cirrihitichthys falco</i>	0.0172	2.977	4.5	8	TL
Mugilidae					
<i>Liza macrolepis</i>	0.0167	2.962	6	29	FL
<i>Liza melinoptera</i>	0.0177	2.938	4	35.5	FL
<i>Mugil cephalus</i>	0.0117	3.064	6.5	48.5	FL
<i>Valamugil buehanani</i>	0.0119	3.050	7	60	FL
<i>Valamugil engeli</i>	0.0068	3.232	6.5	26	FL
<i>Valamugil seheli</i>	0.0065	3.250	11.5	43.5	FL
Sphyraenidae					
<i>Sphyraena barracuda</i>	0.0098	2.875	19	59.5	FL

continued

Table 1. (continued)

Fish taxa	a	b	Length range		Length type
			L _{min}	L _{max}	
<i>Sphyraena flavicauda</i>	0.0082	2.861	5.5	35.5	FL
<i>Sphyraena forsteri</i>	0.0056	3.019	8.5	60	FL
<i>Sphyraena novaehollandiae</i>	0.0296	2.464	19	28	FL
<i>Sphyraena obtusata</i>	0.0370	2.472	19	26.5	FL
<i>Sphyraena putnamiae</i>	0.0083	2.903	20	104	FL
<i>Sphyraena putnamiae</i>	0.0083	2.903	20	104	FL
<i>Sphyraena waittei</i>	0.0104	2.808	19	31	FL
Polynemidae					
<i>Polydactylus microstoma</i>	0.0202	2.970	10.5	24.5	FL
Labridae					
<i>Bodianus perditio</i>	0.0163	3.063	16.5	73	FL
<i>Cheilinus chlorourus</i>	0.0293	2.849	4.2	32	FL
<i>Chelinus undulatus</i>	0.0123	3.115	23	93	TL
<i>Cheilio inermis</i>	0.0036	3.066	5.8	23.7	TL
<i>Choerodon graphicus</i>	0.0145	3.125	4	51.5	TL
<i>Halichoeres trimaculatus</i>	0.0227	2.804	3.5	16	TL
<i>Labroides dimidiatus</i>	0.0076	3.105	4.5	10	TL
<i>Stethojulis interrupta</i>	0.0560	2.192	3.1	15.6	TL
<i>Stethojulis strigiventer</i>	0.0168	2.934	2.8	11.5	TL
<i>Thalassoma lunare</i>	0.0238	2.749	2.8	20	FL
<i>Thalassoma lutescens</i>	0.0123	3.077	4.5	16.5	FL
Scaridae					
<i>Leptoscarus vaigiensis</i>	0.0173	2.965	3.5	19.6	TL
<i>Scarus altipinnis</i>	0.0188	3.026	15.5	44.5	FL
<i>Scarus ghobban</i>	0.0169	3.049	6.8	49.5	FL
<i>Scarus microrhinos (S. gibbus)</i>	0.0273	2.930	4	53	FL
<i>Scarus niger</i>	0.0142	3.140	15	43	FL
<i>Scarus psittacus</i>	0.0222	2.982	6.1	15	FL
<i>Scarus rivulatus (S. fasciatus)</i>	0.0184	3.058	12.5	41.5	TL
<i>Scarus schlegeli</i>	0.0309	2.870	4.5	37	TL
Pinguipedidae					
<i>Parapercis cylindrica</i>	0.0143	2.950	2.5	14	TL
Blennidae					
<i>Cirripectes stigmaticus</i>	0.0207	2.906	5.5	9	TL
<i>Ecsenius bicolor</i>	0.0395	2.319	4	9.5	FL
<i>Plagiotremus rhinorhynchus</i>	0.0020	3.549	6	9.5	FL
Eleotridae					
<i>Butis amboinensis</i>	0.0156	2.626	4.5	8.5	FL
Gobiidae					
<i>Ctenotrypauchen microcephalus</i>	0.0444	2.070	4.5	11.5	TL
<i>Istigobius decoratus</i>	0.0227	2.686	5.5	11	TL
<i>Istigobius ornatus</i>	0.0106	3.086	3.8	11	TL
<i>Oxyurichthys papuensis</i>	0.0194	2.727	8	14	TL
<i>Priolepis cinctus</i>	0.0240	2.719	3.5	7	TL
Acanthuridae					
<i>Acanthurus blochii</i>	0.0178	3.144	2.5	37	FL
<i>Acanthurus dussumieri</i>	0.0554	2.799	2.5	51.5	FL
<i>Acanthurus mata</i>	0.0269	2.945	10	29.5	FL
<i>Acanthurus nigricauda</i>	0.0261	3.024	7.5	22.5	FL
<i>Acanthurus nigrofuscus</i>	0.0301	2.967	4.5	17.5	FL
<i>Acanthurus triostegus</i>	0.1317	2.392	6.5	16.5	FL
<i>Acanthurus xanthopterus</i>	0.0473	2.787	8	57	FL
<i>Ctenochaetus binotatus</i>	0.0810	2.590	8.5	15	FL
<i>Ctenochaetus striatus</i>	0.0254	3.027	3.8	21	FL
<i>Naso brevirostris</i>	0.0136	3.128	2	31.5	FL
<i>Nasa unicornis</i>	0.0216	2.988	18.5	60	FL
<i>Zebrasoma scopas</i>	0.0400	2.867	4	16	TL
<i>Zebrasoma veliferum</i>	0.0339	2.855	4	26.5	FL
Siganidae					
<i>Siganus argenteus</i>	0.0131	3.088	10	32	FL
<i>Siganus doliatus</i>	0.0143	3.164	2	22.5	FL
<i>Siganus fuscescens (S. canaliculatus)</i>	0.0161	3.010	3	29.5	TL
<i>Siganus lineatus</i>	0.0254	2.948	5.5	35	FL
Scombridae					
<i>Scomberomorus commerson</i>	0.0190	2.809	19	100	FL

continued

Table 1. (continued)

Fish taxa	a	b	Length range		Length type
			L _{min}	L _{max}	
Bothidae					
<i>Asterorhombus intermedius</i>	0.0045	3.407	7	12.5	TL
<i>Bothus pantherinus</i>	0.0038	3.475	8	18	TL
<i>Engyproponon grandisquama</i>	0.0212	2.786	5.5	11.5	TL
<i>Grammatobothus polyophthalma</i>	0.0244	2.717	11	20.5	TL
Balistidae					
<i>Abalistes stellatus</i>	0.0603	2.692	14	53.5	FL
<i>Paramonacanthus japonicus</i>	0.0557	2.470	5	17	TL
<i>Pseudalutarius nasicornis</i>	0.0137	2.980	8	13.5	TL
<i>Pseudobalistes fuscus</i>	0.2318	2.452	26	57	FL
<i>Sufflamen fraenatus</i>	0.0310	2.950	19	36.5	TL
Ostraciidae					
<i>Lactoria comuta</i>	0.0275	2.709	20.5	30	TL
<i>Ostracion cubicus</i>	0.1012	2.588	2.5	41	TL
<i>Tetrosomus gibbosus</i>	0.2731	2.229	5	26	TL
Tetraodontidae					
<i>Arothron hispidus</i>	0.0570	2.801	6.5	46	TL
<i>Arothron manillensis</i>	0.0469	2.704	3.5	33	TL
<i>Arothron stellatus</i>	0.0947	2.664	5	75	TL
<i>Canthigaster valentini</i>	0.0729	2.500	2	8.6	TL
<i>Lagocephalus sceleratus</i>	0.0194	2.904	9	71.5	FL
Diodontidae					
<i>Diadon hystrix</i>	0.2854	2.345	28	75	TL

Note: TL = Total Length; FL = Fork Length; WD = width of disk.

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